

PRACTICE NOTE

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INTRODUCTION

1. This Note describes a system intended to facilitate the identification of, and trade in, locally sourced stock for the planting of native species of trees and shrubs in Britain. The Forestry Commission has developed this initiative in response to demand from a range of interests, including many growers, for technical market support for the collection, sourcing and growing of local stock (seeds or cuttings) for our native species. This is the first attempt to produce guidance on the production and use of local stock for native species throughout Britain. It has been developed after extensive consultation with all the main stakeholders.
2. The system comprises a map of *local seed zones* (Figure 1), and guidance on its use. It also includes, at the request of the forest nursery trade, a voluntary scheme to allow seeds and plants to be identified and monitored in a consistent way.
3. The Forestry Commission recognises that scientific understanding of the origin (see box below) of native species is still very limited. The aim has been to provide a system for the use of woodland owners and

Provenance and origin

Forestry has exploited population differences effectively over many years by paying attention to the *provenance* and *origin* of reproductive material (seed, plants, parts of plants). The term provenance is used to describe the location of the stand from which the reproductive material was collected. In practice, the origin of the material is more important since this term is used to describe that part of the natural range from which the material originally derived. However the origin of planted stands is often not known. In such cases local provenance is normally considered sufficient on the assumption that collections are made from stands which appear well adapted.

others who are interested in planting native species in woodlands. The system advanced here is intended to help the workings of the existing market in locally sourced planting stock but it does not change current grant scheme requirements for the use of this type of stock. The system however is complementary to the statutory controls in the Forest Reproductive Material Regulations 1977 which cover the marketing of certain tree species including five of our native forest tree species. We will need to try out the system, see how well it works, and revise it in the light of research and experience over the next few years.

SEMI-NATURAL WOODLANDS & NEW NATIVE WOODLANDS

4. *The UK forestry standard* (Forestry Commission, 1998) sets out the following national aims for semi-natural woodlands:
 - to maintain and restore natural ecological diversity;
 - to maintain and improve their aesthetic value;
 - to maintain genetic integrity of populations of native species, so far as is practicable;
 - to take opportunities to produce utilisable wood;
 - to enlarge the woods where possible by creating new woodlands.

The UK forestry standard and the associated Forestry Practice Guides *The management of semi-natural woodlands* 1–8 recommend using plants of local provenance, preferably from semi-natural parent trees, where planting is to be undertaken in semi-natural woodlands or where native woodlands are to be created by planting. The UK Woodland Assurance Scheme also seeks the use of seed of local origin for restocking and planting semi-natural woodlands where this is available and considered appropriate. The system described in the Note will help woodland owners in making choices of planting material in these circumstances.



Native Scots pine seedlings of local origin have been used for planting over 20 000 ha of new native pinewoods since 1989 in the Scottish Highlands.

THE MAP OF LOCAL SEED ZONES FOR NATIVE SPECIES

Regions of Provenance

5. The framework for the new zonation is provided by the existing Regions of Provenance defined in the Forest Reproductive Material Regulations 1977. The Regulations cover a range of forest trees including some native species – Scots pine, beech, sessile oak, pedunculate oak and the genus *Populus*.
6. The Regulations, which were introduced in 1977, apply to the marketing of reproductive material of certain species commonly used for timber production. They are based on the concept of identifying regions of climatic similarity which can be ascribed to planting stock as an aid to sourcing suitable plant material. These are referred to as Regions of Provenance.
7. There are four broad Regions of Provenance. These divide the country into eastern and western zones within northern and southern divisions, and are identified as Regions 10, 20, 30 and 40, delineated by bolder lines in Figure 1.
8. The Regulations apply only to the *marketing* of reproductive material; where planters collect and raise planting material for their own use without marketing, the statutory controls do not apply.

How the map of new local seed zones for native species was created

9. The seed zones are a non-statutory sub-division of the statutory Regions of Provenance. These regions have been sub-divided to produce the local seed zones (Figure 1) using information about climatic and geological variation. Elevation should be considered as an additional factor using two levels - above and below 300 metres - because of the importance of elevation in influencing local climatic conditions. The seed zone number may be used to identify collections of seeds or cuttings made under the statutory Regulations or the voluntary identification system described in paragraphs 19–27. Explanation of the seed zones is given in the box opposite.

Which species are native to a particular zone?

10. This initiative is relevant to all tree and woody shrub species considered native to Britain. The more common species are listed in Table 1, together with an indication of the seed zones in which they are thought to be locally native, i.e. they occur in the zone in populations which have developed naturally (not planted). We believe that this represents the approximate natural distribution of the species over recent centuries, although it is accepted that in some cases this may have been different in the more distant past. Also, in some cases the natural distribution of a species occupies only part of a zone. Guidance on the main soil types on which the species occur is also given in Table 1.



Trees of most native species in ancient semi-natural woodlands are likely to be of local origin, although oak and beech have been widely planted during the past two centuries.

How the seed zones were devised

The seed zones are based on major geoclimatic influences and take account of geological and landform boundaries; major watersheds have been used as zone boundaries in several cases. In Scotland, the major geological fault lines are used and the outlying islands are separated. Further divisions are then often based on watersheds.

The application of these principles in Region 10 leads to the separation of the inner and outer islands from four mainland areas separated by geological faults. Two of these, the north-west Highlands and the southern Uplands are further divided because of their size, using a watershed (between zones 102 and 105) and the course of the River Nith (between zones 108 and 109) respectively.

In Region 20, the geological fault lines form the basis of the zonation, and the major watershed separating the Spey from the Don/Dee catchments is used to divide the north-east Highlands for this (between zones 201 and 202).

Region 30 comprises north-west England (including the Pennines), most of Wales and the peninsula of south-west England. The River Lune combined with the M6 motorway, in the absence of any other strong feature, is used to separate the Lake District from the Pennines. Watersheds are used to divide Wales, the main watershed of the Cambrian mountains being used to separate west and east Wales. South-west England remains as a single zone.

This approach was more difficult to follow in attempting a zonation of the lowlands of England (Region 40) where the climatic gradients are more gradual. For want of a clearer geographic basis, the region is therefore subdivided to reflect broad patterns of the natural distribution of native species, as depicted by Soutar and Peterken in *Forest nature conservation guidelines* (Forestry Commission, 1990). One large area covering most of the Midlands from the Welsh border to the East Anglian coast is subdivided into eastern and western zones.

11. In semi-natural and new native woodlands only locally native species should normally be planted. However, there may be other places where a woodland owner may wish to plant native species for amenity, timber production or wildlife conservation objectives; examples are beech and Scots pine.

Local variation of the seed zone

12. Sometimes a local interpretation or different seed zone boundary may need to be used, based on particular knowledge of a species, e.g.
 - where a particular species may have a localised distribution within a seed zone comprising a number of distinct populations;
 - where knowledge of distinct genetic differentiation suggests an alternative zonation such as the scheme already in use for Scots pine.

Using the seed zones map to choose the right seed source

13. In trying to match seed source to planting site, the first task is to locate the seed zone and elevation band in which the planting site falls, then to identify the potential seed sources within the same seed zone and elevation band and to select material from these for planting.
14. Problems of interpretation could arise if no matching planting material is available or if the planting site lies close to a seed zone boundary or the elevation threshold. These will be considered separately.

No planting material is available from the same seed zone and/or the same elevation band

15. Try to find appropriate sources in adjacent seed zones/elevation bands using the following guidelines:
 - alternative material from the same elevation band should be used;
 - material from zones adjacent to that of the planting site should be sought in preference to more distant zones;
 - material from adjacent or close areas within the same Region of Provenance should be used in preference to that from an adjacent Region of Provenance.

The planting site lies close to a boundary between two seed zones or the 300 metres elevation threshold

16. The use of planting material from the adjacent seed zone or elevation band should be used, provided the following are met:

- both the planting site and the location of the basic material lie within 35 kilometres of the zone boundary; or,
- both the planting site and the location of the basic material lie within 50 metres of the elevation threshold, i.e. within the range 250–350 metres;
- the boundary on the map to which the planting site is close is not between two Regions of Provenance.

Clearly, in specific instances in which both seed zone and elevation boundary are implicated, both the first two of these criteria should be met.

17. There may be some cases, e.g. important semi-natural woodlands, where it will be preferable to delay planting until local stock is available rather than to use sources outside the same seed zone. Alternatively, greater efforts could be made to use natural regeneration.

Special zones for Scots pine

18. Remnant Scots pine populations within the area of Scotland to which the species remains indigenous have been the subject of biochemical analysis of resin terpenes. The zonation devised as a result of terpene analysis is different from that proposed here for other species and it is a requirement for native pine planting under the rules of the Woodland Grant Scheme. As more detailed knowledge of local variation or adaptation is accrued, it may be relevant to consider other species in this way.

THE VOLUNTARY IDENTIFICATION SYSTEM

Identifying seedlots

19. There are clear advantages to collectors, producers and planters in the wide adoption of a consistent form of identity. The established means of recording for a seedlot commonly used in Britain is:

Species Crop year(Seed zone/Region of Provenance/
Seed stand number)

The species may be the common name, Latin name or a recognised abbreviation such as SP, POK or BI. The crop year is presented as the last two digits of the year,

e.g. 1998 is 98. The year runs from 1 August to the following 31 July. The seed zone number appears in the bracket part of the identity.

Examples:

AH 98(403)

Ash collected in the 1998 crop year in zone 403

Hawthorn 99(304)

Hawthorn from zone 304 collected in 1999

Betula pendula 01(201)

Silver birch collected in zone 201 in 2001

Controlling seed collections and the production of plants not covered by the Forest Reproductive Material Regulations

20. Material marketed in these circumstances can be identified by means of a Certificate of Local Provenance. If collectors and suppliers wish to use the voluntary system they should follow the procedures set out below which mirror the controls currently used under The Forest Reproductive Material Regulations.
21. Before work is due to begin the collector must give the local Forestry Commission (FC) Conservancy Office advance notice of intention to collect seed. Guidance on making seed collections is given in on page 5.
22. The following information must be provided:
- name, address and telephone number of the collector;
 - the location where the seed collection will take place;
 - the proposed date the collection will commence and the approximate date of completion.

The collector should keep the FC fully informed about any changes in the timing or the location of the collection.

23. The FC will send the collector a blank form FRP4 and may arrange an inspection to ensure that the collection is made within the correct area.
24. Once the collection is finished the collector should fill in the FRP4 stating location, elevation, when the collection was made and the amount of seed collected, and return it to the FC.

25. If they are content that the correct procedures have been followed the FC local office will endorse the FRP4 and forward it to FC HQ from where a **Certificate of Local Provenance** will be issued. If the standard procedures are not followed it may not be possible to issue the Certificate.
26. When a supplier provides seed (or seedlings grown on from it) customers must be issued with a supplier's certificate containing information about the collection, including the number of the Certificate of Local Provenance and the location where the seed was collected.
27. The Forestry Commission carries out random inspections of seed collections and nurseries to ensure that the statutory requirements of the Forest Reproductive Material Regulations are complied with. Material collected and grown under the voluntary identification system will be subject to similar checks. Any abuse of the system will mean that a Certificate of Local Provenance will not be issued, or that any Certificate which has been issued will be withdrawn.



Acorn collection in the New Forest. Seed collections should be made from at least 20–30 trees, taking similar amounts from each.

MAKING SEED COLLECTIONS

- Characteristics which indicate that the seed source is likely to be of local origin include such factors as evidence of coppicing, absence of organised planting patterns, a wide age-class distribution and old records or maps. Areas recognised as ancient semi-natural woodland are most likely to contain populations of local origin.
- In collecting seed, the aim should always be to choose a defined population, i.e. an identifiable group or assembly, of interbreeding individuals of the species in question. Isolated trees or pooled collections of seed from a range of these should be avoided. Clearly there will be acceptable reasons for exceptions to this in specific circumstances.
- There should be no selection for particular characteristics if there is a choice of parent trees available. Trees should be sampled to reflect the range of growth and morphological characteristics visible in the population.
- Parent trees from which seed is collected should, if possible, be isolated from the immediate influence of non-native material of the same species as a potential pollen source.
- If possible, collection should be made from at least 20–30 individuals. Care should be taken to collect fairly equal quantities from each of these rather than to create an imbalance in their contribution to the collection by favouring individuals with a particularly abundant and accessible seed crop. As a general principle, small quantities should be picked from many individuals in preference to larger quantities from a few trees.
- In natural stands, it is also important to collect seed from well-separated trees because, under natural regeneration, close trees are more likely to be the progeny of the same seed parent and thus too closely related. Collectors should try to achieve a minimum of 50 metres separation between parent trees.
- Following extraction and clearing the seedlot should be thoroughly mixed to ensure that seed of individual component parents are combined. This is especially important where a seedlot is divided up for use by several growers.

Table 1a Native species appropriate to the numbered zones

Large and medium sized trees		Seed zone number																		Soils														
		101	102	103	104	105	106	107	108	109	201	202	203	204	301	302	303	304	305	401	402	403	404	405	406	a	b	c	d	e	f			
Species																																		
alder, black	<i>Alnus glutinosa</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								
apple, crab	<i>Malus sylvestris</i> ssp <i>sylvestris</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	
ash	<i>Fraxinus excelsior</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	
aspen	<i>Populus tremula</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	
beech	<i>Fagus sylvatica</i>																																	
birch, downy	<i>Betula pubescens</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	
birch, silver	<i>Betula 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	
cherry, bird	<i>Prunus padus</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	
cherry, gean	<i>Prunus avium</i>																																	
elm, wych	<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	1	1	1	1	1	1	1	1	
hornbeam	<i>Carpinus betulus</i>																																	
lime, small-leaved	<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	
lime, large-leaved	<i>Tilia platyphyllos</i>							1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
maple, field	<i>Acer campestre</i>																																	
oak, common	<i>Quercus robur</i>																																	
oak, sessile	<i>Quercus petraea</i>																																	
pine, Scots	<i>Pinus sylvestris</i>																																	
poplar, black	<i>Populus nigra</i> var. <i>betulifolia</i>																																	
poplar, grey	<i>Populus canescens</i>																																	
rowan	<i>Sorbus aucuparia</i>																																	
service tree	<i>Sorbus torminalis</i>																																	
whitebeam	<i>Sorbus aria</i> sensu lato																																	
willow, crack	<i>Salix fragilis</i>																																	
willow, goat	<i>Salix caprea</i>																																	
willow, white	<i>Salix alba</i>																																	
yew	<i>Taxus baccata</i>																																	

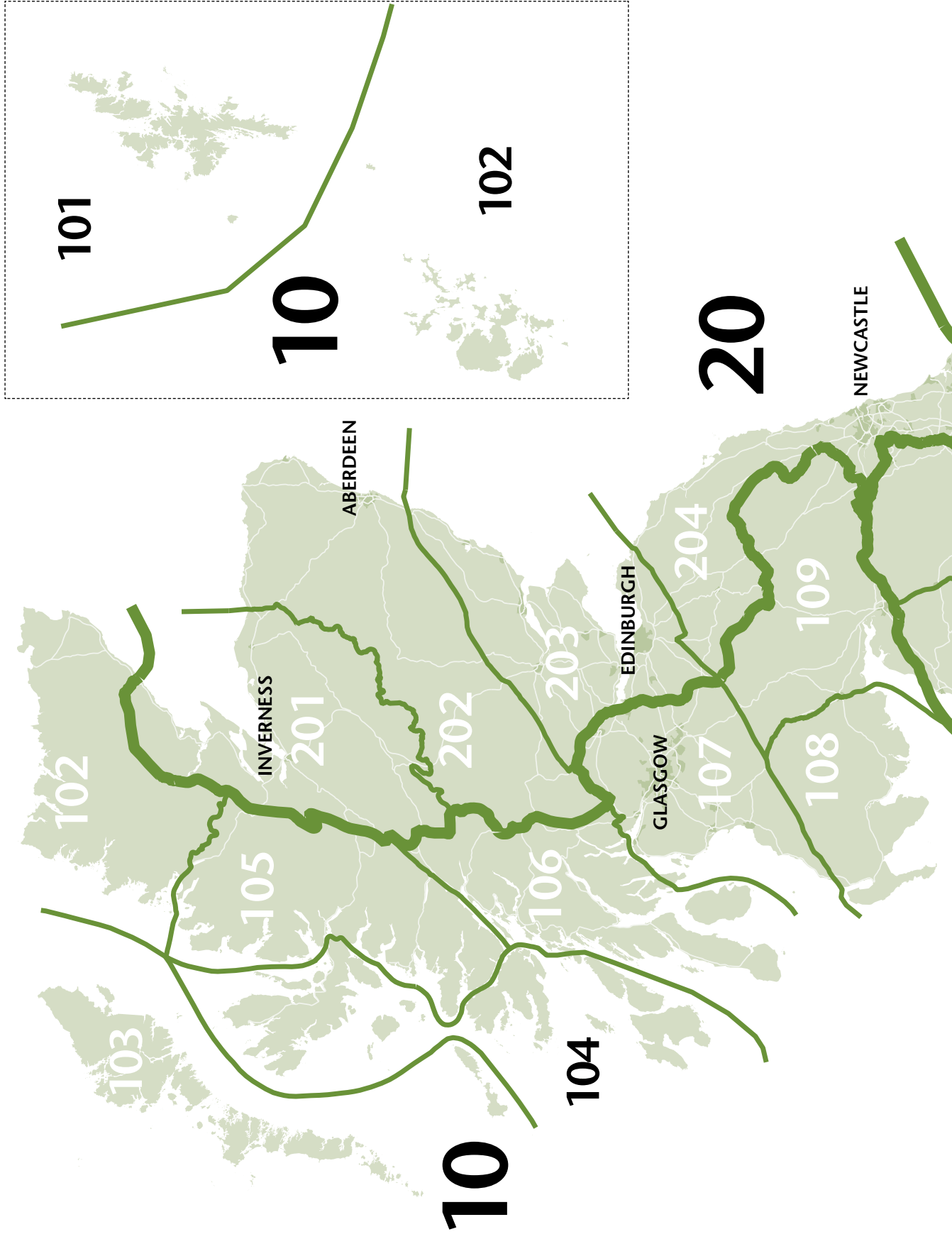
SOILS: a = wet sites b = light, dry soils c = heavy soils d = acid e = neutral or alkaline f = exposed sites

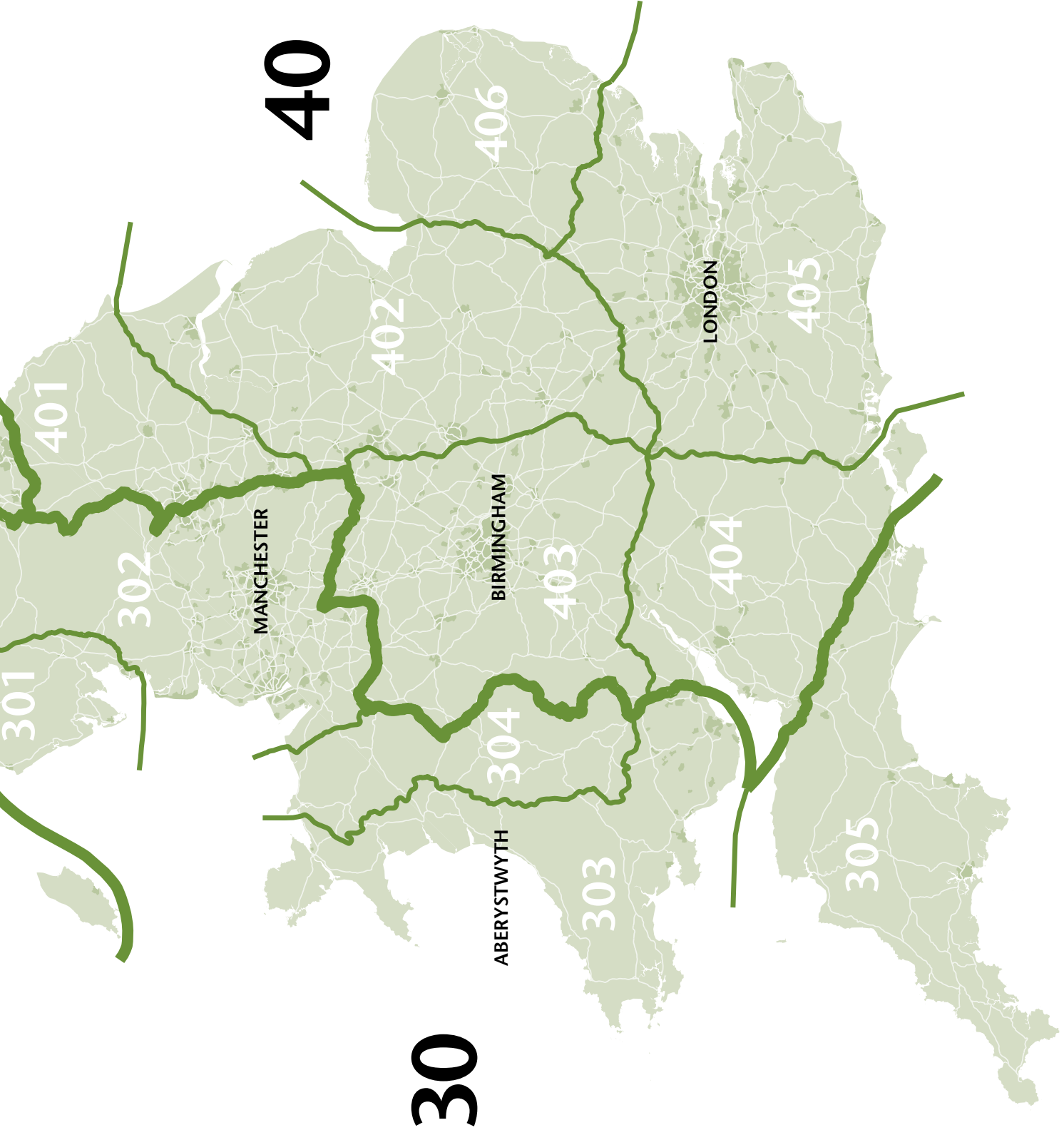
Table 1b Native species appropriate to the numbered zones

Small trees and shrubs		Seed zone number																				Soils														
		101	102	103	104	105	106	107	108	109	201	202	203	204	301	302	303	304	305	401	402	403	404	405	406	a	b	c	d	e	f					
blackthorn	<i>Prunus spinosa</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		
box	<i>Buxus sempervirens</i>																1	1	1				1				1							1		
broom	<i>Cytisus scoparius</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		
buckthorn, alder	<i>Frangula alnus</i>								1																										1	
buckthorn, purging	<i>Rhamnus catharticus</i>								1																										1	
butcher's broom	<i>Ruscus aculeatus</i>																																		1	
dogwood	<i>Cornus sanguinea</i>								1																										1	
elder	<i>Sambucus nigra</i>								1																										1	
gorse	<i>Ulex 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	1	1	1	
guelder rose	<i>Viburnum opulus</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
hawthorn, common	<i>Crataegus monogyna</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
hawthorn, Midland	<i>Crataegus laevigata</i>																																			1
hazel	<i>Corylus avellana</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	
holly	<i>Ilex aquifolium</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
juniper	<i>Juniperus communis</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
privet	<i>Ligustrum vulgare</i>								1																											1
rose, dog	<i>Rosa canina</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
rose, field	<i>Rosa arvensis</i>								1																											1
spindle	<i>Euonymus europaeus</i>								1																											1
spurge laurel	<i>Daphne laureola</i>								1																											1
wayfaring tree	<i>Viburnum lantana</i>																																			1
willow, almond	<i>Salix triandra</i>								1																											1
willow, bay	<i>Salix pentandra</i>								1																											1
willow, eared	<i>Salix aurita</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
willow, grey	<i>Salix cinerea</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
willow, oster	<i>Salix viminalis</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
willow, purple	<i>Salix purpurea</i>								1																											1

SOILS: a = wet sites b = light, dry soils c = heavy soils d = acid e = neutral or alkaline f = exposed sites

Figure 1 Map of local seed zones





30

40

MANCHESTER

BIRMINGHAM

ABERYSTWYTH

LONDON

401

302

402

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403

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305

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304

REFERENCES

FORESTRY COMMISSION (1998).

The UK forestry standard.

Forestry Commission, Edinburgh.

STATUTORY INSTRUMENT 1977 No 891.

The Forest Reproductive Material Regulations 1977.

HMSO, London.

FORESTRY COMMISSION (1990).

Forest nature conservation guidelines

HMSO, London.

FORESTRY COMMISSION (1994).

The management of semi-natural woodlands

Forestry Practice Guides 1–8.

Forestry Commission, Edinburgh.

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