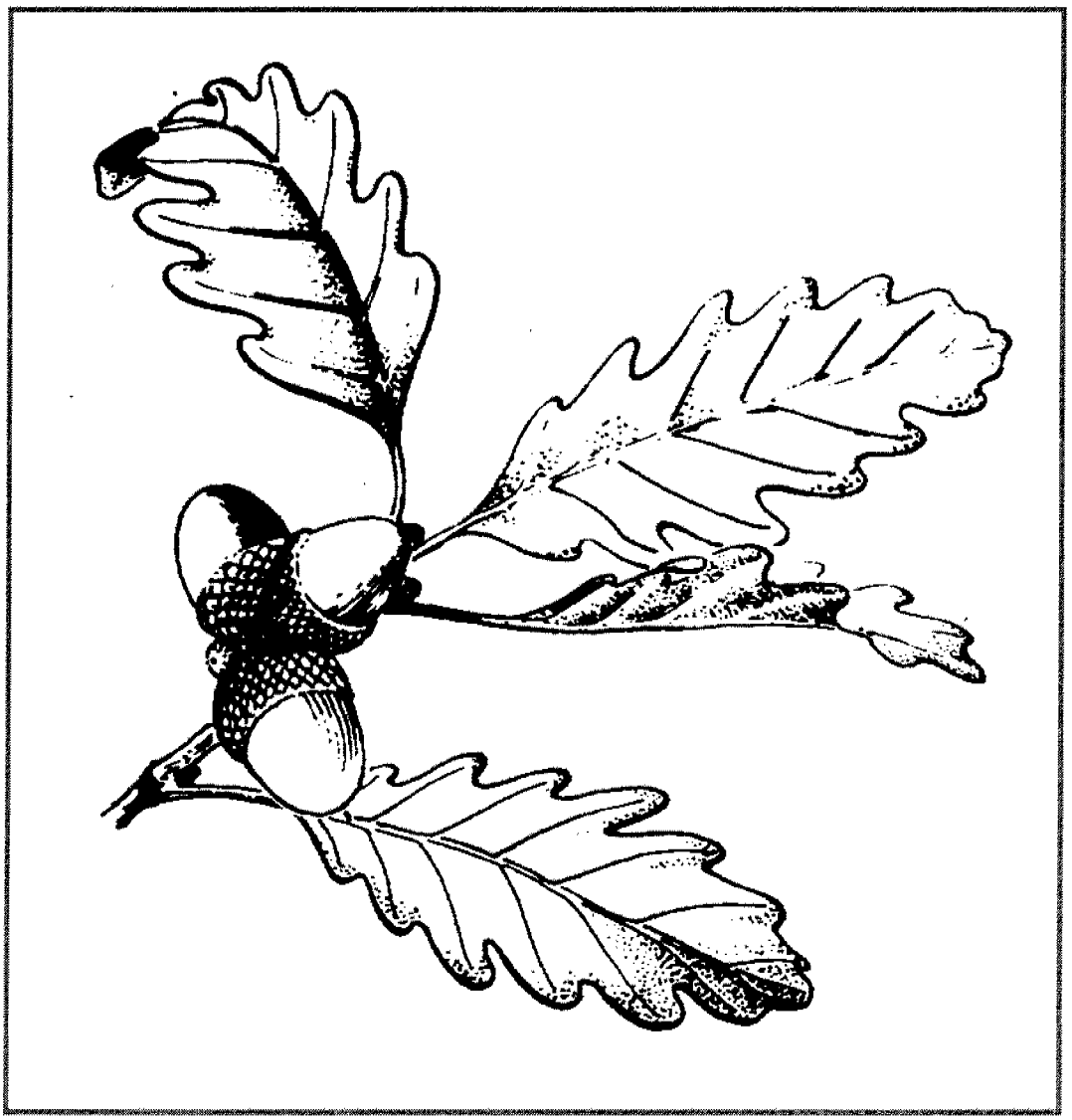
ENGLISH NATURE

Developing new native woodland in the English uplands

No. 230 - English Nature Research Reports



working today
for nature tomorrow

INSTITUTE OF TERRESTRIAL ECOLOGY
(NATURAL ENVIRONMENT RESEARCH COUNCIL)
Project T08077B5
ENGLISH NATURE Contract UFT/2/U78

Final Report

DEVELOPING NEW NATIVE WOODLAND IN THE ENGLISH UPLANDS

By

[1]Good, J.E.G., [1]Norris, D., [2]McNally, S. & [1]Radford, G.L

[1]Institute of Terrestrial Ecology
Bangor Research Unit
University of Wales, Bangor
Deiniol Road, Bangor
Gwynedd LL57 2UP

[2]Institute of Terrestrial Ecology
Monks Wood Research Station,
Abbots Ripton, Huntingdon
Cambridgeshire PE 17 2LS

FEBRUARY 1997

CONTENTS Page No

TABLES Page No

CAPTIONS TO FIGURES

NORTHUMBERLAND NATIONAL PARK

LAKE DISTRICT NATIONAL PARK

DARTMOOR NATIONAL PARK

CAPTION TO PLATES

Northumberland National Park - Photographs taken in the College Valley

Lake District National Park - Photographs taken at Glenridding

Dartmoor National Park - Photographs taken at Widecombe in the Moor

Peak District National Park - Photographs taken at Milldale

Shropshire Hills Area of Outstanding Natural Beauty - Photogaphs taken at Brown Clee Hill

PREFACE

English Nature is committed to promoting the expansion of all woodlands types in the appropriate locations, in line with the Government's target of doubling woodland cover in England by 2050. This study is a preliminary investigation of the possibilities and practicalities for the expansion of native woodland in the English uplands. The extensive tracts of non-woodland semi-natural habitat in the English uplands combined with the prevailing socio-economic context have meant that in the past, woodland expansion has been regarded with some sensitivity. This document will be used as the basis for discussion and developed through consultation with all interested stakeholders, to achieve productive upland landscapes that are rich in wildlife.

Christine Reid, Woodlands Officer
Jayne Manley, Senior Uplands Officer

English Nature
March 1997

EXECUTIVE SUMMARY

The objectives of the study, which was primarily desk-based but supported by essential fieldwork were:

- to document the extent of initiatives and schemes to develop new native woodland in upland England (particularly but not exclusively in the National Parks);
- to record expert opinion on the potential land available for such woodland development, compatible with maintaining the nature conservation value of open land;
- to assemble 15-20 examples (subsequently reduced to 10) where both small (<5 ha) and large (10-50 ha) blocks of new woodland might be developed with benefits for nature conservation (with the reasoning behind this) in the absence of financial or agricultural constraints;
- to analyze for at least 5 of these what are the constraints in practice concentrating on the larger examples;
- to indicate what is needed to overcome such constraints.

Our findings are as follows:

- general support from conservation organisations, the forestry industry and to a lesser extent the farming industry for expansion of semi-natural woodland in the upland;
- concern about how such woodland expansion might be achieved relating to worries about changes in landscape character and loss of open-ground habitat among conservationists, loss of subsidy income among landholders;
- woodland grant scheme uptake in England has mainly been in the lowlands on larger holdings with existing forestry (in contrast to Northern Ireland, Scotland and Wales) where a higher proportion has been in LFA's);
- there has been considerable local variation in uptake in the different upland areas included in this study, from 5% of land entered in the Lake District and Dartmoor National Parks to only 1% in Northumberland (which also has by far the lowest proportion of current woodland cover);
- this suggests that the schemes need to be more flexible to allow tailoring to meet the requirements of landholders in regions with differing agroeconomic circumstances;
- concern over lack of local markets for wood, especially small diameter hardwood, contribute to landholders scepticism about moving land from agricultural production into farm woodlands. This problem is being addressed in various places but a more concerted effort is required to stimulate development of local wood-based industries;
- most upland farmers have no experience of forestry, no understanding of its potential benefits and no knowledge of the grants available or of how to establish and manage farm woods. Advice on grants and how to obtain them and training in farm woodland practices, expanding on-farm demonstrations would help to overcome these deficiencies;
- our analysis shows that there is no shortage of land potentially suitable for new woodlands in any of the five study areas;
- in most instances the majority of this land is adjacent to existing woodland, joining together fragments (often including ancient semi-natural stands) to form larger woods. This fits in ideally with policy statements by all parties consulted favouring extension of existing woodland rather than planting on isolated sites;

- ecological cost-benefit analysis is advised to determine whether particular new woods will produce a net nature conservation benefit. This requires individual well informed decisions at the local level;
- these decisions must be made within the context of the broader regional Natural Area, Landscape Character and other appropriate guidelines;
- bigger woods are generally better for wildlife conservation than smaller ones as they generally contain more species and more viable breeding populations. Very small stands with a high edge:area ratio should generally be avoided, although they may be useful to link isolated woods as many species will use them as corridors which would not stay and breed in them;
- economic considerations also favour bigger woods because they are cheaper to establish and manage and are more likely to produce timber in economically marketable lots;
- attitudes vary in the National Parks about placement of new woods. Sensitivities to loss of open-ground landscapes/habitats are particularly strong in Dartmoor, which is the only substantial area of open moorland in the South of England and in the South West Peak and the Clun Forest and Clee Hills of Shropshire where heathland area is small and fragmented. Controlled woodland expansion on moorland is more acceptable (in principle, though often not in practice) in the Lake District, Dark Peak and Northumberland with their larger moorland areas;
- woodland expansion is (perhaps paradoxically) most readily accepted in areas (South West Lake District, Clun Forest hill slopes, Dartmoor edge river valleys) where woodland cover is already relatively dense and woodland is therefore a feature of Natural Area and Landscape Character plans;
- natural regeneration is generally favoured as the method of semi-natural woodland establishment. However, there are many instances where it will not be appropriate and where planting will be necessary using methods described in Forestry Commission Bulletin 112;
- some evidence (chiefly from the Lake District) suggests that current ESA Tier 2 grazing prescriptions may be allowing natural regeneration without the need for fencing. In most instances, however, fencing will be necessary and in many places deer are an increasing threat to broadleaved woodland establishment. Coordinated deer control policies are required to deal with this problem;
- sustainable multi-use forests are unlikely to resemble ancient semi-natural woodland but they will be greatly preferable to conifer monocultures as wildlife habitat. English Nature should be combining with the Countryside Commission and the National Park Authorities to bring pressure to bear on the Forestry Authority to promote silvicultural techniques (notably continuous cover forestry) in such forests which favour landscape and wildlife conservation;
- English Nature and the other agencies seeking expansion of semi-natural woodland in the uplands should be trying to influence MAFF to move away from livestock headage payments and towards support for production. This would remove the current penalty suffered by most upland farmers who take land out of agricultural production and into forestry and would thus provide a considerable stimulus to woodland expansion.

1. GENERAL INTRODUCTION

1.1 BACKGROUND

In its White Paper, *Rural England*, published in 1995, the Government drew attention to the low level of woodland cover and its belief that a significant expansion of woodland would help to improve the appearance of the countryside, create jobs, enrich wildlife habitats and open up new opportunities for recreation. The White Paper recommended "a doubling of woodland in England over the next half century".

Doubling woodland cover (to 15%) would involve approximately one million hectares of new woodlands, requiring major changes in land use and would "transform the appearance of the countryside" (*Woodland Creation: Needs and Opportunities in the English Countryside*, FC/CC 1996). This would bring cover back to approximately what it was at the time of the *Domesday Book*. How this unprecedented expansion of woodland cover is to be achieved is not clear and this is in part the reason for English nature commissioning this study. There is little doubt that the land is potentially available if the constraints (financial, cultural, ecological, landscape, archaeological) can be overcome. While the potential problems are daunting It should be borne in mind that restoring woodland cover to 15% of land area would merely place England on a level par with the average for its European neighbours. Furthermore, there is no reason to suppose that the increase in woodland need occur evenly throughout the country. Some counties already have substantial woodland cover (Surrey 19%) while others have very little (Cambridgeshire 2%).

While the main opportunities for woodland expansion, particularly with broadleaves, may be considered to lie in lowland areas, where site conditions are generally more suitable, and where changing agri-economic conditions may favour the release of land from intensive agriculture, there are also opportunities in the uplands. This is recognised in, for example, the UK Biodiversity Habitat Action Plan for upland oakwoods which has a target for an increase of 10% by area. More generally, expansion of native woodland within National Parks is envisaged in an accord between the National Parks Authorities and the Forestry Authorities signed in 1995. Local Native Woodland Accords are currently being negotiated between these partners in each of the National Parks. One of the key objectives of the national and local accords is to identify areas and circumstances where new native woodland is appropriate. This is an issue of key importance in the uplands because of memories of past controversies over 'insensitive' large-scale conifer afforestation and present concerns over potential encroachment of new woodlands onto areas of open habitat (notably heather moorland and species-rich grassland) of high conservation value.

English nature is anxious to determine where new woodland in the uplands will benefit nature conservation and where it should be discouraged. Hence the present study which relates primarily to the plans for woodland expansion in National Parks.

1.2 OBJECTIVES

The objectives of the study, which was primarily desk-based but supported by essential fieldwork were:

- to document the extent of initiatives and schemes to develop new native woodland in upland England (particularly but not exclusively in the National Parks);
- to record expert opinion on the potential land available for such woodland development, compatible with maintaining the nature conservation value of open land;
- to assemble 15-20 examples (subsequently reduced to 10) where both small (<5 ha) and large (10-50 ha) blocks of new woodland might be developed with benefits for nature conservation (with the reasoning behind this) in the absence of financial or agricultural constraints;
- to analyze for at least 5 of these what are the constraints in practice concentrating on the larger examples;
- to indicate what is needed to overcome such constraints.

The results of these studies are presented here in 5 Sections: Introduction; Methods; Study Areas; Socioeconomic Considerations (study areas), ending with a General Discussion which includes consideration of the views presented by the correspondents selected by English nature.

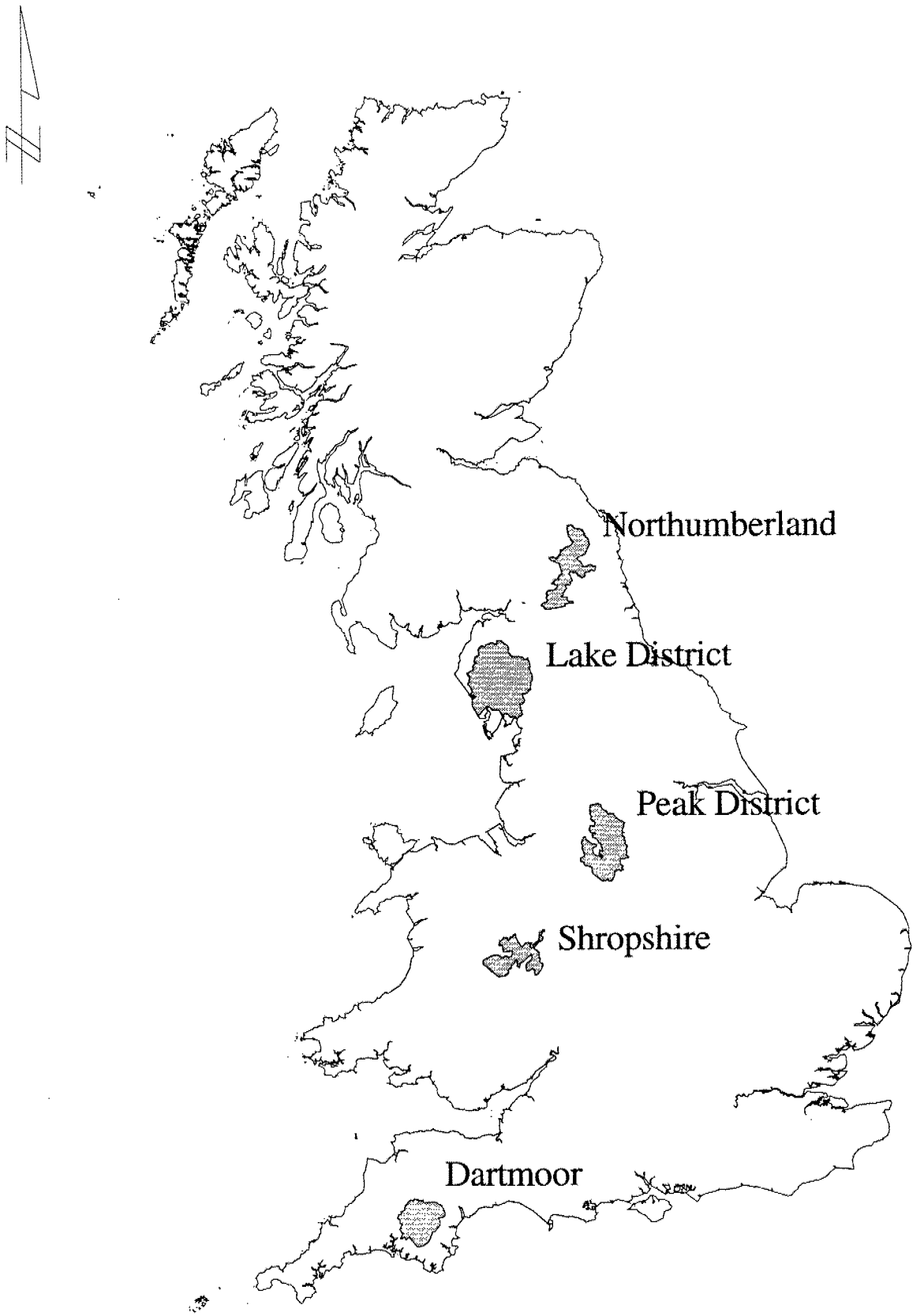
1.3 APPROACH

It was agreed in discussions between ITE and EN that the study should be limited to four National Parks (Dartmoor, Peak District, Northumberland, Lake District) and one Area of Outstanding Natural Beauty (AONB) (Shropshire Hills)(Figure1.3.1). It was considered that these five areas represented the main range of upland wildlife habitats in England with contrasting topography, climate and land use. It was also agreed that in selecting study areas within these five NP's/AONB certain restrictive criteria should be applied in the first instance, although with the option that they be overridden where a good case could be made. For example, areas below the 200 m contour (not predominantly upland in character) or above the 600 m contour (too high for successful tree establishment) were to be excluded. All deep peat areas were also excluded on the grounds of their unsuitability for native broadleaved woodland and their generally high wildlife conservation value. The ITE Land Cover Map was used to characterise broad land cover types in the NP's and it was decided to screen out additional areas considered inappropriate for broadleaved woodland expansion by excluding certain land cover types. These included existing woodland and substantial areas (>5 ha) of shrub heath and shrub moor. More details of the methods employed may be found in the methods section (2.1).

The resultant GIS-produced maps showing possible planting areas in each of the NP's were then sent to the English Nature Team Leaders in the offices covering each Park/AONB requesting them to select 2-3 contrasting areas not more than 10 x 10 km in extent, one being relatively well wooded already, a second with little woodland cover. Existing areas of woodland >2 ha in extent were shown on the maps to guide the choice. Team Leaders were

Figure 1.3.1

Location of study National Parks and AONB



also asked to indicate availability of datasets (e.g. air photograph cover, Phase 1 and Phase 2 survey data, local survey and monitoring data, digital terrain, geology or soils data, National Park Section 3 maps) which might be useful in the next stage of the study. Once the suggested 10 x 10 km study areas were received back from the Team Leaders boundary lines where redrawn where necessary before asking Team Leaders to confirm that they were happy with them.

Meanwhile the consultation exercise required under the second project objective was under way. This involved writing to a wide range of correspondents representing national (Forestry Authority, Forest Enterprise, Countryside Commission, National Trust, National Farmers Union, Council for the Protection of Rural England) and local (National Park Authorities, Local Wildlife Trusts, Local Farmers and Wildlife Advisory Groups) interest groups. In several instances the national bodies provided both national and regional responses. The names and addresses of those contacted and the text of the letter sent to them can be found in Appendix 1. Excerpts from their replies (appropriately acknowledged) may be found throughout this report but the complete correspondence is confidential to English nature at this stage.

The two 10 x 10 km areas within each NP/AONB having been agreed the next step has been to characterise each in terms of topography (aspect, slope, altitude), existing woodland cover, (including Ancient Woodland), other land cover types, soils, using the same exclusion criteria as in the classification of the Parks as a whole. Overlaying the resulting maps has enabled the production of a GIS-generated composite map showing existing woodland and indicating potential planting areas. The details of the methodology employed are contained in the methods section (2.2).

The next stage was to select one smaller area within each NP/AONB (5 areas in all) for more detailed analysis and preparation of suggestions for possible woodland expansion This was done in the local EN offices with EN and often NPA staff during a one-day field visit to each region. It should be emphasised that the intention was *not* to produce a definitive plan for woodland expansion in the smaller study areas, but to demonstrate the usefulness of the method in identifying the opportunities for woodland expansion in a particular area, the most appropriate types of target woodland, the ways of establishing it (species, natural regeneration vs planting, fencing vs. individual tree shelters), the ecological costs and benefits in terms of other habitats and species displaced, and a limited assessment of the landscape, agricultural and archaeological constraints. It was hoped that by focusing on real areas rather than creating imaginary scenarios we would bring to light the influence of such factors as regional perceptions of the need for extra native woodland as well as variations in the actual and perceived constraints. In order to highlight such factors and stimulate discussion when the report is circulated the proposals in each study area were based primarily on objective map-based assessments of planting potential, thus providing a 'level playing field' for those discussions. The smaller study areas are tied in to their 10 x 10 km 'parents' and the National Park in which they lie through a section which describes the criteria used for their selection, and their characteristics in relation to the larger 10 x 10 km study areas and the NP as a whole.

Having agreed the smaller study areas the opportunity was taken to visit each and obtain detailed land cover information from aerial photographs, consult any additional datasets (e.g.

Phase 1 survey) and take photographs to illustrate the final report. The opportunity was also taken during these visits to get a better 'feel' for local issues relating to woodland expansion through discussions with National Park Authority and English Nature staff. These visits took place in January 1997.

In order to address the project objective of highlighting agri-economic issues associated with conversion of agricultural land to woodland in the uplands an assessment has been made at two levels. Firstly an overview has been produced (Section 1.4) which considers such factors as the economic rationale for tree planting, the incentive schemes available to landowners and farmers, and the take up of grants available under such schemes to date. At a more detailed level, an assessment has been made of the likely operation of these factors in each of the National Parks (Section 4). An indication of local perceptions of the economics of converting agricultural land to woodland has been obtained through telephone conversations with EN, NP and landholder organisation representatives.

Having described the opportunities for and possible constraints upon woodland expansion in the 5 study areas, the opportunity has been taken to conclude with a discussion of the regional variations, including the influence of environmental, attitudinal and agri-economic factors considered within the overall context of the likely effects of woodland expansion on the ecology of these differing upland areas.

1.4 OVERVIEW OF ECONOMIC ASPECTS OF WOODLAND EXPANSION

In recent years there has been an increasing recognition of the broad range of benefits that can arise from tree planting. Forestry policy has taken on a wide range of objectives in addition to building up of a reserve of timber, from rural employment promotion to wildlife conservation and from public recreation provision to wood production for local processing industries (Nicholls *et al.* 1996). Although the nature conservation value of woodland is the main concern of this report, there are also other types of benefit generated by woodland that one might also want to bear in mind when making decisions about where to plant trees. There are also likely to be many instances where economic disincentives are likely to be identified as a major reason why woodland expansion may not take place in a particular area.

There are three main sections of this overview. In the first section, there will be a brief account of the economic rationale for tree planting. Secondly, we will describe the different schemes available for tree planting. Finally, we will comment on how such schemes have been evaluated and what issues have been identified by researchers.

1.4.1 **Economic rationale for tree planting**

When economists are evaluating an environmental scheme in a particular area, they usually have a conceptual framework where the different social and private benefits of tree planting are described. Using a range of different valuation techniques, there is an attempt to measure benefits in a monetary way so that they can be compared to the economic costs of tree planting in the area of interest. Benefits arise from timber production, landscape, recreation, carbon sequestration, biodiversity, and so on. The many benefits are often categorised into "use" and "non-use" values where the former is the direct value obtained from using the resource (e.g from going to the wood for recreational purposes) where as the latter value may

be held by people who have never even seen the resource (e.g. the value of knowing that biodiversity is being enhanced).

The economic value of nature conservation is often measured directly by constructing a questionnaire in which aspects of the good being valued (e.g. forestry) are described and then ascertaining what people would be willing to pay for an increase in the provision of that good through an appropriate payment vehicle (such as an increase in income tax or an entry fee).

Once the range of values for the good in question have been measured in monetary terms, they may then be compared directly with costs. That benefits of a proposed scheme outweigh expected costs is a necessary condition for the scheme to be an efficient use of public funds.

However there are considerable practical problems of measuring ecological benefits in a monetary way, as well as more fundamental criticisms that arise when people hold different value systems (see, for example, Hanley *et al.* 1994). However in defence of the methodology, its use, to some extent, ensures that the public's preferences for landscape are given a fair place in decision making and it does improve the accountability of the political process (Santos, 1996). However there is also support among economists for a multi-dimensional approach to conservation decision-making in which expert opinion has an important role (Santos, 1996).

There are other particular approaches to evaluating environmental schemes which have more relevance to this report. For example Cost Effectiveness Analysis (CEA) permits competing conservation initiatives to be judged both in terms of how well they perform in relation to a set of ecological objectives (their effectiveness) and on how much they cost. However as Willis and Garrod (1996) point out, this pre-supposes that the benefits provided under the objectives justify the expenditure needed to obtain them. Willis and Garrod (1996) explain that this approach requires a clear understanding of the costs and benefits arising from each option. They suggest criteria for judging an option's effectiveness for meeting biodiversity targets might include speed, timeliness, negative side-effects and the area of action.

Another similar technique is called Cost-Utility Analysis (CUA). This involves assigning a particular score to the quality and quantity of biodiversity gained or lost for each alternative so that competing alternatives can be judged both in terms of their relative scores and relative costs (Willis *et al.* 1996).

Economic costs of planting trees refer to social opportunity costs (i.e. the resource cost of planting trees and any external impact) rather than the financial costs (e.g the cost of providing grants to farmers). Economic costs are frequently lower than financial costs because the Common Agricultural Policy greatly magnifies the level of grant aid necessary to induce farmer participation in schemes. For a scheme to be efficient in economic terms, a necessary condition is that economic benefits outweigh economic costs (and not necessarily financial costs). However because the total environmental budget is constrained, financial costs do have great significance for policy makers.

Even though the socio-economic benefits of tree planting may be significant, this will not induce many farmers to plant trees if they are primarily concerned with maximising profitability. For the individual farmer, the relevant comparison is between the financial

return available from planting trees versus that obtainable from using the land in an alternative way. Hence an increase in the area under private woodland has largely relied on the availability of grants to farmers.

1.4.2 **What schemes are available to farmers?**

1.4.2.1 National forestry schemes

The main national schemes designed specifically to create woodland are the Woodland Grant Scheme (WGS) run by the Forestry Commission and the Farm Woodland Premium Scheme (FWPS) run by MAFF. The two schemes operate very closely together.

Under the WGS, the grants offered for the creation of new woodlands range from £700/ha to £1,350/ha and are paid in two instalments: 70% after planting and 30% five years later. Normally there must to a stocking density of 2,050 tree per hectare to qualify for a full grant. However the lower density of 1,100 trees per hectare is acceptable in the following circumstances: (1) for new native woodlands on appropriate sites; (2) for small-scale planting of broadleaves where there is little potential for timber production, normally as discrete woodlands under 3 hectares or as a component of predominantly coniferous planting schemes (FC, 1995).

There are a range of other grants within this scheme and details of these are given in Table 1.4.1 These included payments to assist work required to encourage natural regeneration, locational supplements for planting in specific areas of the country and annual management grants which may be given for conservation purposes.

The Farm Woodland Premium Scheme run by MAFF is open to farmers throughout England and encourages the planting of new woods on land currently in productive agriculture. Annual payments ranging from £60/ha to £250/ha are available depending on the type of land to be planted, for either 15 years for mainly broadleaved woodland or 10 years for mainly conifer woodland. These payments are in addition to the full range of grants payable by the Forestry Authority under the WGS. Farmers have to obtain approval for establishment grants under the WGS before their application under the FWPS can be approved. There is also some limits to the area of land that may be entered into the scheme and minimum areas for planting. Details about the scheme are reported in Table 1.4.2

Grants available under the FWPS can be seen as a way of compensating farmers for loss of agricultural income where as the largest component of grant aid under the WGS is to cover the costs of woodland establishment and maintenance.

Table 1.4.1 Grants available under the Woodland Grant Scheme[1]

1 Establishment/maintenance grants

New Planting

	Rates of grant per hectare	
Conifers	£700	
Broadleaves	£1,350	For woods under 10 hectares
	£1,050	For woods of 10 hectares and over.
Better land supplement	£600	For both conifers and broadleaves on arable land or improved grassland.
Community woodland supplement	£950	Available for planting within 5 miles of the edge of a village, town or city with few other woods available for recreation
Locational supplement	£600	Applies to areas of the country where special initiatives are operating - only available over a limited period of time.
New planting of short rotation coppice		To be paid in a single instalment after planting
	£400	On set-aside land (restricted to 1,250 ha)
	£600	On other land (restricted to 1,000 ha)

Restocking

	Rates of grant per hectare	Required stocking densities per hectare
Conifers	£325	2,250
Broadleaves	£525	1,100

Natural Regeneration

	Discretionary grant to assist with initial costs	Per hectare grants after regeneration has been successful
Conifers	50% of cost of approved work	£325
Broadleaves	50% of cost of approved work	£525

[1] Most of this information is obtained from the Forestry Commission's Annual Report 1995.

2 Annual grants

	Grants per hectare, per year	
Annual Management Grant	£35	Available for work which involves safeguarding or enhancing the environmental value of the wood; improving woods which are below current environmental standards; creating, maintaining or enhancing public access;
Livestock Exclusion Annual Premium	£80	To be paid in appropriate cases for 10 years to exclude livestock from old established or native woodlands whose long-term survival is being threatened by grazing.

3 Other

Woodland Improvement Grant	A discretionary grant (based on 50% of agreed costs) to assist one-off environmental improvement measures including improvements in the recreational quality of woodlands.
Tender Scheme for the National Forest	A Tendering Scheme will be introduced under which applicants submit plans for creating new woodlands and bid for an amount of grant-aid which they believe to be needed to implement their plan.

Table 1.4.2 Grants available under the Farm Woodland Premium Scheme[2]

Annual payments

Type of Land	Payment (per hectare per year)
Arable Land/Improved Grassland	
Outside Less Favoured Areas	£250
Disadvantaged Areas of the Less Favoured Areas	£190
Severely Disadvantaged Areas of the Less Favoured Areas	£130
Unimproved Land	
Less Favoured Areas (whether Severely Disadvantaged or Disadvantaged Areas)	£60

Conditions and eligibility

Available only to farmers who run an agricultural business who have obtained approval under the WGS. Upper limits to the area of land that may be entered into the scheme are applied as follows:

* Aggregate planting not to exceed 50% of the area of the agricultural unit.

* Maximum 40 ha of unimproved land per individual unit.

* Maximum 100 ha of planting on common grazings in the Scottish Crofting Counties.

The minimum area for planting or natural regeneration per agricultural unit is 1 ha. With no restrictions imposed on the size of individual blocks.

[2] This information is reproduced from the report for the Scottish Office Agriculture, Environment and Fisheries Department by the Macaulay Land Use Research Institute. Bob Crabtree (ed.), *Evaluation of the Farm Woodland Premium Scheme*. September 1996.

1.4.2.2 Other schemes to encourage tree planting

There are a range of other schemes through which grant aid may be obtained. Lorrain-Smith (1989) has written a book devoted to the subject in which he describes the range of government grants, grants from trusts and charities, commercially sponsored environmental awards, partnerships initiatives involving trees, loans for forestry, assistance for wood-based developments and taxation in forestry.

The two major national environmental schemes - the Environmentally Sensitive Area Scheme and the Countryside Stewardship Scheme offer incentives for tree planting (although this may be restricted to certain areas). For example in the CSS, payments are available for small-scale tree-planting that fall outside the scope of Forestry Commission grants. Payments are available for coppicing bankside trees and also for pollarding of overgrown trees.

The Lakes District ESA is an example of where supplementary ESA payments may be obtained for loss of grazing and shelter provided that within two years of obtaining an ESA agreement, the farmer gains approval for a woodland management grant under the Forestry Commission's Woodland Grant Scheme or Lake District National Park's Countryside Conservation Grant Scheme. The South West Peak ESA and the North Peak ESA offer a similar deal.

Finally, since June 1995, the rules for environmental set-aside have changed so that farmers are now able to count eligible land entered for the Woodland Grant Scheme and the Farm Woodland Premium Scheme towards their set aside obligation.

1.4.3 Farmer participation in schemes

There have been evaluations of the WGS (Appleton and Crabtree 1991; Gasson and Hill 1990) and FWPS (Crabtree *et al.* 1996) that have indicated various factors determining farmer participation. According to the former studies, evaluations of the WGS, interest mainly came from the more financially secure farmers, principally on arable or mixed farms, where the main motive in planting was environmental enhancement. For many participants subsidies did not fully cover costs and there was some evidence that many farmers would have planted trees in the absence of the scheme. However, the WGS fell well short of achieving its target rate of uptake for the first three years of the scheme.[1] This outcome was predicted by some analysts as a consequence of the low initial rates of grant (Bateman, 1988).

By contrast, the FWPS has been judged to be a great success in leading to a substantial area of new planting in Scotland (Crabtree *et al.* 1996), although there is no publicly stated target for the scheme. However the fact that the two schemes operate so closely together makes it difficult to attribute high uptake to the unique impact of either scheme.

Crabtree *et al.* (1996) distinguish between two types of entrant: farmers who increase income (or wealth) by tree planting and farmers who suffer an income loss, but who have adequate financial resources to make planting feasible and sufficiently strong incentives for tree planting to make it desirable.

---

[1] The initial target for the WGS was to a achieve a total of 36,000 hectares of planting over a three year period. Total approvals when the scheme closed after a six month extension were just under 14,000 hectares (Good et al. 1995).

In their study of the FWPS, they found half of the entrants to be mainstream owner-occupiers, operating farms of above average size, who would be best able to finance any income loss that might occur from tree planting. A further 40 per cent of entrants were found not to be dependent on farm income as their main income source. Entry to the scheme was motivated by many different factors, but from a survey of entrants, the following four reasons were given as most important: to provide shelter; to improve landscape; to encourage wildlife and to make better use of poor quality or difficult land. Providing a source of income was some way down the list. However, the type of farmer not entering the scheme was the owner of a small farm and highly dependent on agricultural income. In such cases the opportunity cost of tree planting might be prohibitive. In a survey of non-entrants, loss of agricultural income was given as the single most important reason for not planting trees.

A farmer concerned principally with maximising profits will carefully weigh all the financial costs and benefits that will arise as a result of alternative land uses. For such a farmer to engage in tree planting, the resulting benefits would have to outweigh the value of foregone agricultural production and any loss of agricultural subsidies. These different costs and benefits will vary substantially between locations depending on farm characteristics and factors such as the agricultural subsidies and woodland grants for which the farmer is eligible to claim.

Finally, although participation in the WGS and FWPS could be increased by raising the payment level (Gasson and Hill 1990; Crabree *et al.* 1996), there are other factors that would encourage increased participation in these schemes. Crabtree *et al.* (1996) found that following higher payment levels, more free advice and information would encourage farmers to participate in the FWPS. A commitment to plant a minimum area was viewed as an important constraint in both the WGS (Gasson and Hill, 1990) and in the FWPS (Crabtree *et al.*, 1996). However in the latter scheme, withholding or repayment of grant aid as a result of crop failure or unsatisfactory establishments was thought of as the most restrictive condition of the scheme by non-participants.

2. METHODS

2.1 SELECTION OF 10 X 10 KM STUDY AREAS

In order to assist local EN staff in choosing the 10 x 10 km study areas within their national Parks, maps showing areas potentially available for upland woodland expansion were prepared base on the following criteria agreed between ITE and English Nature:

Areas to be **included** :-

Land between the 200 m and 600 m contours

And the following ITE Land Cover Map types :-
Saltmarsh
Grass Heath
Moorland Grass
Mown / Grazed Turf
Meadow / Verge / Semi-natural
Ruderal Weed
Felled Forest
Rough / Marsh Grass
Bracken
Tilled Land

Areas to be **excluded** :-

Areas of deep peat

And the following ITE Land Cover Map types :-
Scrub / Orchard
Deciduous Woodland
Coniferous Woodland
And areas greater than five hectares of the following ITE Land Cover Map types :-
Open Shrub Heath
Open Shrub Moor
Dense Shrub Heath
Dense Shrub Moor

To produce the final map the following procedures were followed for each of the National Parks and the AONB:.

1) Using the Bartholomews 1:250000 digital data set, contour data, areas above 200 m within the study areas were defined. Areas above 200 m were coded 100 (potential areas) and areas below 200 m were coded 0 (non-potential areas).
2) Areas of deep peat, as defined from the Soil Survey of England and Wales 1:250000 maps were digitized. Areas not defined as deep peat were coded as 100 (potential areas) and areas defined as deep peat were coded as 0 (non-potential areas)
3) The ITE Land Cover Map data was 'cut out' using the National Park and AONB boundaries held in the Bartholomews 1:250000 digital data set. Land cover types

which were defined as having potential for woodland were coded as 100. Land cover types defined as not having potential were coded as 0.

Areas of Open Shrub Heath, Open Shrub Moor, Dense Shrub Heath and Dense Shrub Moor greater than five hectares were coded as 50, areas less than five hectares were coded as 0.

4) The maps produced as a result of each of these 'sieves' were then 'overlayed'. Potential areas for woodland expansion showed up as areas coded as 300 (i.e where all maps coincided). These areas are referred to as Provisional Possible Areas for Woodland Expansion. Areas which were found to have potential in terms of soil and altitude but were defined as Open Shrub Heath, Open Shrub Moor, Dense Shrub Heath or Dense Shrub Moor are referred to as Possible Additional Areas.

5) These maps were sent out to the EN regional offices for selection of two or more potential study areas, each not more than 10 x 10 km in size and lying wholly within a single 20 km National Grid square. This constraint was applied to contain project costs because the Ordnance Survey Land-Form PANORAMA Digital Elevation Model (DEM) data is sold in twenty kilometre tiles.

2.2 CHARACTERISATION OF THE 10 X 10 KM STUDY AREAS

Having received the maps back from the EN regional offices with the approximate 10 x 10 km study areas marked ITE staff drew in definitive boundaries which generally followed identifiable features on the Ordnance Survey 1:50000 Landranger maps, such as roads, footpaths and administrative boundaries. In some cases watersheds and the edge of the twenty kilometre tiles were used to help define the study area. Maps showing the redrawn boundaries were then copied to EN regional staff for approval or amendment.

For each study area the following procedure has been used:

1) The OS Land-Form PANORAMA Digital Elevation Model (DEM) data was bought for each of the 20 km tiles within which 10 x 10 km sample areas lay. From this data aspect, slope and altitude classes were defined;
2) From the ITE Land Cover Map a map was produced showing the distribution of existing deciduous/mixed woodland two hectares or over. This was done to 'clean' up the data by taking out very small woodland fragments (in some cases just one pixel) which would have clouded the map;
3) The EN Inventory of Ancient Woodland (Provisional) maps were digitized;
4) A current woodland map was then created by combining the existing woodland and the ancient woodland;
5) The map showing potential and non potential (deep peat) soils was cut out for the study area;
6) The map showing potential and non potential land cover types was cut out for the study area. Following responses from the regional offices areas of Open Shrub Heath, Open Shrub Moor, Dense Shrub Heath and Dense Shrub Moor greater than five hectares were defined as not having potential for woodland expansion;
7) The maps defining the aspect, slope, and altitude classes were then overlayed in turn with the map showing the distribution of existing and ancient woodland. Data was then obtained showing the amount of woodland within each of the classes.

Using this data the aspect, slope and altitude classes having the most influence on occurrence of existing (including ancient) woodland were used to create a map of potential areas for woodland expansion having a similar combination of site characteristics. This was overlayed upon the map of existing woodland to produce a single map of existing woodland and potential areas for woodland expansion.

2.3 SELECTION OF THE SMALLER STUDY AREAS WITHIN THE 10 X 10 KM AREAS

Five areas were chosen, one in each of the NP's/AONB. They were chosen subjectively from within the 10 x 10 km areas in discussion withlocal EN and often NPA staff. Most were catchments or sub-catchments the boundaries of which are relatively easy to identify on maps. Their size varied depending upon the nature and scale of the terrain.

2.4 CHARACTERISATION OF THE SMALLER STUDY AREAS

The terrain was mapped using the PANORAMA DEM. Current land cover was mapped from the most recent available air photograph cover, aided by the use of Phase 1 data where this was available in digital form. This information was used to set the smaller study areas within the broader context of the larger 10 x 10 km study areas and the NP/AONB as a whole.

Woodland identified in the mapping exercise was classified into broad types during site visits. Photographs were taken to show the range of typical terrain and land use both in the area as a whole and to indicate where existing woodlands are located.

2.5 ASSESSMENT OF POTENTIAL FOR WOODLAND EXPANSION IN THE SMALLER STUDY AREAS

An assessment was made in the field of the potential for woodland expansion using the land cover map of the area and the map showing potential areas derived as described in Section 2.2. This was revised later to take account of soil types and land use and to some extent (this was a matter of individual judgement) 'statutory' constraints (SSSI's, Section 3 moor and heathland maps, Common Land). For convenience all areas affected by such constraints were marked on a separate map; these are included in this report. These suggested areas for possible woodland expansion were marked on the maps and annotated with details of the purpose of the woodland expansion, the type of woodland to be targeted and the suggested method of establishment These are produced as overlays in this report. The effects of implementing the suggested opportunities for woodland expansion in terms of the loss of alternative land cover types have been calculated and are presented in tabular form. The broader ecological costs and benefits of the change to woodland are also discussed.

2.6 ECONOMIC COST-BENEFIT ANALYSIS OF THE EFFECTS OF WOODLAND EXPANSION

Taking account of the economic analyses done for each National Park/AONB, the influence of woodland expansion on farm economics have been assessed in broad terms. Areas in which woodland expansion is likely to be a relatively attractive option, given current agricultural and forestry incentives, and others where it is likely to be less acceptable are identified. Where it is felt by ITE that current financial incentives are inadequate this is explained and possible ways of increasing the financial returns (e.g. by developing local markets, co-operative marketing) are discussed.

3. STUDY AREAS

This section describes the studies carried out in the five National Parks/AONB, including descriptions of the whole Park/AONB, 10 x 10 km study areas and the smaller areas, and assessments of the potential for woodland expansion at each of these scales based on the objective maps produced as described in Section 2. Table 3.1 shows the existing woodland area (and proportion of total land cover) in each NP/AONB and in the 10 x 10 km study areas by woodland type (coniferous, deciduous/mixed, scrub), obtained from the ITE Land Cover Map. The distribution of land within each 10 x 10 km study area in each NP/AONB by ITE land cover type, also the area and proportion which would be lost if the potential areas for woodland expansion were realised is shown in Appendix 1.

Table 3.1 Existing woodland areas (ha) within each National Park/AONB and the 10 x 10 km study areas

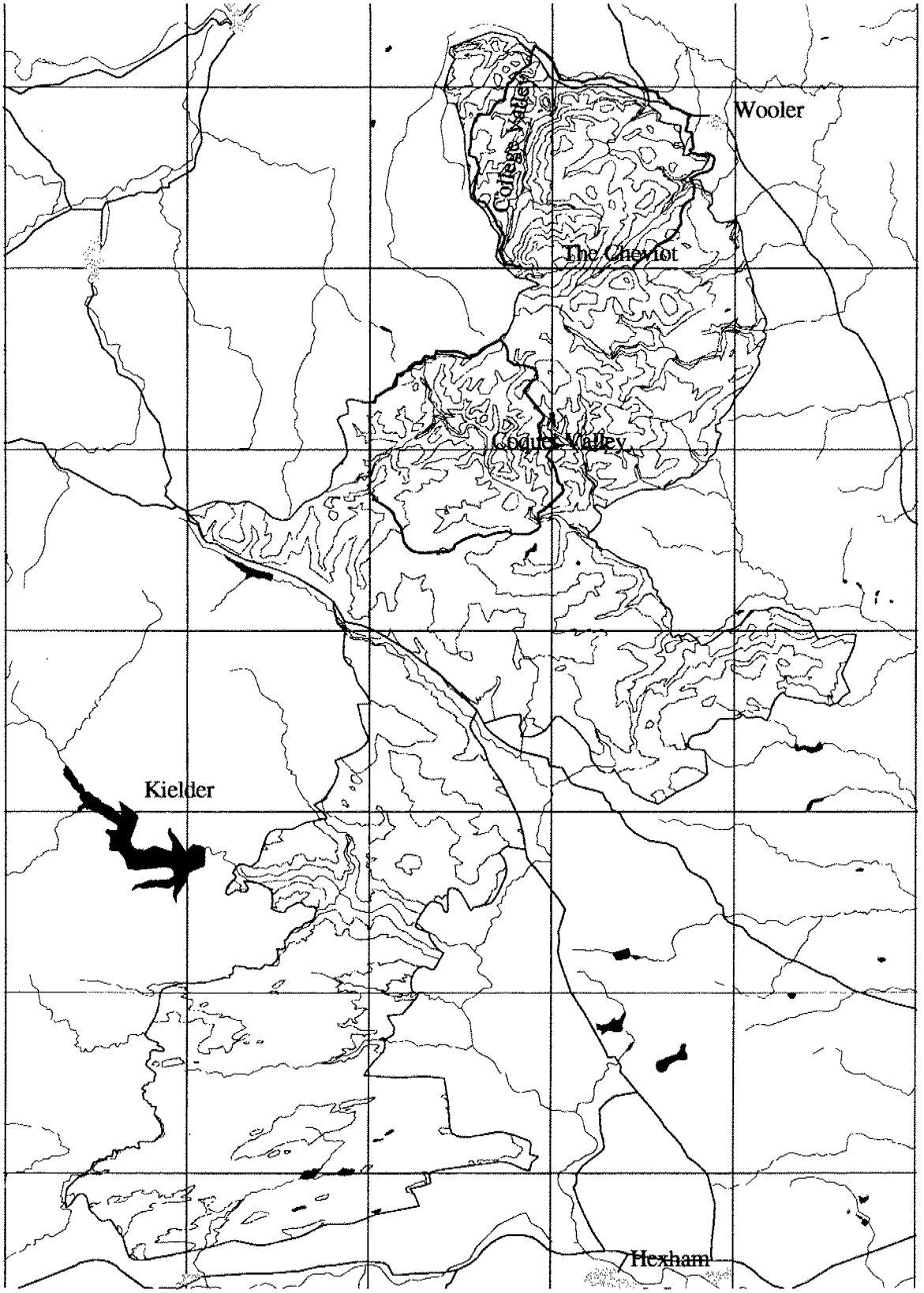
SITE	EXISTING WOODLAND AREA (ha)		
	CONIFER	DECIDUOUS/MIX	SCRUB
Northumberland			
Woller	572 (5.47)	179 (1.71)	0 (0.00)
Coquet	403 (4.45)	39 (0.43)	0 (0.00)
WHOLE PARK	12265 (11.88)	745 (0.72)	0 (0.00)
Lake District			
Helvellyn	77 (0.79)	241 (2.47)	0 (0.00)
Scafell	27 (0.40)	129 (1.91)	0 (0.00)
WHOLE PARK	6051 (2.68)	13523 (5.99)	0 (0.00)
Dartmoor			
Bellever	495 (8.44)	284 (4.84)	26 (0.45)
Teignbridge	209 (2.52)	1241 (14.90)	48 (0.58)
WHOLE PARK	2153 (2.31)	7968 (8.56)	365 (0.39)
Peak District			
White Peak	1 (0.01)	494 (5.01)	265 (2.69)
Dark Peak	174 (2.10)	734 (8.89)	49 (0.60)
WHOLE PEAK	1200 (0.85)	10032 (7.10)	3179 (2.25)
Shropshire			
N Stiperstones	205 (3.24)	747 (11.80)	47 (0.74)
W Clun Forest	185 (2.53)	826 (11.32)	3 (0.04)
E Clee Hills	44 (0.60)	362 (4.85)	31 (0.41)
WHOLE PARK	1703 (2.10)	8519 (10.51)	410 (0.51)

NB Figures in parentheses are proportional cover (%)

Figure 3.1.1

Northumberland National Park

Location map



National Park / AONB Boundary

'10 x 10 km' Study areas

Main Roads

100 metre contours

Main rivers

Urban Areas

Lakes

Mapscale 1 : 330000

Table 3.2 shows the potential area for woodland expansion (and proportion of total land cover) in each 10 x 10 km study area, derived as described in Section 2 and including only those areas currently unwooded which have similar site characteristics to wooded areas within the same study areas. These tables are referred to in each of the NP/AONB descriptions.

Table 3.2 Potential new woodland areas (ha) within each National Park/AONB and the 10 x 10 km study areas

SITE	POTENTIAL NEW WOODLAND AREA (ha)		
	Potential Area (A)	**Total Area of Study Site (B)**	**A/B (%)**
Northumberland			
Woller	1205	10448	12
Coquet	347	9050	4
Lake District			
Helvellyn	1257	9774	13
Scafell	523	6743	8
Dartmoor			
Bellever	1978	5864	34
Teignbridge	1931	8324	23
Peak District			
White Peak	1000	9863	10
Dark Peak	1018	8249	12
Shropshire			
N Stiperstones	2278	6332	36
W Clun Forest	2644	7299	36
E Clee Hills	1872	7463	25

3.1 NORTHUMBERLAND NATIONAL PARK

The Northumberland National Park (NNP) occupies an area of approx. 103,200 ha of land of predominantly upland character stretching from the Scottish Border in the North to Hadrian's Wall in the South (Figure 3.1.1). The chief land uses are hill livestock farming (sheep, beef cattle), conifer plantation forestry, military training, tourism and recreation. Much of the Park consists of open rolling moorland with a few shallow river valleys (notably those of the rivers Coquet and North Tyne), no large natural lakes and few notable topographic features. This is in marked contrast with the more dramatic terrain in the Lake District National Park (LDNP) with its high hills and deep glacial valleys and lakes but is not unlike Dartmoor National Park (DNP), except that the dramatic rock outcrops known as tors which dominate the hilltops in Dartmoor are absent from Northumbria. Most of the land in the northern part of the NNP is above 500 m elevation (highest point, The Cheviot, 815 m) falling gradually away to lower levels towards the southern edge. The Park excludes Kielder Forest to the west, which is the largest plantation forest in Europe, but includes the extensive Wark Forest which also consists primarily of plantation conifers. The coastal lowlands to the east of the A697 are also excluded.

Over much of the higher plateau land in the NNP the soils are acidic or very acidic being poorly drained with a wet peaty surface horizon of varying depth. There is little potential for tree growth on such soils without deep draining, which itself is inimical to their generally high existing wildlife value, so these areas have been excluded from the 'potential areas' for woodland expansion. On steeper slopes over igneous rocks the soils are better drained with a shallower peaty surface horizon (e.g. Dunwell Series), while on the steepest slopes where crags, boulders and screes abound and drainage is free, very stony loamy soils occur (e.g. Malvern Series). It is on these well drained soils that the best examples of remnant native broadleaved woodland are generally found and it is they which offer the best prospects for expanding such woodland.

The climate in the NNP is cool (mean January air temperature 1.4°C, mean July air temperature 13.7°C) and damp (939 mm yr^{-1}, spread fairly evenly throughout the year). On average there are 5.5 hours of sunshine per day in June, which is the sunniest month.

There are a number of SSSI's in the NNP covering quite a wide range of habitats and geological features. The largest and most representative is The Cheviot (3470 ha), which includes a range of upland habitats from valley woodlands, associations of acidic grasslands, heathland and blanket bog to montane heath on the summits and including crags and spring features which support rare arctic-alpine plants. This site also supports a typical upland breeding bird community, priority species including waders (curlew, golden plover, redshank, lapwing, snipe and dunlin), raptors (merlin, peregrine, hen harrier), black grouse and apparently healthy populations of nationally declining farmland species (skylark, grey partridge)(RSPB, pers. comm.). Some rock features are of geomorphological importance. The best and most extensive remaining examples of semi-natural and ancient woodland in Northumberland are in the River Coquet and Coquet Valley Woodlands SSSS (1250 ha), the upper two thirds of which is within the National Park. However, the best woodland sites occur below Rothbury in the section of the SSSI which lies outside the Park. The upper sections of the river within the NNP are more notable for their aquatic flora and associated fauna.

The Northumberland National Park is very rich in archaeological sites, most notably Hadrian's Wall which forms the southern boundary of the Park, but also including many hundreds of sites with dates ranging from the earliest period of man's habitation in the North of Britain to modern sites of industrial archaeological importance. Many of these sites occur in open areas and it is essential when considering any potential woodland expansion that their whereabouts are known and that care is taken through consultation with appropriate bodies and individuals to avoid compromising their value both individually and as components of the larger archaeological heritage.

3.1.1 Native woodland in the Northumberland National Park

Broadleaved woodland is notable by its absence throughout most of the Northumbrian uplands including the NNP. The ITE Land Cover Map (LCM) reveals only 745 ha of deciduous/mixed woodland >2ha in extent in the NNP (0.72% of land area), by far the smallest proportion in any of the five study areas (Table 3.1). Small shelterbelts and scattered groups of trees, often associated with streamsides or the improved agricultural land in the wider valley floors, frequently represent the only tree cover.

The NNP Authority, and the local offices of the Forestry Authority and the Countryside Commission are all very aware of this shortcoming and there is considerable support for expanding the area of native woodland both within the NNP and in Northumberland generally. In response to the 1993 national *Accord on New Native Woodlands* agreed between the National Parks and the Forestry Authority a local memorandum was drawn up between the NNP and the Forestry Authority local conservancy in 1995. This set an annual target for planting of 100 ha yr^{-1} to the year 2000, thus aiming to double the existing area of broadleaved woodland. The target figure was reached in the first year but unfortunately progress has slowed due to shortage of money (NNP, pers. comm.). As part of this accord it is agreed that where conifer plantations occupy ancient woodland sites owners will be encouraged to convert them to appropriate native broadleaves. Also within the National Park, the Ministry of Defence is keen both to protect existing woodland and create new areas for wildlife habitat as well as military training purposes within its 23,000 ha upland estate (MOD, pers. comm.).

In another initiative, which covers the whole of Northumberland and not just the NNP, the Northumberland Farming and Widlife Advisory Group (FWAG) developed a *Woodland Initiative for Northumberland* in partnership with the NNP the N. Northumberland Agricultural Training Association and the Forestry Authority (with the support of, among others, English Nature). The aim of this initiative, which was submitted (unfortunately unsuccessfully) to the European Union for funding under their European Agricultural Guidance and Guarantee Fund programme (EAGGF), but for which alternative funding is being sought, is "To enhance the conservation value of woodlands and develop the rural economy in the Northumberland Uplands by promoting the development of a sustainable farm woodland industry" (Northumberland FWAG, pers. comm.) .

Most proposals for expansion of native woodland in Northumberland assume that planting rather than natural regeneration will be the principal means of woodland establishment. This reflects the scarcity of native broadleaved woodland within the Northern Pennines already referred to, but also the shortage of individual mature trees or groups of trees to act as seed sources for natural regeneration. Recent research indicates that even birch, with its light,

wind-blown seeds rarely regenerates >200 m away from a seed tree (Wallace, pers. comm.). In other areas with little existing tree cover (Dartmoor, Southern Pennines, Dark Peak), planting is also necessary in most instances, while in areas where tree cover is greater (southern Lake District, White Peak, Shropshire hills) the use of natural regeneration is often favoured.

3.1.2 **The 10 X 10 km study areas**

3.1.2.1 Criteria for selection

Three 10 x 10 km study areas were intially selected by the EN Northumbria Team using the map of the NNP provided by ITE showing 'potential areas' for woodland expansion derived as explained in the Methods section (2.1) (Figure 3.1.2):

i. Relatively well wooded - **North Cheviot upland valleys**
College Valley, Lambden Burn (Goldscleugh), Harthorpe Burn, Common Burn and Carey Burn.

ii. With little woodland - **Upper Coquetdale**
Including key tributaries:- Grasslees Burn, Harthope Burn, River Alwin and Usway Burn.

iii. Additional possible area - **Roman Wall escarpments**
The southern edge of the National Park extending north to the fringe of Wark Forest.

Study areas (i) and (ii) were chosen because EN (supported by the NNP) consider the river valleys to be "perhaps the most suitable areas for woodland expansion in the NNP". The main woodland SSSI in the NP (Collingwood Oaks) is in College Valley (area i) and the NNP Authority are promoting woodland creation in this and nearby valleys. There is a joint EN/NNP scheme in hand for promoting increased tree cover, through a Wildlife Enhancement Scheme, along the recently notified River Coquet and Coquet Valley Woodlands SSSI (area ii). Concern was expressed that some of these valleys were excluded from the possible areas for woodland expansion on the map provided by ITE. It was subsequently made clear in discussions with local EN and NP staff that the 200m lower exclusion criterion could be varied where necessary to include areas of predominantly upland character occurring below 200m.

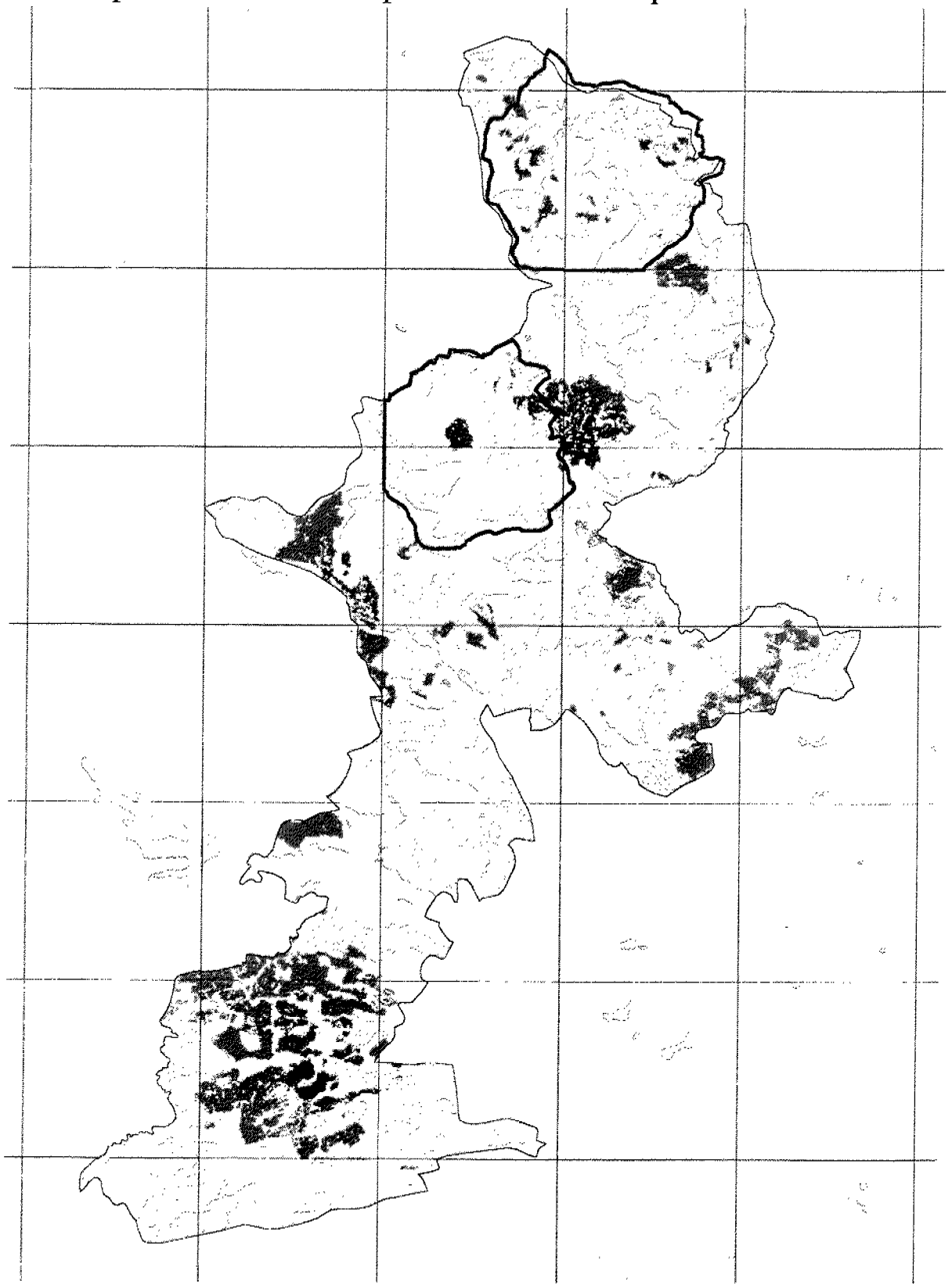
Study area (iii) was soon rejected by both EN and the NNP on grounds of the scarcity and national (in some cases international) importance of the existing landforms, geology, wetland habitats and archaeolgical sites. English Heritage has recently produced a Management Plan for the World Heritage Site (Hadrian's Wall) corridor which discourages further large scale woodland or forestry planting.

3.1.2.2 Current land cover and potential for woodland expansion

The locations of the study areas are shown in Figure 3.1.2. Figures 3.1.3-3.1.4 show the land cover in each study area derived from the ITE Land Cover Map. Figures 3.1.5--3.1.6 show the existing areas of coniferous woodland, broadleaved/mixed woodland (including ancient semi-natural and secondary woodland digitised from the maps in the provisional Ancient Woodland Inventory for Northumberland) and scrub, and the areas with potential for woodland expansion. It can be seen from Figures 3.1.3 and 3.1.4 that the land cover differs

Northumberland National Park

Provisional possible areas for upland woodland expansion

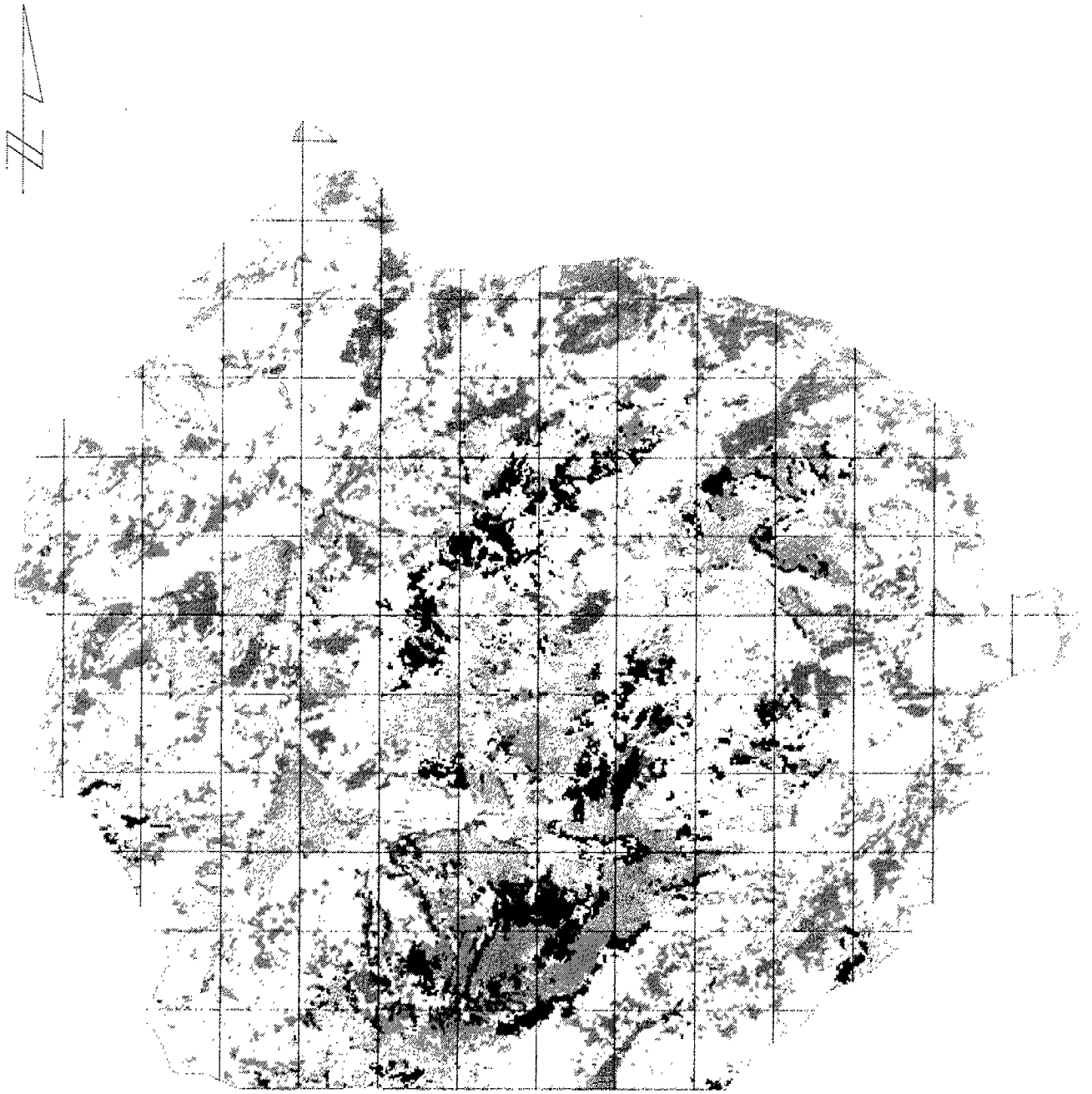


Possible Areas
Possible Additional Areas
Urban Areas
Lakes/Marsh Areas
Coniferous
Deciduous
Scrub/Orchard
National Park / AONB Boundary
'10 x 10 km' Study areas'

Mapscale 1 : 333000

Northumberland National Park

10 x 10 km Study area –ITE Land Cover Map – Wooler

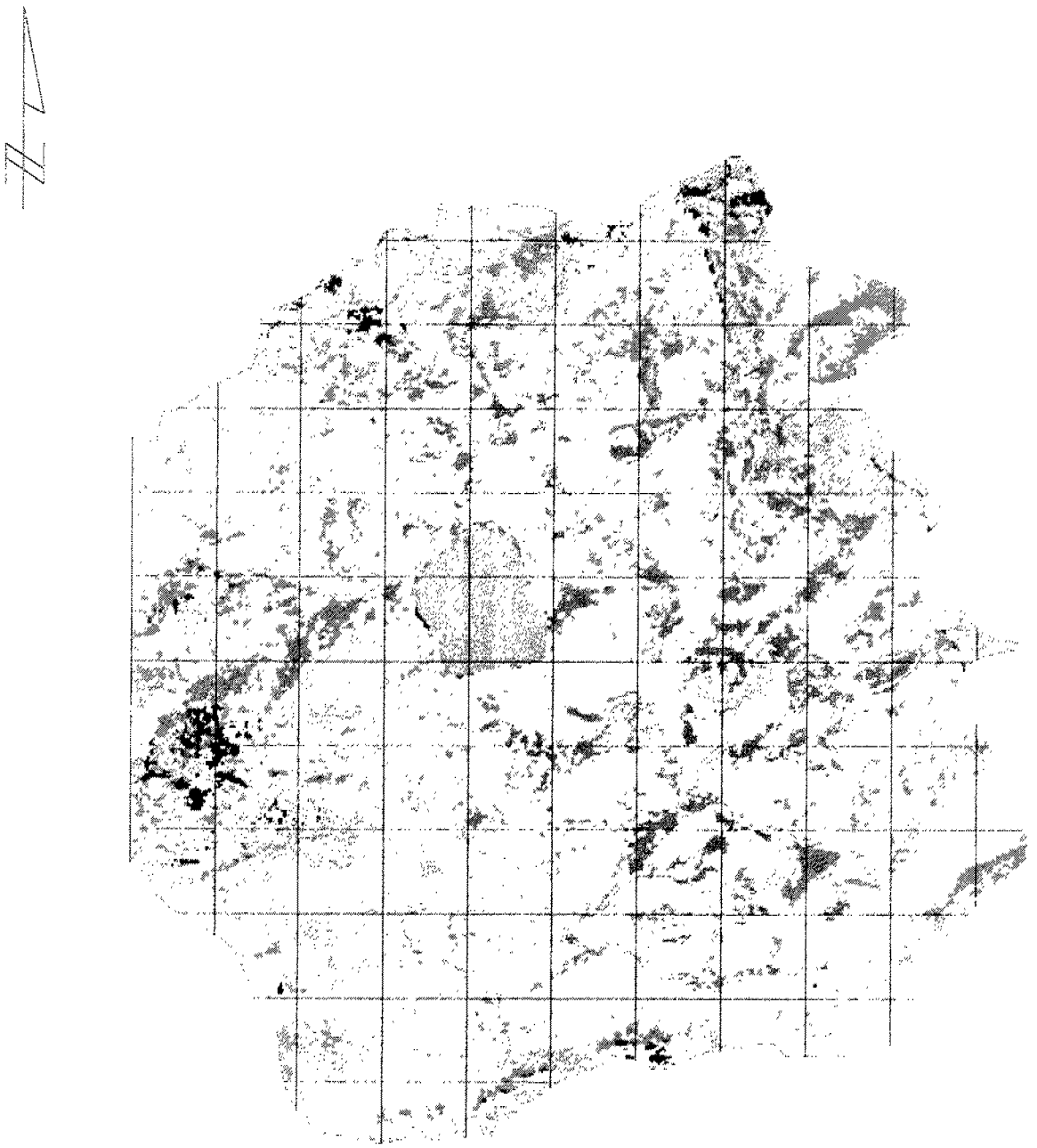


Mapscale 1 : 80000

- Inland Water
- Beach/Tidal Flats/Cliff
- Salt Marsh
- Dune/Lowland Heath
- Pasture/Amenity Grass, Mown
- Meadow/Verge/Unimproved Grass
- Marsh/Rough Grass
- Upland Grass/Moor
- Upland Grass/Shrub
- Upland Dwarf Shrub
- Bracken
- Lowland Shrub/Heath
- Shrub/Orchard
- Deciduous Trees
- Evergreen Coniferous Trees
- Upland Bog
- Arable
- Suburban/Rural Development
- Industrial/Urban
- Bare Ground
- Lowland Peat Bog
- Lowland Grass/Shrub Heath
- Unclassified

Northumberland National Park

10 x 10 km Study area –ITE Land Cover Map – Coquet

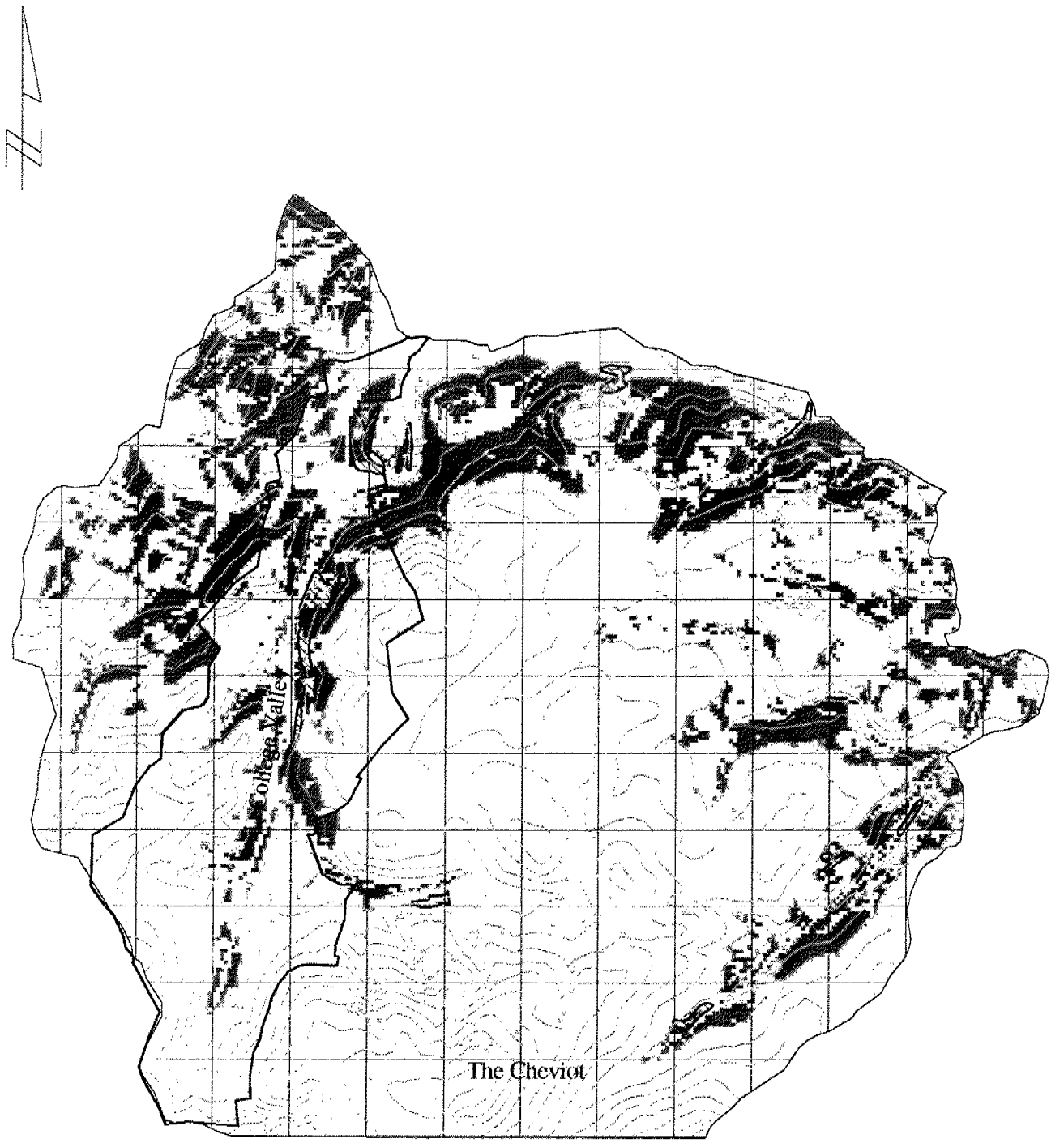


Mapscale 1 : 80000

- Inland Water
- Beach/Tidal Flats/Cliff
- Salt Marsh
- Dune/Lowland Heath
- Pasture/Amenity Grass. Mown
- Meadow/Verge/Unimproved Grass
- Marsh/Rough Grass
- Upland Grass/Moor
- Upland Grass/Shrub
- Upland Dwarf Shrub
- Bracken
- Lowland Shrub/Heath
- Shrub/Orchard
- Deciduous Trees
- Evergreen Coniferous Trees
- Upland Bog
- Arable
- Suburban/Rural Development
- Industrial/Urban
- Barc Ground
- Lowland Peat Bog
- Lowland Grass/Shrub Heath
- Unclassified

Northumberland National Park

10 x 10 Study area –Woodland –Wooler

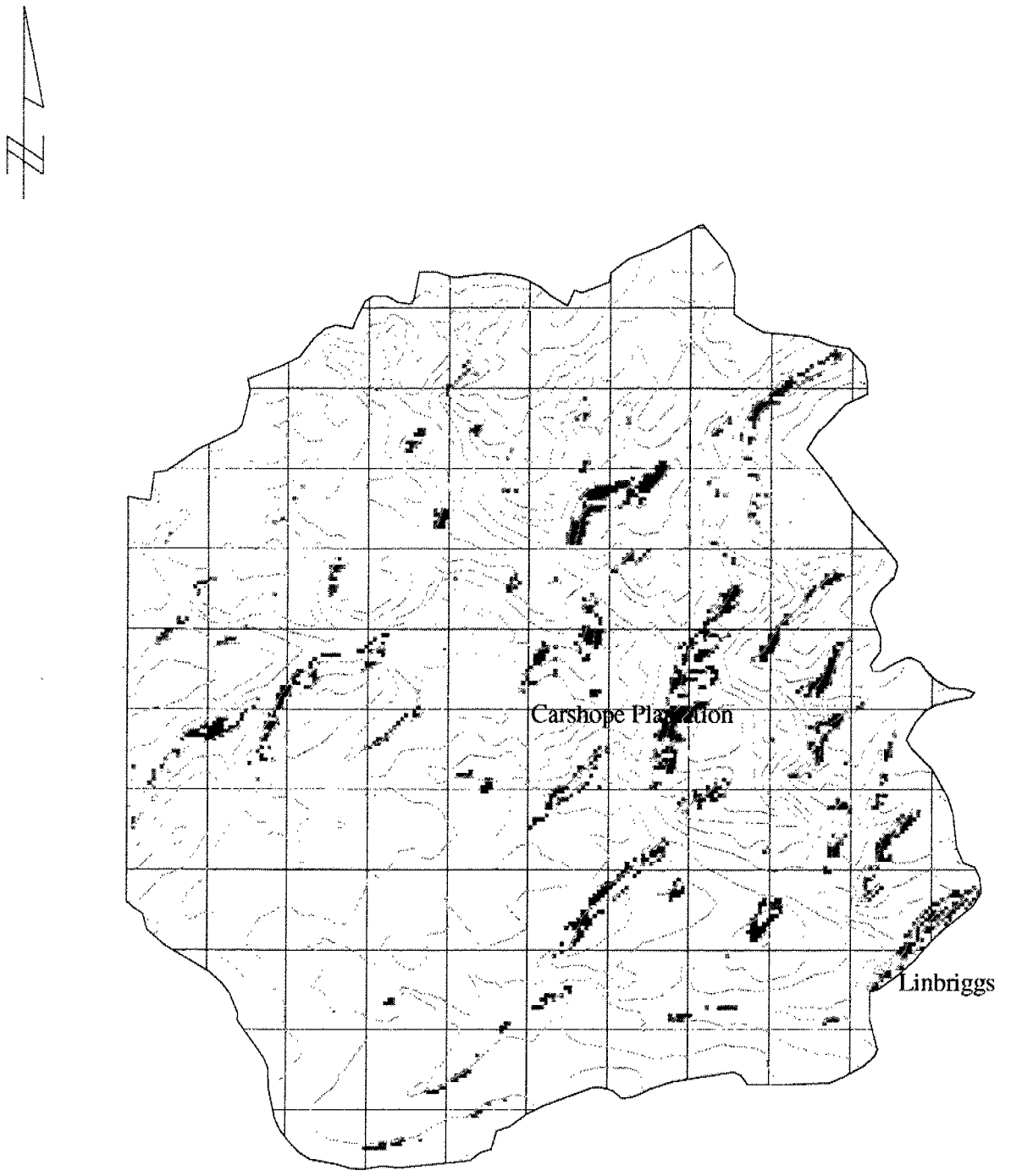


Mapscale 1 : 80000

- Potential areas
- Non –potential areas
- Existing Deciduous/Mixed Woodland
- Existing Coniferous Woodland
- Scrub
- Ancient semi –natural
- Ancient Replanted
- Cleared 1901 –1925
- 'Smaller' Study Area

Northumberland National Park

10 x 10 Study area –Woodland –Coquet Valley



Mapscale 1 : 80000

- Potential areas
- Non –potential areas
- Existing Deciduous/Mixed Woodland
- Existing Coniferous Woodland
- Scrub
- Ancient semi –natural
- Ancient Replanted
- Cleared 1901 –1925

significantly in the Coquet Valley and Wooler study areas. The topograhy is more diverse in the Wooler area and this is reflected in the land cover (Figure 3.1.3). There are less extensive areas of unimproved grass which carry a higher proportion of bracken cover, indicating better soil drainage, while the hilltops support heather-rich communities (upland dwarf shrub, upland grass/shrub). There is a greater area of improved pasture grass, which is concentrated in the valley bottoms and on the lower freely drained slopes, and more broadleaved woodland. Conifer plantations are restricted to the upper parts of these valleys on the poorer, less freely drained soils. The dominant land cover in the Coquet Valley study area (Fig. 3.1.4) is unimproved grass, a large part of which comprises a heather/coarse grass mixture (upland grass/moor) with the heather in various stages of suppression presumably brought about by sustained high levels of sheep grazing. There are a few, small areas of improved pasture grass, several fairly large conifer plantations and very few areas of deciduous trees.

The Areas of existing deciduous/mixed woodland and the potential areas for woodland expansion are shown more clearly in Figures 3.1.5 and 3.1.6 and quantified in Tables 3.1 and 3.2. This confirms that the existing area of broadleaved/mixed woodland is considerably greater in the Wooler study area (179 ha) than the Coquet Valley study area (39 ha). In the Wooler study area there are substantial blocks of woodland in the major river valleys (College Burn, Harthope Burn) with scattered patches of woodland >2ha in extent over much of the remainder of the area apart from the tops of the highest hills. In the Coquet Valley study area the remaining broadleaved/mixed woodland comprises scattered, mostly small areas in the valleys of the River Coquet and its major tributaries (Usway Burn, R. Alwin).

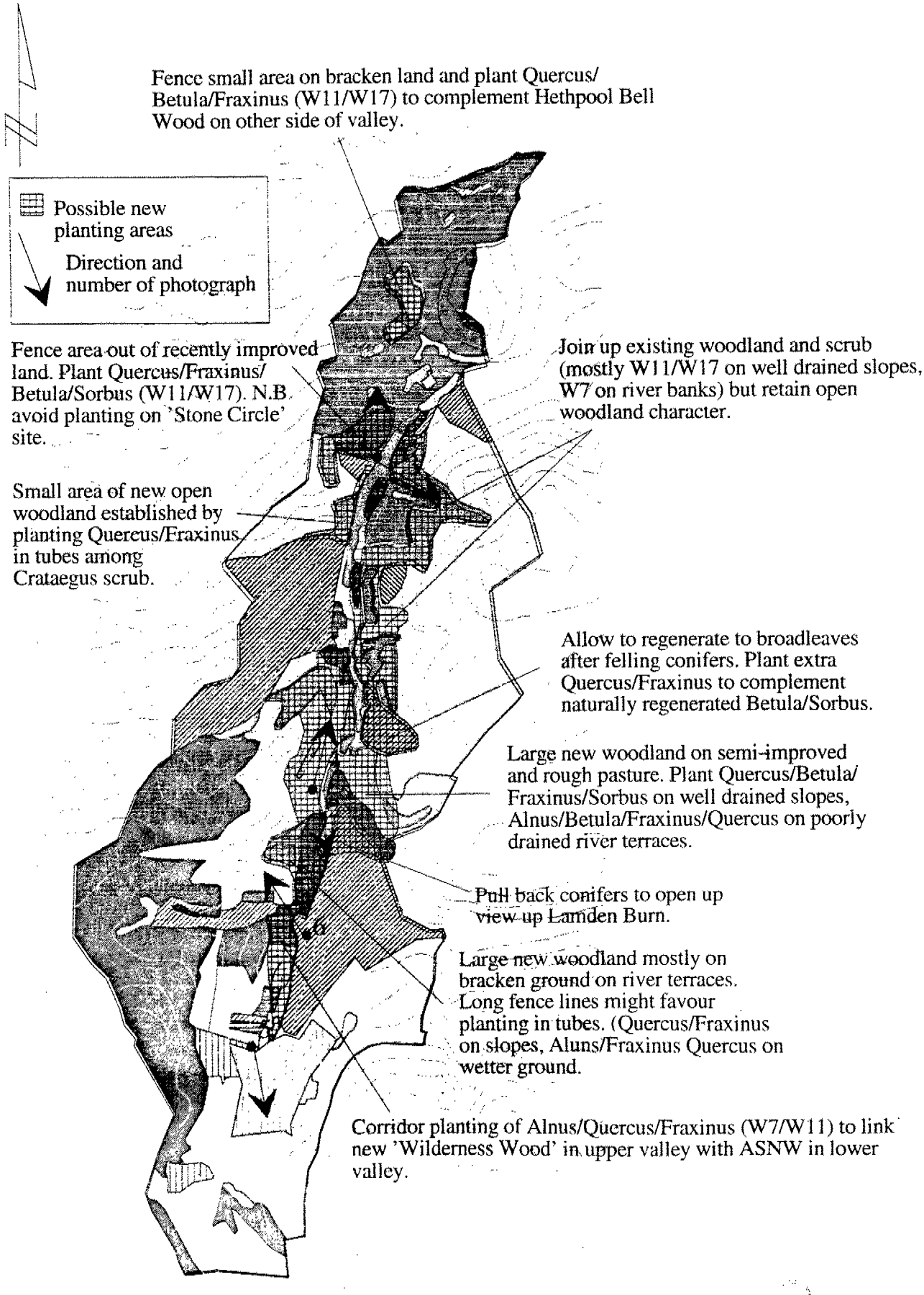
Figures 3.1.5 and 3.1.6 and Table 3.2 also show that the potential for woodland expansion is much greater in the Wooler area (1205ha) than the Coquet Valley area (347 ha). The most notable feature is the considerable potential for expansion around and adjacent to areas of existing woodland, in agreement with the already noted opinion of local EN and NNP staff that the river valleys offer the best potential for development of new woodlands. It should be borne in mind, however, that the procedures used by ITE to determine 'potential areas', in which only land with similar characteristics to that already carrying broadleaved/mixed woodland are selected, tends to favour areas adjacent to existing woodland. It also follows that the potential area derived for the upper River Coquet and its tributaries is probably a substantial underestimate and that much greater areas of land are potentially available in this study area, for example on the steeper slopes many of which currently carry bracken-dominated grassland. However, the high elevation (>50% of the area is >600m) and the associated severe climate would be likely severely to limit choice of tree species and the likelihood of successful establishment and subsequent growth.

3.1.2.3 Conclusions

Although the two study areas form a part of the same upland massif, with generally similar geology and range of soil types, the proportions of these soil types and hence the proportions of major vegetation types vary substantially, affected predominantly by differences in topography. Most of the Coquet Valley study area is a high moorland plateau with little relief resulting in substantial areas of poor quality unimproved grass/heather moor which, while capable in theory of supporting native broadleaved woodland/scrub would not be easy to afforest with broadleaves. Whatever woodland it once had has long since been lost, suggesting

Northumberland National Park

Smaller Study area –Possible woodland expansion – College Valley



Mapscale 1 : 50000

Figure 3.1.8

Northumberland National Park

Smaller Study area –Land cover – College Valley

Mapscale 1 : 50000
Contour interval 50 m

sense the study area is typical of the river valleys of the two 10 x 10 km study areas, but atypical of the NNP as a whole where more rolling terrain has given rise to large areas dominated by peaty soils (stagnopodzols, stagnohumic gleys, raw deep peats) developed over glacial drift.

3.1.3.3 Current land use and potential for woodland expansion

The current land cover of the study area is shown in Figure 3.1.8 with the areas of the different types in Table 3.1.1 with opportunities for woodland expansion shown in the overlay (Figure 3.1.7), including details of the type of woodland aimed for and the preferred means of establishment (**N.B.** codes such as 'W11' refer to woodland and scrub communites identified within the British National Vegetation Classification (NVC, Rodwell 1991). The occurrence of 'Statutory Areas' (SSSI's, NNP Section 3 woodlands, moor and heath land) within the study area are shown in Figure 3.1.9.

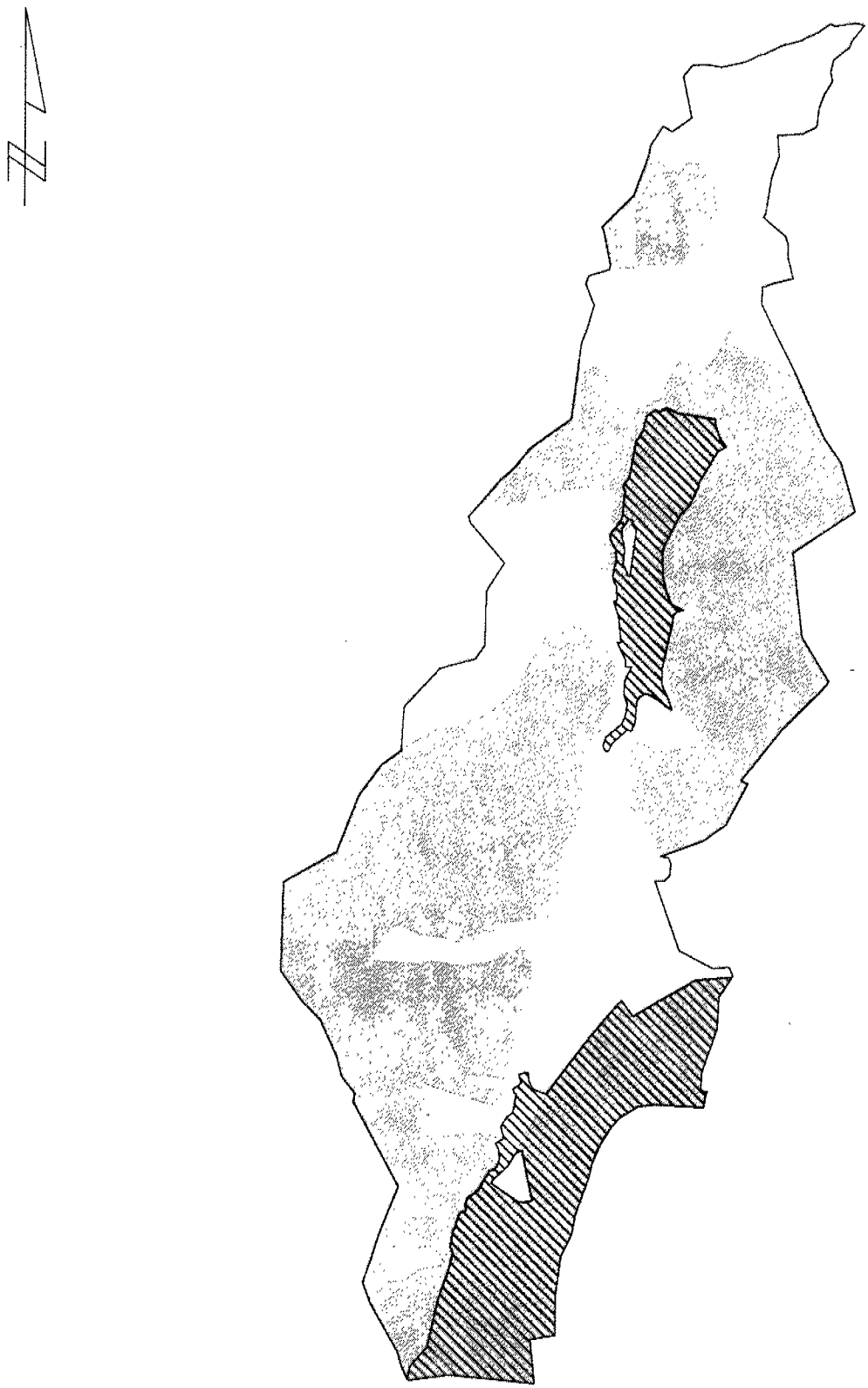
Table 3.1.1 Distribution of land by ITE land cover types in the College Valley study area

Land cover	**Area (ha)**	**Proportion %**
Improved/Semi-improved grass	293	14.1
Rough Pasture	787	38.0
Coniferous Woodland	315	15.2
Mixed Woodland	4	0.2
Deciduous Woodland	49	2.4
Scrub	37	1.8
Scree/Rock	6	0.3
Bracken	168	8.1
Upland Heathland	328	15.8
Clear-felled	22	1.1
New Woodland	58	2.8
Built-up areas	3	0.2
Total	2071	

The valley can be split into three parts, upper, middle and lower distinguished by terrain, land cover and land use. The upper and middle sections are separated by two conifer plantations, a large triangular one (Fawcett Shank) on the east side of the valley and an extensive shelterbelt along the Fleehope Burn on the western side. Both visually, and perhaps to some extent in relation to the movement of flora and fauna up and down the valley these plantations provide a barrier. Their removal and perhaps replacement in part with broadleaved woodland should be considered when the time comes for clearfelling. This would further enhance the return of this area to wilderness envisaged by those responsible for the new 'Wilderness Wood' recently established in this upper part of the valley, although it is

Northumberland National Park

Smaller Study area –Statutory Areas relating to possible woodland expansion - College Valley



Section 3 Woodlands

Commonland

Section 3 Moor and heath land

SSSI

Mapscale 1 : 50000