



## **A Report to the Woodland Trust**

# **A Survey of the Coverage, Use and Application of Ancient Woodland Indicator Lists in the UK**

Written and researched by:

Peter Glaves, Ian D. Rotherham, Barry Wright, Christine Handley,  
& John Birbeck

By Hallam Environmental Consultants Ltd.,  
Biodiversity and Landscape History Research Institute

and

the Geography, Tourism and Environment Change Research Unit,  
Sheffield Hallam University

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**Hallam Environmental Consultants Ltd.**  
Venture House  
105 Arundel Street  
Sheffield  
S1 2NT

Tel/Fax: 0114 2724227  
Email: [info@hallamec.plus1.com](mailto:info@hallamec.plus1.com)

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	<b>Name</b>	<b>Title</b>
<b>Authors</b>	Peter Glaves Ian Rotherham Barry Wright Christine Handley John Birbeck	Biodiversity and Landscape History Research Institute Reader, GTECRU, Sheffield Hallam University Research Associate, GTECRU, Sheffield Hallam University Project Manager, HEC Ltd. Administrator, HEC Ltd.
<b>Checked</b>	Peter Glaves	Principal Consultant, HEC Ltd.
<b>Approved</b>	Christine Handley	Project Manager, HEC Ltd

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## 1 Non-technical Summary

This report presents the results of a survey into the current use of ancient woodland indicator species lists in the UK. The idea of using species particularly vascular plants as indicators of ancient woodlands can be dated back to the 1970s and the work of Peterken. Since then a wide number of lists of Ancient Woodland Indicators (AWIs) have been produced, some based on expert opinions, some utilising field surveys, others adapted from existing lists.

Recently developed lists, e.g. the lists for Scotland, Wales and Northern Ireland have been based on either robust reviews of existing lists, and/or expert opinion and/or field surveys and statistical analysis. Concerns however have been expressed regarding the use of lists and these concerns appear to be supported by the uncritical use of indicator species in recent planning inquiries, e.g. not recognising that indicators are indicators and considering them to be the key value of a woodland.

A survey was undertaken of relevant individuals working in biological record centres, local authorities and key agencies across the UK. The survey sought to identify what lists of Ancient Woodland Indicators are currently in use, where possible to determine the methods used in developing these lists. The survey also sought to assess the awareness of ancient woodland indicator lists and review the ways in which these were used.

A total of 419 questionnaires were sent out; a response rate of 11% was obtained. Follow up phone conversations were held with key individuals involved in developing ancient woodland indicator lists. Responses were received from all counties excluding: Buckinghamshire, Cheshire, Essex, Huntingdonshire, Middlesex, Northamptonshire, Staffordshire, Wiltshire and Worcestershire. In addition, the Lancashire respondent stated there was no AWI list for Lancashire.

The key findings of the survey were:

- There is a wide variety of lists of Ancient Woodland Indicators lists available covering most of the UK.
- Most individuals using indicator lists are unaware of the methods used to produce the lists and therefore of their robustness. Some key stakeholders are unaware of the existence of indicator lists in their area.
- Attitudes to ancient woodland indicator lists are variable, as is their use.
- Few lists use species thresholds or weightings in determining whether a site is ancient, several lists are currently under review.
- There are over 200 species listed on the various Ancient Woodland Indicators lists, few species are common to more than a quarter of the lists.

## **2 Introduction**

### **2.1 Ancient Woodlands and the Evidence Used to Identify Them**

Ancient woodlands in relation to planning are defined as:

*woods which have been continuously wooded since 1600.*

Ancient woodlands have been recognised as having ecological, historical and cultural values, the values are linked to the long continuity of woodland cover.

A range of methods have been used to identify whether a woodland is ancient and woodland continuity; this includes archive data (historical maps and documents etc.) and field surveys. (See Separate Reports for methodologies). The latter includes surveys of the species present in woodlands, in particular for species which are associated with or which indicate the ancientness of a woodland; the so called Ancient Woodland Indicators (see below).

### **2.2 What is an Indicator?**

Biological indicators are species or groups of species whose presence (or in some case their character, condition or behaviour) indicate the presence or absence of particular environmental conditions. Species have been used in various ways as indicators; this includes indicators of pollution (e.g. lichens as indicators of air quality), indicators of soil condition (e.g. nettles as indicators of high levels of nitrogen) and plants as indicators of woodland continuity/ancientness.

### **2.3 Ancient Woodland Indicator Species**

Many species can be used to indicate that a site has had continuous woodland cover for a considerable length of time; these include invertebrates (such as beetles associated with dead wood), mosses and lichens, and vascular plants (i.e. flowering plants and ferns). It is the latter group i.e. ancient woodland vascular plants (AWVPs) which are most often used, as they are relatively easy to find and identify.

Analysis so far indicates that there are no vascular plant species that are exclusively found in ancient woodland, there are however a number of species who tend to occur in ancient woodlands and are less commonly found in more recent woodland (i.e., they tend to be associated with ancient woodlands).

Most ancient woodland indicator lists list species whose presence (in conjunction with other evidence) can be used to indicate ancientness. These are referred to as presence / absence indicators. Some lists are more detailed and take into account species abundance or likelihood of occurrence.

Peterken, (1974 *en seq*) suggested a number of possible reasons why a species might be more common in ancient than in recent woods, these include:

- **Slow colonists** - that Ancient Woodland Indicators have poor dispersal abilities and take many years to colonise new woodlands.
- **Intolerant of non-woodland conditions** - that they cannot survive in the dryer and more exposed conditions found outside woodlands.
- **Habitats isolation** - Ancient Woodland Indicator species were formerly more widespread but have become isolated by fragmentation and have difficulty spreading into new woods unless these are directly linked.
- **Climatic relics** – species that historically could survive and disperse into non-woodland habitats but climate change means that they are no longer able to move beyond woodlands.
- **Recent woods do not contain suitable environmental conditions** – i.e. specialised niches may take many years to evolve, e.g. veteran trees, specialised woodland micro-habitats etc.
- **Recent woods have different soils or other physical conditions** – for example recent plantations may be established on land which was previously used as farmland and their soils have been modified by such land uses and are unsuitable for ancient woodland indicator plants to grow.

In reality different factors in combination may account for why some species tend to be more frequently found in ancient woodlands.

## 2.4 Ancient Woodland Indicator Lists

People have noticed for many years that some species tend to be found in ancient woodland more than others. However the origins of the concept of Ancient Woodland Indicators (AWIs) and lists of AWIs can be dated back to the 1970s, and George Peterken's work in Lincolnshire, as published as Peterken, G.F (1974) *A method for assessing woodland flora for conservation using indicator species. Biological Conservation* 6, 239-245.

During the 1980s the conservation importance of ancient woodland became widely recognised. This was associated with development of ancient woodland inventories (of sites believed to have been wooded since 1600) and the development of lists of Ancient Woodland Indicators to help identify such sites.

Peterken's Lincolnshire list of Ancient Woodland Indicators and others developed in Kent etc. were adapted for use in other areas, leading to a proliferation of such lists in the 1980s. Kirby has collated 13 regional lists which are now available in Rose (2004) *Wild Flower Key*.

Few such lists were based on extensive field surveys or cross relating archive data on site history to species occurrence. Recent lists developed in Wales (Castle, Latham and Mileto 2008) Scotland (Crawford 2009) and Northern Ireland (Woodland Trust 2007) have sought to develop more robust verified lists. In mainland Europe, Hermy et al. (1999) have used a combination of statistical analysis of field surveys and analysis by species types to review ancient woodland species.

## 2.6 Potential Concerns about Ancient Woodland Indicator Lists

Provisional analysis of lists prior to this survey indicated that there is wide variation in the number of species listed on different Ancient Woodland Indicator lists (from 25 to over 100 species). There is also variation in the species included on such lists even on lists from neighbouring counties/areas. Few species are found on most lists.

In a number of lists local expert opinion and/or site surveys have been used to produce the lists, in other areas the origin of the lists is uncertain, and so it is therefore difficult to assess their robustness.

How ancient woodland species are used varies between lists. Some are just lists of species, others rank species in some way (for example separating out common ancient woodland species from rarer species). Some indicate threshold values (i.e. a number of species present above which a site can be considered to be ancient). Care needs to be taken in using numbers of indicator species to determine whether a site is ancient or not as a number of factors can affect the number of indicators found in a single woodland. These include:

- **Size of woodland** - generally the larger a woodland the more species found.
- **Soil type** – acid woodlands tend to contain fewer species than neutral or calcareous.
- **Altitude** – with generally fewer species and therefore indicators in upland woodlands.
- **Structural diversity** – with more species being found in woodlands with greater structural diversity (different ages of trees and gaps etc.).
- **Topographic and physical variations** - can also affect numbers of species found, as a number of indicators tend to be found in woodland microhabitats such as beside streams, on steep slopes or rocky areas etc. (Adapted from Kirby 2008).
- **Site management** – for example recent coppicing work can affect the number of species found.

### **3 Survey Methodology**

#### **3.1 Rationale**

Concern has been expressed by some workers in the field regarding the robustness of some existing ancient woodland indicator lists and the uncritical way in which some users have been applying these, for example, the perception that the indicators of ancientness are valuable in themselves rather than their value as indicators. This has been shown in surveys presented at recent planning enquires relating to ancient woodlands.

A range of anecdotal evidence has been collected but there has been no systematic wide ranging survey of the range of lists currently in use, how these lists were derived and how they are applied. Recent work on developing lists for Northern Ireland, Scotland and Wales has reviewed the existing lists (where available) and adopted a more systematic approach (see Castle, Latham and Mileto 2008, Crawford 2009 and Woodland Trust 2007).

As indicated in previous sections other concerns regarding the use of such lists to identify ancient woodlands include the lack of quantified data to support some lists and the fact that indicators vary in their specificity to ancient woodlands in different parts of the country, on different soils etc.

#### **3.2 Survey Approach**

Key individuals who have been involved in the production of ancient woodland indicator lists or who may use ancient woodland lists in their work were surveyed using an e-mail questionnaire.

The questionnaire was sent out to 419 individuals from the following stakeholder groups/roles;

- Biological record centres
- Local Authority tree officers
- Local Authority ecologists (including members of the Association of Local Authority Ecologists)
- Regional and National Biodiversity Groups
- County Biodiversity Officers
- Natural England staff and equivalents in other organisations
- Individuals who work with veteran trees and ancient woodlands, including individuals who had attended previous conferences and workshops on the topic
- Individuals who were known to have been involved in developing ancient woodland indicator lists



- BSBI County Recorders
- Community Forest Groups

The key questions covered in the questionnaire were:

- Do you know of or use lists of Ancient Woodland Indicators in your area
- Can you provide a copy of the lists you use
- Can you provide information regarding how the list was developed
- How is the list applied – i.e. threshold values
- Other comments on use.

Individuals were asked to pass on the questionnaire to other individuals if they felt they could not answer the questions. Follow up reminders were sent out to non-respondents.

A copy of the questionnaire can be found in Appendix 1.

In addition more in-depth phone or face to face interviews were held with key individuals who had developed or reviewed ancient woodland indicator lists.

### **3.3. Analysis**

The returned questionnaires and interview responses were analysed using the following four themes:

1. Geographical coverage of Ancient Woodland Indicators - gap analysis
2. Methods used to produced lists – if known (robustness analysis)
3. Use/application of lists
4. Content of the lists – species included in lists, thresholds and weightings

In analysing the geographical coverage of list of Ancient Woodland Indicators the old counties have been used as these are generally well recognised. It should be noted that lists often cover different boundaries and where a list covers all or part of a county it has been included for that county.

## 4 Results

### 4.1 Coverage of Ancient Woodland Indicator Lists

The questionnaire survey and review of existing list has identified lists for all UK counties except for the following:

Cheshire

Cumberland (list is in the process of being developed)

Gloucestershire (list for molluscs provided)

Herefordshire

Huntingdonshire

Lancashire (individuals have produced lists but no known standard list)

Northamptonshire

Staffordshire (outside the Peak District none noted)

Westmoreland

Several counties had two or three lists in use.

As noted previously some lists cover several counties, other lists cover parts of counties. For ease of analysis historical counties have been used to classify lists.

### 4.2 Methods used to Produce Lists

The following methods have been used, either on their own or in combination to produced list of Ancient Woodland Indicators:

- 1 **Ecological surveys** – various surveys were indicated, but tended to form into the following categories:
  - Specific surveys of known Ancient Woodlands (normally woodlands on ancient woodland lists), often by naturalist and wildlife groups or single individuals (one based on a degree project);
  - Collation of surveys for a wide range of sites followed by analysis of records;
  - Phase I and Phase II survey data – adapted to produce AWI lists;
  - NVC based lists.

Example responses:

*Vascular plant data was provided by County Botanical Society which maintains an extensive database of plant records for the county, 420 000 so far. The records are obtained from surveys and individuals too numerous to mention plus data from historical records, archive material and herbarium specimens.*

In most cases the number of sites surveyed to produce the lists was not indicated.

The responses showed an increasing use of lists of axiophytes and that many cases used expert opinion to modify the lists derived from field surveys, e.g.

*Our axiophyte list is partly based on the number of tetrads within which species are located which excludes some species. Exceptionally some species such as Bluebell have been retained despite it being found in greater than 25% of tetrads in the county.*

There were several references to NVC woodland community types and the species associated with these in developing ancient woodland indicator lists.

- 2 **Archive based** – less than a quarter of respondents referred to the use of archive evidence in developing lists

Example response: *surveys of documentary info & archives - All known records by recorders working in Shropshire in the past*

It should be noted that some respondents referred only to historical ecological surveys in terms of archive sources, few referred to archive data which demonstrated the ancientness of a woodland.

- 3 **Expert opinion** – expert opinion tended to be used in two ways i.e. use of a single expert or expert panel to develop the list. Experts/colleagues from within the region were used in most cases (draft lists being circulated for comment). In over a third of cases external experts were also used to either produce or refine a list. Experts included Botanical Recorders County Wildlife Site Panels,

Example responses: *Our SINC Panel, which includes local authority ecologists, representatives from Natural England, FC, EA, local WT, and importantly, also several local expert botanists, were all involved in defining the list.*

It was also noted that expert opinion was sometimes not used, e.g. *although following survey of ancient woodland inventory sites views were gathered on refining the list, this analysis was never completed but it would be a worthwhile exercise.*

4 **Adaptation of existing lists**, either for that county or list from other areas,

Example responses: *Based on the NCC Ancient Woodland Indicator List from the 1970s modified to fit Bedfordshire in consultation with BSBI recorder.*

*Use the George Peterken list, rarest species removed, ferns added.*

*Yes – adaptation – didn't follow their lists exactly – disagreed with some of their findings*

Specific reference was made to a number of key text in developing lists of Ancient Woodland Indicators including:

- Peterken G.F (1993) Woodland Management and Conservation, J.M Dent, London, in Rose, F. (1999) Indicators of Ancient Woodland: the use of vascular plants in evaluating ancient woods for nature conservation. British Wildlife 10:241-251.
- Peterken, G., (2000) Identifying ancient woodland using vascular plant indicators. British Wildlife 11: 153-158
- Kirby, K. (2004) list in Rose F (2006) The Wild Flower Key, Warne
- The Botanical Society of British Isles axiophyte lists.

Over half the respondents indicated that their Ancient Woodland Indicator Lists were derived from a combination of expert opinion and ecological surveys; with experts either developing a list or trialling a list produced by field work. For example:

*The list was initially drawn up by the Vascular Plant County Recorder with a group of (university) students, and other leading members of the County Botanical Society. Revision was later led by the County Biodiversity Officer in conjunction with the County Botanical Society plus consultation with a wide range of botanists and ecologists working in the county including individuals at Natural England*

Other a third of respondents who knew of and/or used lists were uncertain of how these lists were produced and therefore unable to comment on their robustness etc. For example:

*Not sure – I imagine the County Council would have been involved when ancient woodlands in area initially designated*

Few respondents indicated that their list (and in once case the wider Ancient Woodland selection criteria) were periodically reviewed. An interesting example of reviewing was:

*We are currently reviewing our list as it is felt that there are too many species on the list (currently 90) and that many of these are too common to be true indicators. The list has been reduced and the threshold is suggested to be 5 instead of 10. These amendments are currently waiting to be approved by the County Wildlife Site selection panel.*

#### **4.3 Awareness of and Attitude towards Ancient Woodland Indicator Lists**

It was interesting to note that just over half of the respondents were thinking critically about the ancient woodland list they were using.

Most respondents were positive about the importance of Ancient Woodlands and the use of AWI lists, e.g.

*Useful tool to aid understanding woodland history and identifying small areas of Ancient Woodland.*

A few respondents questioned the relevance of Ancient Woodland Indicators and lists of these, e.g.:

*Given our cool wet climate many species often given as AWI species are found outside woodlands (in the county). Both Bluebell and Wood Anemone occur in grasslands (Upland Hay meadow) in Lancashire and also in Bracken Beds. Also Herb Paris occurs in a number of hedgerows.*

*AWIs become irrelevant in cool wet climates. Whilst certain rare species may only be found in AW, their rarity makes them valueless. It is often the association of species rather than the presence of individual species that characterise AW. This needs to be assessed with habitat and location. The lists given in the I of AW is populated with species frequently associated with other habitats.*

*I normally use magic map (the Natural England website) and the 1872 map*

Some respondents adopted an uncritical approach to Ancient Woodlands, e.g.:

*Ancient woodlands are taken to be those which have been identified by Natural England*

*If we did use a list it would probably be from Natural England, in accordance with their Standing Advice.*

*Our list is split into BAP habitats and might not really identify true ancient woodland. We use the list to identify good quality woodland whatever the provenance. The best examples of course tend to be ancient woodland*

*I would make one (a AWI list) myself if I ever felt need for one.*

The importance of Ancient Woodlands appeared to be questioned by some respondents:

*We have criteria for selecting woodland SNCI's. There is a presumption to include ancient woodlands (as chosen in the county ancient woodland inventory, generated by EN originally). The more important point is whether they are diverse or hold rare species now; so not all AWI woodlands have been selected*

*This county has little ancient woodland and what there is, is well known and almost all within reserves. Therefore we have little need of a AWI list. We do however have an axiophyte list of species which in our opinion are of use in indicating habitats of high conservation value.*

A few respondents applied indicators in a wider context:

*We also tend to look at non woodland sites and take the presence of species such as Chickweed Wintergreen to indicate possible former woodland cover on unimproved land. This is sometimes used in part to justify woodland creation schemes.*

#### **4.4 Use of lists**

Three interesting issues in relation to the use of AWI lists were raised:

*Our stance is to try and protect sites which are of at least county value, so this will include ancient woodlands, but we don't separate these from other woodlands of high wildlife value.*

*AWI lists might be useful in developing criteria for Local Sites. A fundamental question is what area should AWI lists covers (e.g. Character Areas or Local Authority areas)*

*I'm the only member of staff who deals with this amongst a lot of other issues so there is no time for this kind of information. It would be great to be able to do this kind of stuff but isn't going to happen any time soon.*

Few list used **threshold criteria**. Where used the threshold varied, e.g.

*in Cardiff we use a threshold of 12 AWI spp*

*Woodlands with the characteristics of ancient woodland with a minimum species index score of 10 may qualify as Local Wildlife Sites.*

*Up to 4 species is poor, 4-8 is good, more than 8 is very good*

In many cases a threshold value for indicators was just one of the criteria for determining a site e.g.

*In order to determine if a site should be included as a County Wildlife Site having been initially identified through historic data, species lists and survey the following thresholds are used:*

#### **MINIMUM THRESHOLD**

*a) Ancient semi-natural woodlands included in Bedfordshire Inventory of Ancient Woodlands which retain over 25 % semi-natural cover.*

*b) Ancient woodlands which are over 75% replanted which contain either;*

***i) more than 10 ancient woodland indicator species;***

***ii) more than 40 woodland plants.***

*c) Ancient semi-natural woods under 2 ha with one of the following:*

*i) more than 5 ancient woodland indicator species;*

*ii) more than 30 woodland plants:*

*iii) good example of NVC W8 (ash-field maple-dog's mercury woodland);*

*iv) good example of NVC W 10 (pedunculate oak-bracken-bramble woodland);*

*v) good example of NVC W16 (oak-birch-wavy hair-grass woodland).*

The use of thresholds for Ancient Woodland Indicator species raised opposing opinions, e.g.

Positive responses included:

*Not (currently used) but some species are less strongly indicative than others. This varies between the upland and lowland areas of this county, For example, *Mercurialis perennis* is strong in the upland west but much less so than in the lowland east.*

*Sites are not determined as ancient purely on the basis of presence (or absence) of particular species, it is a significant factor but can usually be combined with other archive data on mapped history, documentary evidence etc. to provide an assessment of site history*

Negative responses included:

*Would seem highly questionable practice to me, rather than basing on historical records and physical evidence, unless possibly i) separate thresholds were used for different NVC sub-communities, and ii) they were indicative guidelines of woods which have some biological attributes indicative of ancient woodland, rather than definitive opinion that woods above the threshold are ancient.*

Less than a third of respondents used any sort of weighting in their lists:

Where weightings were used they related to either:

- Geographical factors – weighting of species in relation to different geology or natural area types
- Particular species given higher scores – but criteria not indicated

No respondent mentioned rarity of species as a factor to consider in weighting.

Some lists use a standard weighting:

*Our woodland species list is weighted – plants shown in bold score 2, the rest score one each, and we have different thresholds relating to different Natural Areas etc.)..*

In other cases weighting was determined by surveyors

*Our surveyors try and make a determination as to whether any of the AWI species might have been planted or are garden escapes, but this is not done in a scientific way.*

One respondent made reference to the potential use of negative indicators:

*Note that the absence of some plants (particularly ruderals) can also be indicative of the past history of a site*

Only two respondents referred to the use of species other than non-vascular plants: fungi, hoverflies, molluscs and craneflies as indicators.

#### **4.5 Species included in Ancient Woodland Indicator Lists**

See separate list in Appendix 4 for a list of species covered in selected ancient woodland indicator lists.



## 5 Conclusions

Although the response rate was fairly low (11%) and the results therefore need to be treated with care the questionnaire has raised a number of key issues:

- **Coverage of ancient woodland indicator lists is good** - there is a wide variety of lists of Ancient Woodland Indicators available covering most of the UK, some areas have several lists which are currently being used (with variation in the species on these lists – this is a potential concern).
- **Methods used to produce lists were variable** - many used a combination of field surveys and expert opinion, but the extent of field trialling and level of expert review was not indicated in most cases. Archive material was rarely used when compiling lists. Adaptation of existing lists was fairly common, the criteria used to modify lists in many cases are unclear.
- **Robustness of lists** – some lists are based on substantial field surveying and expert review and potentially therefore have a higher level of robustness. In other cases the methods used and robustness of the list is uncertain.
- **Awareness of robustness of lists** - it appears that many individuals using indicator lists are unaware of the methods used to produce the lists and therefore of their robustness. Some key stakeholders are unaware of the existence of indicator lists in their area which raises concerns.
- **Attitudes to ancient woodland indicator list are variable** - there was some critical awareness amongst respondents.
- **Use of ancient woodland lists also appears to be variable** – one respondent questioned their relevance, many use such lists in general woodland site reviews as well as for ancient woodland sites showing the relevance of such lists to wider conservation site designation.
- **Few lists use thresholds or weightings** - where used, the thresholds set and weightings used are quite variable.
- **Reviewing** - few lists have been reviewed since they were originally produced, some are currently under review.
- **Species on lists** - there are over 200 species listed on the various Ancient Woodland Indicators lists, few species are common to more than a quarter of the lists.

- **Number of indicators in lists** – is highly variable, one list is being reviewed to decrease the number of indicators.

## **Recommendations**

- Guidance on the use of existing ancient woodland indicator lists in identifying ancient woodland sites and evaluating these sites is needed (see separate Field Survey method report).
- Training and awareness raising in the use of ancient woodland indicator lists is needed, as is advice on analysis of the results of such surveys.
- There is a need for all key individuals who are working with ancient woodlands to be aware of the indicator lists available and the robustness and limitations of these lists.
- Lack of use of archive data in developing ancient woodland indicator lists is a concern. In identifying ancient woodland sites, indicator species should be used to support archive data. In developing Ancient Woodland Indicators field surveys are very helpful, but there is a need to confirm the ancientness of sites using archive data before looking for species associated with these sites.
- There is a need to develop a more robust and standardised approach to ancient woodland species lists. This could draw on the statistical analysis approach used by the Woodland Trust (2007), the comparative and expert review approach used in Scotland (Castle 2009) and species ecological type analyses. The approach used by Hermy et al (199) in mainland Europe, which combined statistical analysis and ecological traits could potentially be adapted for use in the UK.

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## Appendix 1 Survey Questionnaire



### Ancient Woodland Indicator Questionnaire

This questionnaire forms part of national survey we are undertaking for the Woodland Trust on the use of and methods used to produce lists of ancient woodland indicator species (AWI lists). The results will be used to assess the current coverage of AWI lists and their robustness. All responses will be treated in confidence.

If you are interested in the results of this survey and our other work on Ancient Woodland Indicators please complete the box at the end of the questionnaire. Thank you for your assistance in this research.

Please return the completed questionnaire by e-mail to [info@hallamec.plus.com](mailto:info@hallamec.plus.com), or by post to Hallam Environmental Consultants Ltd., Venture House, Arundel Street, Sheffield, S1 2NT.

### Questions

- 1 Are you responsible for or involved in the use of Ancient Woodland Indicator (AWI) Species Lists?  

YES / NO \*

\* **If NO** do you know who is responsible for or involved in AWI lists in your area?  
Please provide contact details below:
  
- 2 Do you have an AWI list you use?  

YES\* / NO

\* **if YES** what area does the AWI cover?

\* **if YES** can you return a copy of the AWI list with this questionnaire or supply details of how we can obtain a copy below:
  
- 3 Do you know anything about how the list was produced?  

YES\* / NO

\* **If YES** was it produced by any of the following methods:  
If more than one method was used please indicate all methods used

  - i Ecological surveys of the area  
\* Please provide details of surveys undertaken if known  

YES\* / NO
  
  - ii Expert opinion  
\* Please provide details of which experts were consulted if known  

YES\* / NO

iii      Adaptation of existing list      YES\* / NO  
\* Please provide details of which list were used as the basis for your list

iv      Surveys of documentary information and archives      YES\* / NO  
\* Please provide details

v      Other methods      YES\* / NO  
\* Please provide details

\* **If NO** can you provide details of anyone who may know how it was produced:  
Contact details:

4      Does your AWI provide any weighting for particular species      YES\* / NO  
\* **If YES** Please provide details of weighting below

5      Does your AWI list have any thresholds to determine if a site is ancient  
(i.e. X species or more are needed to identify an ancient woodland)      YES\* / NO  
\* **if YES** please provide details below:

6      Would you be willing to answer further questions about ancient woodland  
YES / NO indicator species lists

7      Are interested in attending workshops on AWIs.  
YES / NO

8      Are you interested in receiving information on the outcomes of this survey?  
YES / NO

9      Any other comments on local AWI lists?

**Your Details**

**Name:**

**Organisation:**

**Contact e-mail:**

**Contact phone number:**

## Appendix 2 Consultees who have responded

Mark Antcliff, Native Woodland Development Officer, North York Moors National Park Authority.  
Carolyn Barber, Ecological Development Officer, Rotherham Metropolitan Borough Council.  
Gavin Bird, Thames Valley Environmental Records Centre  
Steve Colderick, Forestry Commission  
Fred Conacher, Angus Council  
Mags Cousins, Devon Biodiversity Records Centre  
Sean Davies, Mansfield District Council  
Helen Davies, Bristol Regional Environmental Records Centre  
Laura Downton, Bedfordshire, Cambridgeshire, Northamptonshire & Peterborough Wildlife Trust  
John Durkin, Durham Biodiversity Action Group  
Marlies Fell, Bracknell Forest Council  
Hugh Firman, Calderdale Council  
Peter Grainger, Sedgemoor District Council  
Richard Green, Erewash Borough Council  
Quentin Groom, BSBI South Northumberland County Recorder  
Margaret Haggerty, Lincolnshire Biodiversity Partnership  
Geoffrey Hall, Ecological Consultant  
Matt Harris, Cardiff City Council  
Rhodri Jones, Peak District National Park Authority  
Mel Jones, Sheffield Hallam University  
Ian Kennedy, Woodlands Officer, Rotherham Metropolitan Borough Council  
Gary Kennison, Principal Ecologist, Gloucestershire County Council  
Keith Kirby, Natural England  
Harvey Lowson, York City Council  
Stuart McPherson, East Lothian Council  
Edward Mills, Cumbria Woodlands  
Linda Moore, Gloucestershire Environmental Records Centre  
Louise Moss, North Yorkshire County Council  
Peter Norman, Dumfries & Galloway Biodiversity Partnership  
Graham Roberts, Principal Ecologist, West Sussex Council  
Michelle Russell, Biodiversity Officer, Cambridgeshire County Council  
Martin Sanford, Suffolk Biodiversity Records Centre  
Sue Timms, Senior Ecologist, Leicestershire County Council  
Emma Townsend, Devon Biodiversity Records Centre  
Robin M Walls, BSBI Dorset County Recorder  
Charlotte Watkins, Ecologist Cherwell District Council  
Sarah Whild, BSBI Shropshire County Recorder  
Sian Williams, South Lanarkshire Council  
Dan Wrench, County Biodiversity Officer, Shropshire Biodiversity Partnership

### Appendix 3 A list of Ancient Woodland Indicator Lists

County	AWI List Details	Available from (where known)
Bedfordshire		Bedfordshire & Luton County Wildlife Selection Guidelines Jan 2009
Berkshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Buckinghamshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Cambridgeshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Cambridgeshire		Cambridgeshire County Wildlife Site Selection Criteria Version 4.3 2006
Cheshire		
Cornwall	K. Kirby 2004 list	Rose, F. The Wildflower Key
Cumberland		
Derbyshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Devon	K. Kirby 2004 list	Rose, F. The Wildflower Key
Devon	S. Whild et al 2003	Shropshire Botanical Society Newsletter Spring 2003
Dorset	K. Kirby 2004 list	Rose, F. The Wildflower Key
Durham	K. Kirby 2004 list	Rose, F. The Wildflower Key
Essex	K. Kirby 2004 list	Rose, F. The Wildflower Key
Gloucestershire		
Hampshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Herefordshire		
Hertfordshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Huntingdonshire		
Kent		
Lancashire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Leicestershire		
Rutland		
Lincolnshire	G F Peterken 2000	On line at <a href="http://www.lincsbiodiversity.org.uk/docs/LWS">www.lincsbiodiversity.org.uk/docs/LWS</a>
Middlesex	K. Kirby 2004 list	Rose, F. The Wildflower Key
Norfolk	K. Kirby 2004 list	Rose, F. The Wildflower Key
Northamptonshire		
Northumberland	K. Kirby 2004 list	Rose, F. The Wildflower Key
Nottinghamshire		Summary of National Vegetation Classification woodland descriptions Whitbread, A. M. and Kirby, K.J. 1992
Oxfordshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
North Oxfordshire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Shropshire	S. Whild et al 2003	Shropshire Botanical Society Newsletter Spring 2003
Somerset	K. Kirby 2004 list	Rose, F. The Wildflower Key
Avon/Somerset/South Gloucestershire	K. Kirby 2004 list	Rose, F. The Wildflower Key
Staffordshire		
Suffolk	K. Kirby 2004 list	Rose, F. The Wildflower Key
Surrey	K. Kirby 2004 list	Rose, F. The Wildflower Key

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Sussex	K. Kirby 2004 list	Rose, F. The Wildflower Key
East Sussex	S. Peay 1984	Weald Ancient Woodland Survey 2006
Warwickshire		
Westmorland		
Wiltshire	K. Kirby 2004	Rose, F. The Wildflower Key
Worcestershire	K. Kirby 2004	Rose, F. The Wildflower Key
West Yorkshire		
North Yorkshire	R. Gulliver 1995	Ecological Issues undated Online at: <a href="http://www.forestry.gov.uk/pdf/Nympart2.pdf/\$FILE/Nympart2.pdf">www.forestry.gov.uk/pdf/Nympart2.pdf/\$FILE/Nympart2.pdf</a>
North Yorkshire		Guidelines for Site Selection. N. Yorkshire SINC Panel 2002
South Yorkshire	M. Jones 1987	
South Yorkshire	M. Jones 1995	Jones, M. Rotherham's Woodland Heritage
<b>Wales</b>		
Anglesey/Sir Fon	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Brecknockshire/Sir Frycheiniog	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Caernafonshire/Sir Caernafon	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Carmarthenshire/Sir Gaerfyrddin	K. Kirby 2004	Rose, F. The Wildflower Key
Cardiganshire/Ceredigion	Castle et al 2008 West Wales list	Countryside Council for Wales. Contract Science Report No. 819
Denbighshire/Sir Ddinbych	Castle et al 2008 North West Wales list	Countryside Council for Wales. Contract Science Report No. 819
Flintshire/Sir Fflint	Castle et al 2008 North West Wales list	Countryside Council for Wales. Contract Science Report No. 819
Glamorgan/Morgannwg	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Merioneth/Meirionnydd	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Monmouthshire/Sir Fynwy	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Montgomeryshire/Sir Drefaldwyn	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
Pembrokeshire/Sir Benfro	Castle et al 2008 West Wales list	Countryside Council for Wales. Contract Science Report No. 819



Radnorshire/Sir Faesyfed	G. Castle, J. Latham & R. Mileto 2008	Countryside Council for Wales. Contract Science Report No. 819
<b>Scotland</b>		
Aberdeenshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Angus/Forfarshire *	Tidswell	Scottish Woodland Plant Species. Unpublished list from Scottish National Heritage
Argyllshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Ayrshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Banffshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Berwickshire *	Badenoch 2006	Ancient Woodland Indicators in Scotland. Unpublished species list
Buteshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Cromartyshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Caithness	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Clackmannanshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Dumfriesshire *	Badenoch 2006	Ancient Woodland Indicators in Scotland. Unpublished species list
Dunbartonshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
East Lothian *	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Fife	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Inverness-shire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Kincardineshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Kinross-shire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Kirkcudbrightshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Lanarkshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Midlothian *	Crowther 2006 Ray, D. & Moseley, D. 2007 Badenoch 2006	Using shade tolerant plants to identify broadleaved lowland ancient woodland in Midlothian. Edinburgh Natural History Society Journal 2006. pp 17-19.
Morayshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009

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Nairnshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Orkney	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Peeblesshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Perthshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Renfrewshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Ross shire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Roxburghshire *	Badenoch 2006	Ancient Woodland Indicators in Scotland. Unpublished species list
Selkirkshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Shetland	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Stirlingshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Sutherland	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
West Lothian/Linlithgowshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
Wigtownshire	C. L. Crawford 2006	Scottish Forestry Vol. 63 No. 1 2009
All Scotland *	Tidswell 1993	Scottish Woodland Plant Species. Unpublished list from Scottish National Heritage
Northern Ireland and counties*	Woodland Trust 2007	Back on the Map. An inventory of Ancient & Long-established woodland for Northern Ireland. Preliminary report.
Isle of Man *	A. Dubbleadam undated	Isle of Man Wildlife Trust
North & Central Europe *	Hermy, M et al 1999	An ecological comparison between ancient and other forest plant species of Europe, and the implications for forest research. Biological Conservation 91. pp9-22.

Appendix 4 Species listed on Ancient woodland Lists

Scientific Name	North & Central Europe *	South west	Avon NSom S Glos	Devon	Bedfordshire	Dorset	Somerset	South	South east	East	Suffolk	Lincolnshire	shropshire	Worcs	Derbs	South Yorkshire	N Yorks acid	N York neutral to calcareous	N Yorks wet	NE Yorks	Durham	Northumb	North East Wales	West wales	South Wales	East Wales	Northern Ireland *	S E Wales	Carmarthen	All Wales	All Scotland *	Angus *	Mid Lothian *	Borders & Lothian *	Lothian *	Isle of Man *	Leicestershire & Rutland	Total		
<i>Acer campestre</i>		1			1			1	1	1			1	1	1		1			1	1	1	1	1	1		1												16	
<i>Aconitum napellus</i>		1											1																											2
<i>Actaea spicata</i>																																								1
<i>Adoxa moschatellina</i>	1	1	1			1		1	1	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			27
<i>Agrimonia procera</i>											1																													1
<i>Agropyron caninum</i>		1						1	1																															3
<i>Ajuга reptans</i>										1	1				1	1										1														6
<i>Alchemilla filicaulis</i>										1																													1	
<i>Allium ursinum</i>	1	1	1		1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		27
<i>Anagallis minima</i>								1																																1
<i>Anemone nemorosa</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		32
<i>Apium nodiflorum</i>																		1																						1
<i>Aquilegia vulgaris</i>		1				1		1	1	1		1		1	1		1		1			1	1	1	1				1											14
<i>Arctium nemorosum</i>															1																									1
<i>Arum maculatum</i>									1				1							1	1			1		1				1							1			8
<i>Athyrium filix-femina</i>	1				1				1	1	1	1	1	1			1				1	1																		8

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Scientific Name	North & Central Europe *	South west	Avon NSom S Glos	Devon	Bedfordshire	Dorset	Somerset	South	South east	East	Suffolk	Lincolnshire	shropshire	Worcs	Derbs	South Yorkshire	N Yorks acid	N York neutral to calcareous	N Yorks wet	NE Yorks	Durham	Northumb	North East Wales	West wales	South Wales	East Wales	Northern Ireland *	S E Wales	Carmarthen	All Wales	All Scotland *	Angus *	Mid Lothian *	Borders & Lothian *	Lothian *	Isle of Man *	Leicestershire & Rutland	Total	
<i>Berula erecta</i>																		1																				1	
<i>Blechnum spicant</i>		1					1	1	1	1	1	1	1	1	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
<i>Brachypodium sylvaticum</i>	1								1						1					1	1					1			1										8
<i>Bromopsis benekenii</i>	1					1							1									1							1										4
<i>Bromopsis ramosa</i>		1			1		1	1	1			1		1	1				1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
<i>Calamagrostis canescens</i>					1				1		1					1		1																					5
<i>Calamagrostis epigejos</i>		1					1	1	1		1		1	1	1							1							1										9
<i>Calluna vulgaris</i>																1								1		1		1											4
<i>Caltha palustris</i>																		1																					1
<i>Campanula latifolia</i>	1				1				1	1	1	1	1	1	1		1	1	1	1	1	1	1		1			1					1	1	1	1		19	
<i>Campanula patula</i>														1																								1	
<i>Campanula trachelium</i>		1	1		1			1	1	1	1	1	1	1	1	1						1	1	1	1	1	1	1										17	
<i>Cardamine amara</i>								1	1	1					1			1				1							1										8
<i>Cardamine impatiens</i>														1	1															1				1					4
<i>Carex acuta</i>																		1																					1
<i>Carex acutiformis</i>												1						1																					2
<i>Carex binervis</i>																1																							1
<i>Carex digitata</i>															1																								1
<i>Carex elata</i>																		1																				1	

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Scientific Name	North & Central Europe *	South west	Avon NSom S Glos	Devon	Bedfordshire	Dorset	Somerset	South	South east	East	Suffolk	Lincolnshire	shropshire	Worcs	Derbs	South Yorkshire	N Yorks acid	N York neutral to calcareous	N Yorks wet	NE Yorks	Durham	Northumb	North East Wales	West wales	South Wales	East Wales	Northern Ireland *	S E Wales	Carmarthen	All Wales	All Scotland *	Angus *	Mid Lothian *	Borders & Lothian *	Lothian *	Isle of Man *	Leicestershire & Rutland	Total		
<i>Carex elongata</i>														1																									1	
<i>Carex laevigata</i>	1	1	1		1		1	1	1			1	1	1	1			1			1	1	1	1	1	1		1	1	1			1	1	1				24	
<i>Carex montana</i>		1				1		1	1	1		1		1	1																		1							9
<i>Carex nigra</i>																		1																					1	
<i>Carex pallescens</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1		1		1										23	
<i>Carex paniculata</i>		1			1	1	1	1	1	1	1	1	1	1				1	1	1	1	1					1		1											11
<i>Carex pendula</i>	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30
<i>Carex pseudocyperus</i>											1																												1	
<i>Carex remota</i>	1	1		1			1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29
<i>Carex riparia</i>																		1																					1	
<i>Carex strigosa</i>		1	1	1	1	1	1	1	1	1	1	1	1	1	1			1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
<i>Carex sylvatica</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30
<i>Carpinus betulus</i>							1	1	1	1																													4	
<i>Cephalanthera damasonium</i>						1								1																									2	
<i>Cephalanthera longifolia</i>	1						1							1																									3	
<i>Ceratocapnos claviculata</i>		1					1		1	1	1	1		1		1							1	1					1	1									10	
<i>Chrysosplenium alternifolium</i>	1						1		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
<i>Chrysosplenium oppositifolium</i>	1	1			1		1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25
<i>Circaea intermedia</i>	1														1							1							1										5	

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Scientific Name	North & Central Europe *	South west	Avon NSom S Glos	Devon	Bedfordshire	Dorset	Somerset	South	South east	East	Suffolk	Lincolnshire	shropshire	Worcs	Derbs	South Yorkshire	N Yorks acid	N York neutral to calcareous	N Yorks wet	NE Yorks	Durham	Northumb	North East Wales	West wales	South Wales	East Wales	Northern Ireland *	S E Wales	Carmarthen	All Wales	All Scotland *	Angus *	Mid Lothian *	Borders & Lothian *	Lothian *	Isle of Man *	Leicestershire & Rutland	Total	
<i>Circaea lutetiana</i>	1								1	1															1	1												8	
<i>Cirsium heterophyllum</i>															1																								1
<i>Clematis vitalba</i>									1	1																													2
<i>Colchicum autumnale</i>		1					1	1						1																									4
<i>Conopodium majus</i>	1	1	1					1	1	1	1	1		1	1	1								1	1	1		1							1				19
<i>Convallaria majalis</i>	1	1	1		1			1	1	1	1	1	1	1	1	1	1	1		1			1	1	1	1	1	1	1	1									22
<i>Cornus sanguinea</i>									1	1	1	1	1					1																					5
<i>Corydalis claviculata</i>		1		1				1																		1													4
<i>Corylus avellana</i>	1				1					1		1				1										1								1					8
<i>Crataegus laevigata</i>					1			1	1	1	1			1	1	1																							8
<i>Crepis paludosa</i>																		1																				1	
<i>Dactylorhiza fuchsii</i>	1								1	1	1	1						1																1				5	
<i>Daphne laureola</i>		1	1	1				1	1	1	1		1	1	1			1					1	1			1											15	
<i>Daphne mezereum</i>															1									1			1												4
<i>Deshampsia flexuosa</i>																								1			1												3
<i>Dipsacus pilosus</i>		1						1	1	1	1	1	1	1	1							1							1									11	
<i>Dryopteris aemula</i>		1						1	1	1													1	1	1	1	1	1	1	1						1			12
<i>Dryopteris affinis</i>	1	1			1			1	1	1		1	1	1	1			1					1	1	1	1	1	1					1					19	
<i>Dryopteris carthusiana</i>	1	1						1	1	1		1	1	1	1			1					1	1	1	1	1	1								1		15	

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Scientific Name	North & Central Europe *	South west	Avon NSom S Glos	Devon	Bedfordshire	Dorset	Somerset	South	South east	East	Suffolk	Lincolnshire	shropshire	Worcs	Derbs	South Yorkshire	N Yorks acid	N York neutral to calcareous	N Yorks wet	NE Yorks	Durham	Northumb	North East Wales	West wales	South Wales	East Wales	Northern Ireland *	S E Wales	Carmarthen	All Wales	All Scotland *	Angus *	Mid Lothian *	Borders & Lothian *	Lothian *	Isle of Man *	Leicestershire & Rutland	Total		
<i>Dryopteris filix-mas</i>										1																													1	
<i>Elymus caninus</i>	1	1			1			1	1	1		1	1	1	1						1	1	1	1	1	1		1												19
<i>Epilobium montanum</i>	1																																							2
<i>Epilobium obscurum</i>												1																												1
<i>Epipactis helleborine</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28
<i>Epipactus leptochila</i>							1	1					1																											3
<i>Epipactis muelleri</i>							1	1																																2
<i>Epipactis phyllanthes</i>						1							1										1						1											4
<i>Epipactis purpurata</i>					1	1		1	1	1	1		1	1																										8
<i>Equisetum fluviatile</i>																		1																						1
<i>Equisetum hyemale</i>															1																									1
<i>Equisetum sylvaticum</i>	1	1		1				1	1	1		1	1	1	1	1		1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22	
<i>Equisetum telmateia</i>	1													1	1																				1					5
<i>Erica tetralix</i>																		1																						1
<i>Euonymus europaeus</i>	1	1			1					1	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
<i>Eupatorium cannabinum</i>												1						1																						2
<i>Euphorbia amygdaloides</i>		1	1	1	1	1	1	1	1	1	1		1	1	1								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	
<i>Festuca altissima</i>	1												1	1	1		1				1	1	1			1			1	1					1				13	
<i>Festuca gigantea</i>	1	1	1					1	1	1			1	1	1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	

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<i>Fragaria vesca</i>	1									1	1	1	1			1																							8	
<i>Frangula alnus</i>		1		1				1	1	1	1	1		1	1	1	1	1				1		1	1		1													17
<i>Gagea lutea</i>	1									1	1		1	1	1			1		1	1	1													1					11
<i>Galanthus nivalis</i>							1																																	1
<i>Galium odoratum</i>		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		34
<i>Geranium robertianum</i>										1																	1													3
<i>Geranium sanguineum</i>														1	1																								2	
<i>Geranium sylvaticum</i>													1	1			1																						3	
<i>Geum rivale</i>	1	1			1			1		1	1	1	1	1	1	1		1	1				1	1	1	1	1		1										19	
<i>Geum urbanum</i>										1														1		1			1											4
<i>Glechoma hederacea</i>										1																													1	
<i>Gnaphalium sylvaticum</i>										1			1	1																									3	
<i>Goodyera repens</i>																						1																	2	
<i>Gymnocarpium dryopteris</i>	1													1		1				1	1	1	1	1		1	1	1	1				1						12	
<i>Hedera helix</i>										1																														1
<i>Helleborus foetidus</i>										1			1	1	1								1																	6
<i>Helleborus viridis</i>		1						1	1	1	1	1		1	1	1							1	1	1														12	
<i>Holcus mollis</i>		1						1	1						1								1	1	1														9	
<i>Hordelymus europaeus</i>					1			1		1		1	1	1	1	1	1	1	1	1	1	1																	12	



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<i>Humulus lupulus</i>												1																											1		
<i>Hyacinthoides non-scripta</i>	1	1			1			1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1						1	1	1	1	1	1	1	27	
<i>Hymenophyllum tunbrigense</i>		1																					1	1	1															6	
<i>Hymenophyllum wilsonii</i>													1	1									1	1	1															6	
<i>Hypericum androsaemum</i>		1	1	1				1	1	1	1		1	1									1	1	1	1	1							1						16	
<i>Hypericum hirsutum</i>	1				1					1	1	1				1										1														9	
<i>Hypericum humifusum</i>					1							1				1																		1						4	
<i>Hypericum maculatum</i>																					1																			1	
<i>hypericum perforatum</i>																1																									1
<i>Hypericum pulchrum</i>	1	1			1			1	1	1		1		1	1	1		1		1			1	1		1										1				19	
<i>Hypericum tetrapterum</i>												1				1																									2
<i>Ilex aquifolium</i>	1	1						1	1	1			1		1									1	1																11
<i>Iris foetidissima</i>		1							1	1	1		1		1								1	1			1														11
<i>Iris pseudacorus</i>																		1																							1
<i>Juniperus communis</i>																					1	1																			2
<i>Lamium galeobdolon</i>		1	1	1	1		1	1	1	1	1	1	1	1	1	1		1	1	1			1	1	1	1	1											1		24	
<i>Lathraea squamaria</i>	1	1	1	1			1	1	1	1		1	1	1	1	1		1		1	1	1	1	1	1	1	1													28	
<i>Lathyrus linifolius</i>		1			1			1	1	1		1		1	1								1	1	1															13	
<i>Lathyrus montanus</i>		1		1											1																									5	

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<i>Lathyrus sylvestris</i>		1			1	1		1	1	1			1	1	1											1			1										11	
<i>Ligustrum vulgare</i>										1								1																						2
<i>Linnaea borealis</i>																														1									1	
<i>Listera ovata</i>	1									1	1		1	1																		1							6	
<i>Lithospermum officinale</i>										1	1																													2
<i>Lonicera periclymenum</i>	1									1						1								1		1			1				1							8
<i>Luzula forsteri</i>		1		1	1	1		1	1					1										1	1		1		1											11
<i>Luzula pilosa</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35
<i>Luzula sylvatica</i>	1	1		1		1	1	1	1	1	1	1	1	1	1	1	1	1		1			1	1	1	1	1	1	1			1	1	1	1	1	1	1	27	
<i>Lycopus europaeus</i>																		1																						1
<i>Lychnis flos-cuculi</i>										1		1						1																						3
<i>Lysimachia nemorum</i>	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	29
<i>Lysimachia nummularia</i>										1	1	1																												3
<i>Lysimachia thyrsoflora</i>																		1																						1
<i>Lysimachia vulgaris</i>												1		1																										2
<i>Lythrum portula</i>										1																														1
<i>Maianthemum bifolium</i>										1		1																												2
<i>Malus sylvestris</i>		1		1	1			1	1	1	1		1		1								1	1	1	1	1	1	1											16
<i>Melampyrum cristatum</i>										1																														2

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<i>Melampyrum pratense</i>	1	1	1		1			1	1	1	1	1		1	1	1	1				1	1	1	1	1	1													27	
<i>Melampyrum sylvaticum</i>	1																1		1																					3
<i>Melica nutans</i>	1									1			1	1	1					1	1	1				1								1						12
<i>Melica uniflora</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1									1	1	1		33
<i>Melittis melissophyllum</i>		1				1											1						1	1			1	1	1											8
<i>Mercurialis perennis</i>	1									1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1				22
<i>Milium effusum</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				31
<i>Moehringia trinervia</i>		1			1			1	1	1			1		1									1	1		1	1	1	1										15
<i>Molinia caerulea</i>																		1																						1
<i>Moneses uniflora</i>																														1				1					2	
<i>Monotropa hypopitys</i>						1								1																										2
<i>Myosotis laxa spp caespitosa</i>																		1																					1	
<i>Myosotis scorpioides</i>																		1																						1
<i>Myosotis secunda</i>																		1																						1
<i>Myosotis sylvatica</i>										1	1	1	1	1	1						1	1		1	1	1			1	1	1	1	1	1	1	1	1			15
<i>Narcissus pseudonarcissus</i>		1		1	1			1	1	1	1	1	1	1	1										1				1											12
<i>Neottia nidus-avis</i>	1	1		1		1	1	1	1	1	1	1	1	1	1		1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				26
<i>Oenanthe crocata</i>																		1																						1
<i>Ophioglossum vulgatum</i>						1				1		1																												3

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<i>Ophrys insectifera</i>					1	1				1																													3	
<i>Orchis mascula</i>	1	1	1		1			1	1	1	1	1	1	1	1		1		1					1	1	1	1	1												22
<i>Orchis purpurea</i>									1																															1
<i>Oreopteris limbosperma</i>		1						1	1	1			1	1	1		1						1	1					1											11
<i>Orobanche hederæ</i>														1																										1
<i>Orthila secunda</i>																																								1
<i>Osmunda regalis</i>																					1																			1
<i>Oxalis acetosella</i>	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						1	1	1				30
<i>Paris quadrifolia</i>	1	1	1		1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1			29
<i>Phegopteris connectilis</i>	1	1															1				1	1		1					1	1	1	1	1	1		1				12
<i>Phyllitis scolopendrium</i>		1						1	1					1	1							1			1				1											10
<i>Pimpinella major</i>									1	1				1																										5
<i>Platanthera chlorantha</i>		1			1			1	1	1	1	1	1	1			1						1	1			1		1											14
<i>Poa nemoralis</i>	1	1	1	1	1	1		1	1	1		1	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				26
<i>Polygonatum multiflorum</i>		1	1			1	1	1	1	1			1			1								1	1			1												13
<i>Polygonatum odoratum</i>															1											1			1											3
<i>Polygonatum verticillatum</i>																														1									1	
<i>Polypodium vulgare</i>		1					1	1	1	1	1			1	1		1					1	1	1	1	1	1		1		1	1	1	1	1				18	
<i>Polystichum aculeatum</i>	1	1		1			1	1	1	1		1	1	1	1		1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			25	

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<i>Polystichum setiferum</i>		1					1	1	1	1	1	1	1	1	1		1			1	1	1		1		1		1	1										18	
<i>Populus tremula</i>		1					1	1	1		1	1	1	1	1								1	1	1	1	1		1							1				15
<i>Potentilla sterilis</i>	1	1		1			1	1	1	1	1	1	1		1	1							1	1	1	1	1	1	1											17
<i>Primula elatior</i>				1				1	1	1	1																													3
<i>Primula vulgaris</i>	1	1		1			1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
<i>Prunus avium</i>		1		1			1	1	1	1	1	1	1	1	1	1							1	1	1	1			1											14
<i>Prunus cerasifera</i>								1																																1
<i>Prunus padus</i>								1							1			1				1	1	1	1	1	1	1	1											9
<i>Pulmonaria longifolia</i>		1					1																																	2
<i>Pulmonaria obscura</i>								1																																1
<i>Pyrola minor</i>														1	1	1	1																		1					4
<i>Pyrus communis</i>								1																																1
<i>Pyrus pyraeaster</i>								1																																1
<i>Quercus petraea</i>		1		1	1		1	1	1	1	1	1	1	1	1	1	1					1	1	1	1	1	1	1	1							1	1			20
<i>Radiola linoides</i>								1	1																															2
<i>Ranunculus auricomus</i>	1	1	1	1	1		1	1	1	1	1	1	1	1	1		1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25
<i>Ranunculus ficaria</i>								1																																1
<i>Ranunculus flammula</i>																		1																						1
<i>Rhamnus cathartica</i>								1	1						1		1							1		1	1	1												8

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<i>Ribes alpinum</i>															1																							1	
<i>Ribes nigrum</i>		1		1				1	1	1					1																								8
<i>Ribes rubrum</i>		1		1			1	1	1	1					1									1	1		1		1	1	1								13
<i>Ribes spicatum</i>		1						1	1												1	1																	5
<i>Ribes sylvestre</i>		1						1	1																														3
<i>Ribes uva-crispa</i>										1																													2
<i>Rorripa palustris</i>																					1																		1
<i>Rorripa sylvestris</i>																					1																		1
<i>Rosa arvensis</i>		1		1				1	1		1				1									1	1				1										9
<i>Rubus caesius</i>										1					1																								2
<i>Rubus fruticosus</i>									1																														1
<i>Rubus idaeus</i>									1																														1
<i>Rubus saxatilis</i>															1																								1
<i>Rumex sanguineus</i>									1																										1				2
<i>Ruscus aculeatus</i>		1		1				1	1	1	1																												6
<i>Salix aurita</i>														1		1																							2
<i>Salix caprea</i>									1														1	1				1	1										5
<i>Salix cinerea</i>									1																														1
<i>Salix pentandra</i>																					1																		1

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<i>Sanicula europaea</i>	1	1	1		1		1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	
<i>Scirpus sylvaticus</i>		1						1	1		1		1	1	1			1			1		1	1	1		1	1	1	1									16	
<i>Scrophularia nodosa</i>	1									1		1											1	1	1		1		1	1										10
<i>Scutellaria minor</i>								1																																1
<i>Sedum telephium</i>		1			1			1	1	1	1			1									1						1											9
<i>Senecio aquaticus</i>																										1														1
<i>Serratula tinctoria</i>								1	1						1																									3
<i>Sibthorpia europaea</i>	1																																						1	
<i>Silene dioica</i>										1																														2
<i>Solidago virgaurea</i>	1		1					1	1				1	1	1								1	1	1				1											12
<i>Sorbus aria</i>					1																																			1
<i>Sorbus aucuparia</i>										1	1														1				1											5
<i>Sorbus rupicola</i>															1																									1
<i>Sorbus (microspecies)</i>		1		1																																				2
<i>Sorbus torminalis</i>		1	1	1			1	1	1	1	1	1	1	1	1	1				1			1	1	1	1	1	1	1	1							1			23
<i>Stachys officinalis</i>		1						1	1	1	1	1	1	1	1																									9
<i>Stachys sylvatica</i>	1									1																														3
<i>Stellaria alsine</i>																		1																						1
<i>Stellaria holostea</i>	1									1		1	1	1	1										1	1			1											10

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<i>Stellaria neglecta</i>									1	1				1				1						1		1													7
<i>Stellaria nemorum</i>	1								1						1			1	1	1	1			1	1	1	1	1	1			1	1						13
<i>Tamus communis</i>		1					1	1	1						1							1		1	1				1										9
<i>Taxus baccata</i>				1									1								1			1	1		1	1											7
<i>Teucrium scorodonia</i>									1							1																							2
<i>Thalictrum flavum</i>																		1																					1
<i>Thelypteris oreopteris</i>		1						1	1																														3
<i>Thelypteris phegopteris</i>		1																																					1
<i>Tilia cordata</i>		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
<i>Tilia platyphyllos</i>													1	1	1																								3
<i>Trichomanes speciosum</i>																1													1									1	
<i>Trientalis europaea</i>																																		1	1			3	
<i>Trollius europaeus</i>															1																							1	
<i>Ulmus glabra</i>		1		1				1	1				1	1	1							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
<i>Vaccinium myrtillus</i>		1						1	1					1	1	1	1							1			1	1	1	1	1	1	1	1	1	1	1	1	9
<i>Valeriana dioica</i>												1						1																					2
<i>Valeriana officinalis</i>												1						1								1							1						4
<i>Veronica chamaedrys</i>									1																													1	
<i>Veronica montana</i>	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28



A survey of the coverage, use and application of ancient woodland indicator lists in the UK

Scientific Name	North & Central Europe *	South west	Avon NSom S Glos	Devon	Bedfordshire	Dorset	Somerset	South	South east	East	Suffolk	Lincolnshire	shropshire	Worcs	Derbs	South Yorkshire	N Yorks acid	N York neutral to calcareous	N Yorks wet	NE Yorks	Durham	Northumb	North East Wales	West wales	South Wales	East Wales	Northern Ireland *	S E Wales	Carmarthen	All Wales	All Scotland *	Angus *	Mid Lothian *	Borders & Lothian *	Lothian *	Isle of Man *	Leicestershire & Rutland	Total			
<i>Veronica officinalis</i>												1																												1	
<i>Viburnum lantana</i>										1	1																														2
<i>Viburnum opulus</i>	1	1		1			1	1	1	1	1	1	1		1			1			1	1	1	1	1		1		1											20	
<i>Vicia sepium</i>		1						1	1	1						1						1	1	1	1									1	1					12	
<i>Vicia sylvatica</i>		1			1	1		1	1			1	1	1	1			1		1	1	1	1	1	1		1		1				1	1		1			21		
<i>Viola odorata</i>										1														1					1											3	
<i>Viola palustris</i>		1						1	1							1			1																				5		
<i>Viola reichenbachiana</i>		1		1	1		1	1	1	1	1	1	1	1	1			1		1		1	1	1	1		1		1										20		
<i>Viola riviniana</i>									1	1	1	1	1	1													1													6	
<i>Wahlenbergia hederacea</i>		1						1																															2		
<b>Total</b>	68	110	29	42	58	43	27	110	107	154	83	90	90	109	123	25	57	56	28	56	52	86	37	103	87	32	81	38	121	47	29	67	55	21	23	18					

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