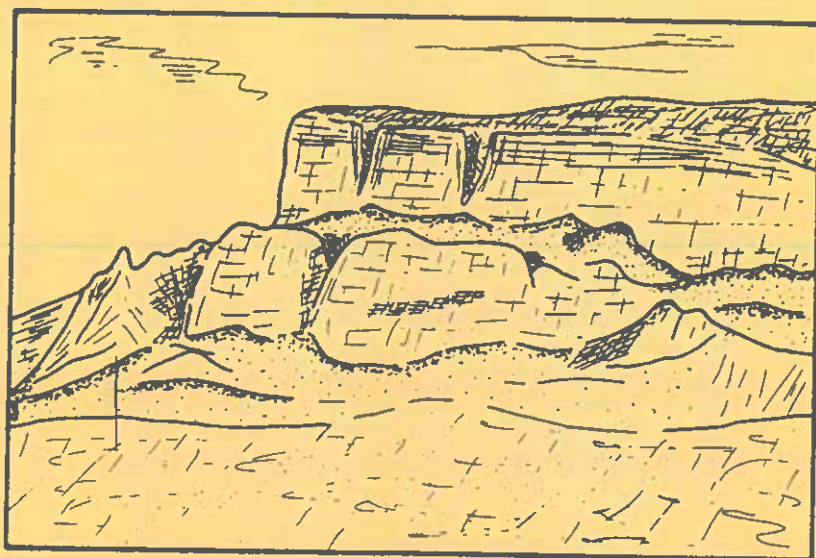


A LANDSCAPE ECOLOGICAL STUDY OF THE SPERRINS AND NORTH DERRY AREAS OF OUTSTANDING NATURAL BEAUTY

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SUMMARY

1. A landscape and ecological survey of the North Derry and Sperrins region was carried out during the Summer of 1988. The objectives of the work were to:
 - a) Develop a structured method of landscape assessment and evaluation.
 - b) Quantify the distribution of land use, ecological resources and landscape attributes.
 - c) Describe the structure, composition and management of these resources.
 - d) Identify associated environmental problems and prescribe management options
 - e) Prepare a computerised data base and map archive for monitoring environmental change.
2. The Countryside and Wildlife Branch of the Department of the Environment for Northern Ireland (DOENI) defined the initial study area to include the current North Derry AONB and Sperrins AONB as well as surrounding land considered to have potential for AONB status.
3. Multivariate land classification of kilometre squares within the study area was carried out and the resulting land classes were combined to give 10 land class groups summarising the main elements of landscape variation. Local patterns of land class distribution and land class clusters were further used to divide the study area into 16 geographically distinct, preliminary landscape units.
4. Following reconnaissance survey, landscape quality of the units was assessed by comparing the balance between landscape attributes which contributed to or detracted from landscape quality. After consultation with CWB, 10 refined landscape units, considered to be of high landscape quality, were selected for landscape and ecological survey.
5. Quantitative field survey of landscape and ecological resources was carried out separately in the Sperrins AONB and North Derry AONB using a random sample of 25ha squares, stratified by land class group and landscape unit. Within each square, land use and linear features were recorded under the main categories of woodland, seminatural vegetation, field boundaries, agriculture and landscape attributes. Data were recorded as a map archive on field data sheets and as a microcomputer database.
6. In the Sperrins AONB, about 30% of the land surface was occupied by agricultural grassland and crops, of which 35% was poorer quality grassland. This reflects the upland and wet climatic nature of the area. Primary and secondary wet heath and bog was the main ecological resource, covering over 40% of the landscape. Other seminatural vegetation types were poorly represented. Almost 50% of field boundaries were mostly earth or wall banks and post & wire fences.

7. Seminatural deciduous woodlands were uncommon, mostly unenclosed and unmanaged and had a species-poor or grass-dominated ground flora. Mature oak/hazel woodland was particularly scarce but in contrast, woodland and scrub over peat was a feature of lower elevations. The enclosure of seminatural deciduous woodland is a management priority. Woodland and scrub on cut-over lowland bog and wet heath offer potential for positive management. Preferred habitats for tree planting in other parts of the landscape include poor-fen and rush-infested grassland, particularly associated with streams and lower elevation hill sides.
8. Forestry plantations occurred as a small number of large blocks. They were generally poorly contoured and landscaped monocultures. Further large scale afforestation of uncut peat should not be part of management policy. There were, however, extensive areas of cut-over peatlands at intermediate elevation where afforestation is an alternative land use. Coniferous farm shelterbelts were frequent. Encouragement should be given to diversifying their composition and design.
9. Peatland vegetation consisted of a wide range of uncut, cut-over, undrained and drained types increasing in abundance with elevation. Peat exploitation was extensive throughout the AONB. Bog and wet heath vegetation was common at lower elevation but had largely been cut-over by hand. Blanket bog was the main peatland type in the hills. Machine peat-cutting was common in the uplands and upland transition on both primary and secondary peat. Open drains in peat (mainly to improve drainage), burning, grazing and erosion, were widespread.
10. Disturbance by draining, cutting, burning and grazing, had given rise to complex vegetation mosaics dominated by a small number of species such as ling heather, cross-leaved heath, cotton grasses, heath-rush, deer-grass and hypnaceous mosses.
11. Lower elevation bogs were more species-rich but their structure was highly modified by hand peat-cutting. Ling heather was a common dominant and there was often colonisation by shrubs and trees, particularly birch and willow. Priority should be given to retaining bogs and bog fragments that still have a characteristic hydrology and structure. In other cases, rehabilitation to improve them, is an option.
12. On the higher elevation raised bogs, peat cutting was not so common. There was less ling heather but deer-grass was often dominant, with much bog asphodel. They were often eroding, particularly where there was a change of slope. There were fewer species on blanket bog than raised bogs in the Sperrins AONB.
13. Blanket bog and wet heath had been cut-away from many of the lower hill tops and mountain slopes. Only the more inaccessible areas retained primary wet bog communities. Gully erosion was often extensive. Agricultural drains, newly constructed roads and machine peat-cutting were associated with new peat-cutting and erosion. Erosion was exacerbated by sheep grazing and trampling.
14. The conservation of upland primary peatland should be a major priority. Uncut wet bog had the greatest wildlife and landscape value. Steep-sided mounds of glacial deposits with their characteristic wet heaths also ranked high in terms of their ecological, landscape and geomorphological value.
15. The economic potential of peatland should be considered as part of any management policy. Peat-cutting for domestic use and for sale occurred on such a large scale and was such an integral part of the local farming economy, that it has a direct influence on the ecological and landscape resource value of peatland communities.
16. A distribution map of uncut peat and peat types that are capable of being exploited for fuel would be of use in developing an integrated management strategy. This would provide a framework for the conservation of the more valuable or sensitive areas and the rational exploitation of the less interesting ones. Problems of small scale land ownership and multiple turbary rights will make this type of land use policy difficult to implement. The promotion of guidelines and incentives to farmers would also help to minimise environmental damage.
17. The reclamation of wet heath and bog for agricultural grassland should not be encouraged, given the short period of production before regression and the high inputs needed to maintain swards. Reclamation also disrupted local patterns of field boundaries and was associated with incongruous new farm roads, drainage ditches and post & wire fences. The practice of creating large, open drains in peat to improve grazing was part of the general intensiveness of agricultural land use in the hills. It caused peat erosion on steep slopes.
18. Recent increases in sheep numbers are likely to result in an increase in peat erosion, a decrease in heather cover, increases in unpalatable or resistant species such as hare's-tail cotton grass, heath-rush and purple moor-grass. Changes will be long term.
19. Heather regeneration after burning was generally successful, particularly on wet heath, despite the short estimated time interval between burning of 5 years for wet heath and 12 years for wet heath mosaic vegetation. If heather moorland management guidelines are implemented so as to increase the time interval between burns and to control grazing intensity, it is likely to be successful in promoting a greater, agriculturally more productive heather cover.

20. Quarries were particularly frequent in areas where glacial sands and gravels under podzolised soils supported wet heath, bog and small oligotrophic lakes. Both working and derelict quarries were visually obtrusive. There is potential for rehabilitating derelict workings to make best use of associated wetland habitats.
21. Poor sandy soils and high rainfall were the main limiting factors to agriculture. As a result, ryegrass pasture regresses quickly. Infestation with broadleaf weeds and rushes was frequently recorded. Older, more neglected grassland, had regressed to poor-fen, wet heath and bog. On the better farmland, management prescription is largely limited to the maintenance and rehabilitation of fragmentary seminatural vegetation. Variation in land-use history is a diversifying agent which is responsible for the attractive patchwork of small field systems and land use types at the upland transition. Environmental management should aim to retain these features.
22. Upland reclamation and large field sizes were commonplace, particularly in and near the main glens and valleys. New farm roads into the hills need to be better routed, for example, along contours or existing tracks. Derelict buildings throughout the area were frequent and detracted from the quality of the landscape. The siting and design of modern bungalows should be considered in the more sensitive areas.
23. Field boundary removal was associated with farm rationalisation and upland reclamation. In sensitive areas, key field boundaries should be retained to preserve local patterns of field systems. At low elevation, derelict hedges imparted a wooded appearance to the landscape. In order to halt dereliction and maintain a hedged, wooded landscape a tree planting and hedge rehabilitation policy is required. The erosion and damage to hedgebanks and earth or wall banks caused by sheep, also needs to be controlled.
24. In comparison with the Sperrins AONB as a whole, the main Sperrins valleys, centred on the Glenelly, Owenkillew and Owenreagh Rivers had less hill pasture, wet heath and wet bog but a greater amount of mixed and other poorer agricultural grasslands. The predominance of grasslands reflects the high degree of agricultural intensification which has taken place and the extent to which peatlands have been exploited in the past.
25. In the North Derry AONB, coastal vegetation types were a feature but they are threatened by recreation and agriculture. The protection of their nature conservation value and landscape interest should be a management priority, particularly since they are a major attraction in the area.
26. Much of the land at lower elevation was intensively farmed as large amalgamated enterprises. Farms were highly productive with large field sizes and post & wire fences. Ryegrass swards and arable/fallow land were the major land uses. Management prescription should aim to maintain and rehabilitate fragmentary parcels of seminatural vegetation, ditch vegetation and hedges. Derelict buildings, farm rubbish and eutrophic watercourses/ditches presented environmental problems. Tree and hedge planting would diversify the landscape.
27. Whilst there was little deciduous woodland and scrub in the AONB, its retention and the planting of woodland on the basalt escarpment is a priority. Enhancement of the more obtrusive conifer plantations with broadleaf species should be considered when they are clear-felled. Contrasting land use on the escarpment, of large monoculture forest plantations and agricultural reclamation, together with agricultural dereliction, present difficult management problems. Farmers should be encouraged to retain and manage key field boundaries and seminatural vegetation such as gorse, ericaceous heath, species-rich grassland, fen, poor-fen and peaty flushes, particularly on the lower parts of the escarpment.
28. Peatlands on the plateau were extensively cut-over by hand, leaving mosaics of heterogeneous bog vegetation. Peat-cutting by machine, on secondary peat was frequent. Since the amount of primary peat was small, priority should be given to its conservation. Management should concentrate on controlling further exploitation and developing a peatland use policy on cut-over areas to optimise economic, nature conservation, recreation and aesthetic benefits.

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1. Introduction

This report was written as part of a research contract awarded to the Department of Environmental Studies of the University of Ulster, by the Countryside and Wildlife Branch (CWB) of the Department of the Environment for Northern Ireland (DOENI). It is concerned with landscape and ecological resources in the wider countryside of the Sperrins and North Derry Areas of Outstanding Natural Beauty (AONB). A research officer, Dr. Ronald Murray was appointed for one year, in October 1987, to coordinate the work. Thomas McCann was subsequently employed for a three month period during the Summer of 1988 to help with field work and analysis.

The main objectives of the study were to:

1. Develop a structured method of landscape assessment and evaluation.
2. Quantify the distribution of land use, ecological resources and landscape attributes.
3. Describe the structure, composition and management of these resources.
4. Identify associated environmental problems and prescribe management options.
5. Prepare a computerised data base and map archive for monitoring environmental change.

The work is complementary to site-based studies for assessing Areas of Special Scientific Interest (ASSI) and full cover surveys of habitat types currently being conducted by the CWB.

Our report is the third in a series of studies written for Areas of Outstanding Natural Beauty in Northern Ireland. The survey methods employed were developed in the first study covering the Mourne AONB (Cooper & Murray 1987a). The methods were based on a standardised approach to field survey introduced by Bunce et al. (1983). With this approach, multivariate land classification is used to stratify a sampling programme of grid squares in which field survey is carried out to determine land use, ecological resources and landscape attributes.

The second report (Cooper & Murray 1987b) covered the Antrim Coast and Glens AONB and the Causeway Coast AONB. At this stage, emphasis was placed on refining field methods and analysis so as to integrate computer data base analysis of the field records.

The Mourne study was developed further under contract to the Department of Agriculture for Northern Ireland (DANI). This involved construction of a computerised data base for the Mourne Environmentally Sensitive Area (ESA). This is being used by DANI, as a base-line study against which to monitor the effect of the ESA legislation (HMSO 1988) in the Mourne.

A major objective of the CWB, following the implementation of the Nature Conservation and Amenity Lands (Northern Ireland) Order (HMSO 1985), has been to redesignate existing AONB's in the province. Progress has been made with the redesignation of the Mourne AONB (DOENI 1986) and the Antrim Coast & Glens AONB (DOENI 1988a).

In the previous studies land classification and field survey took place within boundaries prescribed by the CWB prior to commencement of the contract. In the case of the Sperrins and North Derry studies there was the additional objective of developing a structured method of landscape evaluation based on land classification which would be of value in boundary definition.

An unpublished interim report on the application of the Northern Ireland Land Classification (Cooper 1986) to landscape evaluation was submitted to the CWB. This was followed by a second unpublished report presenting a generalised method of landscape evaluation based on land classification and reconnaissance field survey. The report also described application of the method to AONB boundary delimitation in the Sperrins and North Derry region.

2. Review of AONB Boundaries

2.1 Circumscription of the Sperrins/North Derry region

The study area was initially defined by the CWB so as to cover an area larger than the existing Sperrins AONB and North Derry AONB (Fig. 1). This was to ensure that all land in the region, with a potential for AONB status, was assessed. The wider study area included:

1. The existing Sperrins AONB and North Derry AONB.
2. Upland areas associated with existing AONB boundaries, including land between them.
3. Lowland areas immediately surrounding the uplands. This includes, in particular, part of the Coleraine triangle, Limavady and towns to the north of the existing Sperrins AONB.
4. Land associated with the Rivers Foyle, Derg and Strule in the West and farmed hill and valleys systems north of the Sperrins.
5. Rolling hilly terrain comprising a mosaic of agricultural grassland and bog/heath vegetation south of the Sperrin mountains.

2.2 Land classification

2.2.1 Derivation of land class groups.

Kilometre squares of the Irish Grid within the study area were allocated to a Northern Ireland land class (Cooper 1986). The hierarchical key used to classify squares, the method of recording the map attributes in the key and an example of using the key, are given in Appendix 1. The Northern Ireland land classification hierarchy was used to

subdivide it further, into land classes 19A and 19B. The split corresponded to land class groups E and F described below and was based on the distribution of brown podzolic soils and characteristic geomorphology. The size and diversity of the region was such that only land classes 1-4 (characteristic of the southeast of Northern Ireland) were not represented. Certain land classes were recorded in small numbers and mosaic distribution patterns were frequent. For reasons of simplification, therefore, similar land classes were combined to give a total of 10 land class groups (A-J) with which to stratify the region. Land classes were combined according to the criterion that the main hierarchical divisions in the land classification should be retained (Tables 3 & 4).

2.2.2 Description of land class groups.

Description was based on map attributes recorded from sample kilometre squares of each land class group. The sampling programme and method of recording are described in section 3.2.

1. Group A

This is a low elevation, flat land class group below 50m, largely found in North Derry. It occurs in low lying areas in and peripheral to the existing AONB boundary; particularly in the north and northwest from Dungiven to Portstewart and notably at Magilligan Foreland. The coast, estuaries and associated river valley bottoms are typical. Other low lying, flat river basins include the bottoms of the Mourne and Derg River valleys. The road transport network is dense in

comparison to the other land class groups. Mesozoic rocks underlie most of the squares and alluvial gley soils predominate.

2. Group B

This is a relatively flat, low elevation land class group with a 51-150m elevation component. The topography is more broken than in group A and the land is at a somewhat higher elevation. There are many small villages and a dense but mainly minor road system. Rock types are mainly schists and quartzites with overlying brown podzolic soils.

The main locations are in the Ballinderry and Moyola River basins on the east side of the Sperrin Mountains; immediately north of Newtownstewart and Omagh and land encircling Dungiven.

3. Group C

This is a relatively low elevation group centred on North Derry and lying mostly below the 150m contour. The group occurs on the lower slopes and bottoms of escarpments, on steeply sloping river and lake sides and at the coast. There is a high frequency of buildings. Small streams are ubiquitous. Basalt and Mesozoic rocks predominate. Soils are mainly alluvial and gleyed, with some acid brown earths and grey-brown podzolics.

The main locations are:

Western escarpments of the North Derry mountain range including those of Binevenagh, Keady mountain and Benbradagh. Other locations include steep slopes of the Rivers Roe, Bann, Faughan, Burngibbagh and Burn Denet and the steeper sides of Loughs Catherine and Fanny near Newtownstewart.

4. Group D

The group comprises sloping land at intermediate elevations (51-150m), occurring at the lowland-upland transition. It is at a higher elevation than group C. Rivers and flat valley bottoms are frequent and farm buildings are common. Schists predominate and are associated with brown podzolic soils. The group is dispersed, notably on the east side of the North Derry mountains. It is also found on sloping sides and bottoms of river valleys associated with the more rounded hills encircling the north and west sides of the Sperrins AONB between Dungiven and Omagh.

5. Group E

It is located at higher elevation largely between the 151m and 250m contours but often has a considerable proportion of land below 150m. There is a high density of buildings for an upland group. Rocks are mainly schists. The soils are characteristically brown or peaty podzols. Main locations are quite steep bottom and middle slopes of mountains generally, but in particular those in the Glenelly Valley. The group is also found on rolling hill land north of Carrickmore and Pomeroy.

6. Group F

This comprises flatter, rolling hill land largely at an elevation of between 151 and 250m. Streams, small loughs and rough grazing are frequent. Buildings are less frequent and the road system is less dense than in group E.

Rock types are more varied, with basic igneous rocks, schists and basalts frequent. Brown podzolic soils are most frequent in this group with peaty soils also occurring. There

is one main locality covering the land between Pomeroy and the Sperrins. The Owenkillew and Owenreagh Valleys are included.

7. Group G

This is an upland group centred on the 151-250m contours but including a large proportion of land above and below these elevations. It consists of mainly the steeper, high elevation land of glen sides and escarpments in the mountains and on hill tops between Dungiven and Strabane; north of the main Sperrins block. Schists predominate but there are basalts and other rocks in North Derry associated with Mesozoic strata. Peaty gleys and brown podzolics are the most frequent soils.

8. Group H

This is mountain terrain and uplands largely between the 151m and 500m contours but often with a flatter topography than group G. It is found associated with glen and valley heads where land is less steep. Slopes can be greater when associated with the source of watercourses. The group is dispersed throughout the mountains and hills of the whole region. Schists are the most frequent rocks in the Sperrins with basalt in North Derry. Peaty gleys and brown podzolics are the most frequent soils.

9. Group I

This is mountain terrain mainly between 251m and 500m elevation. It is found throughout the Sperrins and is characteristic of North Derry, where the topography is less steeply sloping. In the Sperrins, schists predominate and in North Derry, basalt. Peaty gleys and blanket peat are the most frequent soils.

10. Group J

This group represents the highest mountain terrain, mainly in the Sperrins, frequently rising to more than 500m. Schists predominate with peaty gleys and blanket peat the most frequent soils. The group is less common in the outlying areas.

2.3 Provisional landscape units

Local patterns of land class distribution and land class clusters were used to divide the region into 16 geographically distinct preliminary landscape units (Fig. 2). The first step in this process was to delimit high elevation and upland transitional areas from the lowlands. Landscape units 1,2,4,5,9 and 10 represented lowland areas. Mountain and upland transitional areas were represented by landscape units 3,6-8 and 11-16. Boundaries within these two major groups were drawn in relation to distinct geographical features and discontinuities between land class groups. The general procedure for circumscribing the provisional landscape units is described in Appendix 2.

2.4 Landscape evaluation

2.4.1 Preliminary assessment

A reconnaissance survey was carried out during January 1988 prior to the main field survey in the summer of 1988. The main aim was to provide a provisional indication of landscape quality, both for the purpose of resource survey and to help with subsequent AONB boundary definition.

Reconnaissance field survey was carried out in each provisional landscape unit to describe the distribution of

landscape attributes which either contributed to landscape quality (positive criteria) or detracted from it (negative criteria). Information was recorded on field data sheets in semi-quantitative form as a subjectively assessed frequency or cover value. The range of landscape attributes recorded was limited to those that could be defined or qualified in physical terms. Table 1 illustrates the features which were recorded during field survey. They were selected to represent a broad range of landscape characteristics. Attributes related to aesthetic appreciation of the landscape were more difficult to define and standardise and for these reasons, were not recorded.

Evaluation of each of the provisional landscape units was carried out by comparing the balance between positive and negative landscape criteria. A quantitative weighting procedure involving additional value decisions was not considered to be of any greater advantage. The distribution of positive and negative criteria in the landscape units is shown in Table 2a & 2b.

Provisional landscape units 7, 8 and 11-15 were considered to be of high landscape quality and worthy of further field study. Units 2, 4-6, 10 and 16 were considered to be of low value mainly because of the large proportion of improved agricultural land present and not worthy of further study. A simple decision was not possible for units 1,3 and 9, since they contained localities which had outstanding qualities and others which were poor. They were assessed as borderline for potential AONB status.

The boundaries of the Sperrins provisional landscape units considered to be of high landscape quality corresponded quite well with the existing AONB boundary. Fig. 3 shows, for example that 70% of the squares lie within 2km of the current Sperrins AONB boundary. In the case of the North Derry AONB, the land is more heterogeneous, containing areas of high landscape value as well as areas of lower value and intensively farmed agricultural land.

2.4.2 Refined assessment

Our recommendation that seven of the landscape units should be considered further for AONB status by carrying out full field environmental survey, and that a further three were borderline for inclusion, was discussed with the CWB.

Their one major criticism of the recommendation was that the separation of upland and lowland zones broke the continuity of some glens and cut across the attractive lowland upland agricultural transition zone. The recommendations also tended to exclude lowland areas which are of major importance for cultural heritage, broadleaf woodlands and river valley or coastal features. (DOENI 1988b).

Refinement by the CWB of the landscape assessment, based on specialist knowledge and further field reconnaissance, resulted in revision of the provisional landscape units selected for further field survey to take account of this criticism. A summary of the revisions and CWB rationale is described below. Two main areas were identified for further study (Fig. 4).

A North Derry area (Fig. 4) was defined as including the Magilligan provisional landscape unit (1), the northern escarpment of the North Derry mountains (3), small areas of Limavady/Dungiven (4) and Coleraine (2). This allowed incorporation of outstanding coastal features such as the River Bann Mouth, Portstewart, Downhill, Magilligan, the River Roe Estuary and the Binevenagh-Eagle Hill escarpment. The North Derry Mountains (3) between Binevenagh and Benbradagh, away from the escarpment and the coast, have not been included creating a smaller area than the existing AONB.

A core Sperrins area was defined as including the Sperrins (8), Plumbridge (7), Owenkillew/Owenreagh (12), Gortin (14). Peripheral areas were added to complete the upland/lowland transition zone and to include adjacent landscape units. The only part of these 4 core units which were not included were the eastern slopes of the Carntogher Ridge (in the NE of the Sperrins unit). The eastern limits of Slieve Gallion (11) have been extended slightly to include the lower slopes. Some parts of Murrins/Black Bog (15) and Davagh (13) have been excluded where extensive gravel workings and obtrusive housing developments exist.

The Strule Valley between Omagh and Strabane, up to and including Bessy Bell, in Newtownstewart (10) has been included although it was recommended for exclusion because of its agricultural nature and housing development. The lower valley slopes and river terraces are well wooded and contain estates and farms of historical interest. The area is a major tourist route, a focus for recreational developments and a major gateway to the Sperrins.

The separation of upland from lowland also affects boundary definition in the northern hills and glens of Plumbridge (7) and Sperrins (8) which continue into Park (6), Dunnamanagh/Claudy (5) and Dungiven (4). The steep sided glens are frequently wooded and have a variety of settlement and field patterns. The following glens, therefore, were included:

Glenmornan	Faughan (Park)
Burn Denet	Clogherna Burn/Owenbeg
Altdarragh Glen	Owenrigh
	Benady Glen
Glenrandal/Inver River and the lower slopes of Benbradagh.	

Some of the lower slopes of the Sperrin Mountains and Slieve Gallion in the Draperstown/Cookstown (9) unit were incorporated to encompass the transitional upland/lowland zone which in some localities have distinctive ladder farms.

The recommendation to exclude from further study, large parts of the Limavady/Dungiven (4), North Derry Mountains (3), Coleraine (2), Evishanoran (16), Dunnamanagh/Claudy (15), Park (6) and Draperstown/Cookstown (9) units was accepted. Units 2,4,9 and 15 are lowland units with considerable rural development and improved agricultural land. Although these areas do include many distinctive features, both natural and cultural, these features lack an integrating harmony within the landscape and are dispersed among otherwise unspectacular scenery.

The rounded hills of Park (6) beyond the Sperrins fringe continuing northwards towards Londonderry, consist of enclosed agricultural land and/or forestry extending to the hill summits. Beyond the first line of hills namely Curradolan, Crookdooish, Slieveboy and Straid Hill, the Sperrins identity evaporates.

Between Binevenagh and Benbradagh the escarpment of the North Derry Mountains (3) loses its prominence, the dip slope lacks dissecting glens to add relief and there are several large and monotonous forest plantations. There is a clear break in outstanding landscape quality between North Derry and the Sperrins.

Evishanoran (16), an area of low but rugged hills interspersed with bogs and gravel ridges has a high concentration of archaeological sites. However active gravel workings, agricultural reclamation and peat extraction have degraded the landscape.

Internal adjustments were made to boundaries to align them more closely with local government boundaries and watersheds.

2.4.3 Description of the refined landscape units

The 10 landscape units which emerged from the refinement and for which a full resource field survey was made, are shown in Fig. 5. For convenience, landscape unit 1 will be subsequently referred to as the North Derry AONB and units 2-10 as the Sperrins AONB. The North Derry AONB was subdivided into subunits 1A, 1B and 1C.

1. North Derry

A coastal unit incorporating Magilligan Foreland at or near sea level (Unit 1A) backed by the North Derry mountain plateau and prominent western escarpment (Unit 1B). The highest point is Binevenagh at 385m. Also included in the unit is the River Bann estuary (Unit 1C) incorporating Castlerock and Portstewart dunes. There is a gradation of land class groups from coastal group A of Magilligan Foreland and Castlerock to groups I and J of the mountain block.

2. Glenshane

A mountain unit north-east of the main Sperrin mountain block, dissected by the Glenshane Pass and Benady Glen. The mountains are higher south of the Glenshane pass. Mullaghmore in the south reaches 550m compared to 465m of Benbradagh in the north. Also incorporated are intermediate elevation slopes adjacent to the lowlands. The area falls within land class groups G-J.

3. Moyola

The unit incorporates the east side of the Sperrin Mountains and intermediate slopes adjacent to the lowlands. It is dissected on the east side by the Moyola River, Glengomna Water and Douglas River. There is a range of land class group representing the transition from lowland to mountain terrain.

4. Slieve Gallion

This is centred around the Slieve Gallion mountains which are separated from the Sperrin Mountains by the Moyola River. Tintagh Mountain reaches 528m. Also incorporated are the intermediate slopes which have a relatively dense road

network. Lough Fea is located on the western boundary. The mountain summits are represented by land class groups I and J and the intermediate elevation slopes mainly by land class groups E and F.

5. Davagh

This incorporates the flat to rolling terrain of land class group F located between Slieve Gallion and the Sperrin Mountains. Elevation ranges from 151-250m with higher mountains of land class groups I and J at the southern boundary. Oughtmore rises to 382m. The unit is bounded by Lough Fea in the east.

6. Mid-Sperrins

This encompasses the main Sperrins block of high mountains dissected by the Glenelly, Owenkillew and Owenreagh Valleys. Sawel Mountain rises to 678m and Dart Mountain to 619m. The unit is mainly represented by land class groups E-J.

7. Murrins

This comprises the flat/rolling terrain of land class groups E and F at 150-250m elevation south of the Owenreagh River. It contains numerous loughs notably Lough Macrory and Lough Finrean.

8. Gortin

A mountain block south of the Owenkillew River dissected by Gortin Glen. Mullaghcarn rises to 542m. Also incorporated are the intermediate slopes of the mountains and some lowland on the west and north sides. Land class group E is the most represented with land class groups D to J all present.

9. Strule River

A low elevation unit mainly less than 150m elevation comprising land in and adjacent to the Strule and lower Owenkillew River valleys. Also incorporated are the towns of Newtownstewart and Sion Mills. The east side of Bessy Bell (420m) is also included. It mainly comprises land class groups A-D.

10. Northwest

This includes part of the main Sperrin Mountains north of a line between Sawel Mountain and Mullaghclogha. Barnes Top rises to 465m. Also incorporated is an extensive area of large rounded hills dissected by rivers extending from Park in the east to Strabane in the west. Owenreagh Hill rises to 400m. Land class groups E, G and H are predominant.

3. Resource Survey and Analysis

3.1 Sample stratification

Landscape units 1-10 (Fig. 5) and land class groups A-J (Fig. 6) were both used to stratify the refined area in order to carry out a detailed landscape resource sampling programme. This was carried out separately for the North Derry AONB and the Sperrins AONB. The sampling programme, summarised by land class group and refined landscape unit, is shown in Tables 3-5. The additional stratification by landscape unit imposed a more regular pattern of sample squares throughout.

A random sample of 116, 1km squares was selected for field survey (Fig. 7) (Appendices 3 & 4). Proportionally, a greater number of samples were allocated to the North Derry AONB than to the Sperrins AONB. This was necessary to obtain reliable resource estimates for the smaller North Derry AONB. The North Derry landscape subunits 1A + 1C and 1B were treated as two separate substrata for sampling purposes. In the Sperrins AONB, landscape unit 6 was sub-stratified into the Glenelly and Owenkillew/Owenreagh Valley systems and landscape unit 10 was sub-stratified into eastern and western sectors.

Within each landscape unit or sector, sample squares were allocated randomly in proportion to their land class group frequency. Sample squares falling next to existing sample squares were re-allocated to further ensure that sample clumping was minimised.

3.2 Physical characteristics of the sampling strata

Using the sampling programme described in section 3.1, the physical attributes of kilometre squares in the Sperrins AONB and the North Derry AONB were recorded from map archives

(Tables 6,7,8,9,10 and 11). The maps from which information was recorded were: Ordnance Survey of Northern Ireland (1:50,000), Geological Survey of Northern Ireland (1:625,000), Generalised Soil Map of Ireland at a scale of 1:575,000 (Gardiner and Radford 1980). The recording procedure is described by Cooper (1986).

The frequency of land class groups in each landscape unit is shown in Table 12. Each unit has a characteristic composition which summarises its physical structure.

3.3 Field recording procedure

A random 25ha quarter square from each of the kilometre squares within the sampling programme described in section 3.1, was selected for field study. Field data were recorded onto standard data sheets (Appendix 5) corresponding to the following categories:

1. Woodland: type, position in the landscape, structure, ground flora, soils, management, main species of the understorey, canopy and regenerating species.
2. Seminatural vegetation: grassland, heaths, bog, coastal vegetation and tall herb vegetation; their structure, management and main species present.
3. Field boundaries: type, structure, the main species of shrubs, small and large trees.
4. Agriculture: grassland, crops, their management, structure and the types and numbers of farm animals.
5. Landscape: artefacts of the built, urban and rural environments, dereliction, recreation and surface topographical features.

Each of the five data sheets held a checklist of coded attributes, a 1:70,060 scale map and a data matrix. The data recording procedure consisted of inserting numeric codes onto the maps then checklist codes into the data matrix. Appendix 5 illustrates the process.

Information was recorded with reference to a set of habitat and attribute standard descriptors, (Appendix 6) and species codes (Appendix 7). Target notes were added for specific parcels of land and the square as a whole.

In the field, boundaries, were located accurately using 1:50,000 and 1:10,000 Ordnance Survey maps. In the uplands, where locating boundaries was more difficult, aerial photographs were occasionally used to check parcels of land. The whole of every sample square was visited, but dangerous or inaccessible areas were viewed from vantage points. Minor² variations in the field, defined as areas less than 10m or linear features less than 10m in length, were not recorded.

Quantitative measurements of land use, linear features and landscape attributes were made from the maps after field survey had been completed, using a digitising table linked to an IBM-XT microcomputer. Measurements were subsequently entered into the field data sheet matrices.

The original field data sheets (Appendix 8) are held by the Department of Environmental Studies, University of Ulster. Copies have been deposited with the Countryside and Wildlife Branch of the Department of the Environment for Northern Ireland.

3.4 Computer data base

Column headings on the field sheet data matrices reflect the field structure of the computer data base. This facilitated the direct transfer of data to computer files. Data base analysis was carried out with dBASE III (Ashton-Tate 1985) and LOTUS 1-2-3 (Lotus Development Corporation 1985), run on an IBM-XT microcomputer. Technical details and a catalogue of files are given in Appendix 9.

3.5 Statistical summary and validation of resource estimates

A statistical summary of the results and an indication of the variation in a range of resource types is given in Appendix 10. Validation of the estimates predicted from the sampling programme are summarised in Appendix 11, by comparing the results of independent full cover surveys for coniferous forest and peatlands.

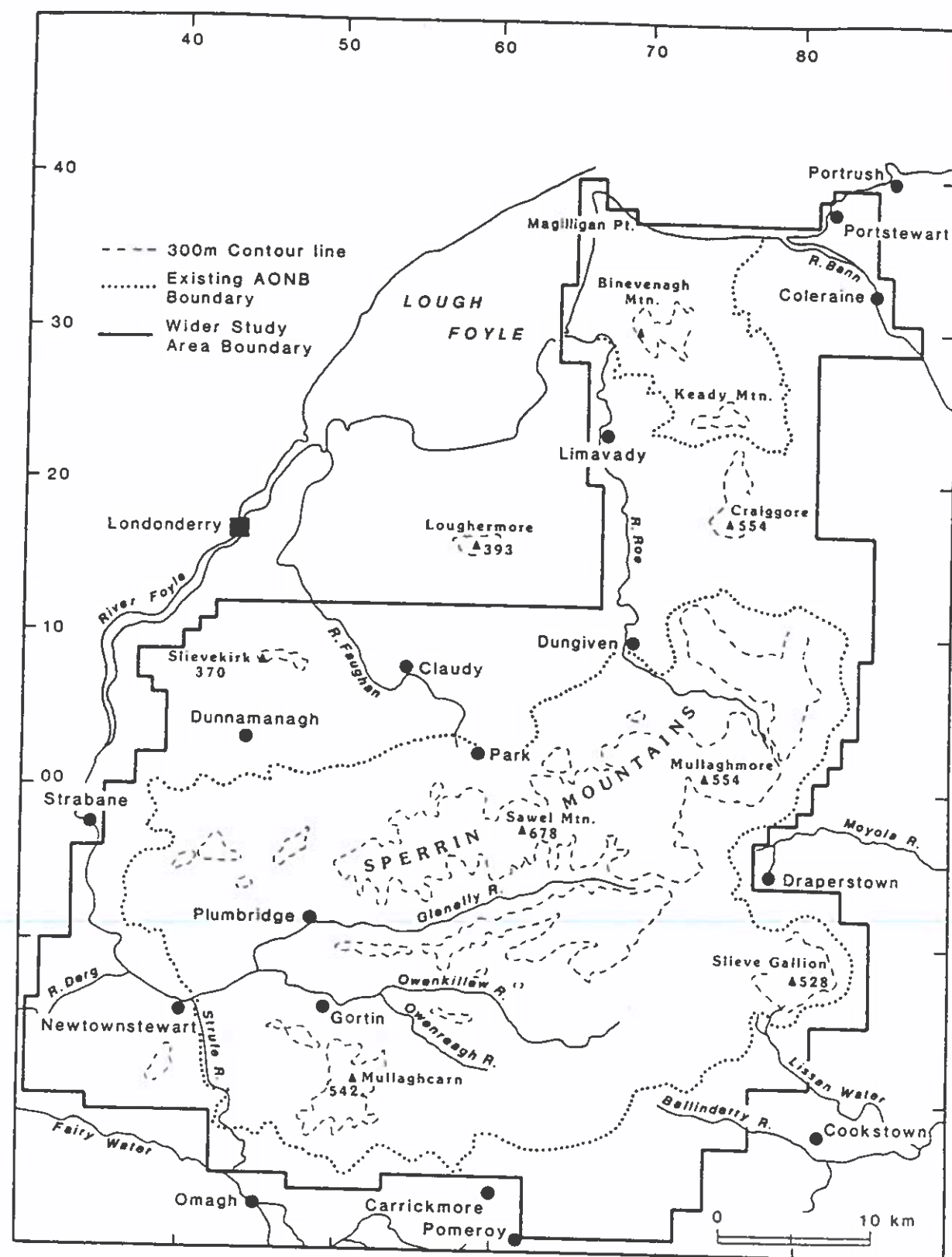


Fig. 1 Map of the wider study area. The boundary follows kilometre squares of the Irish Grid. The existing North Derry AONB and Sperrins AONB boundaries are also shown.

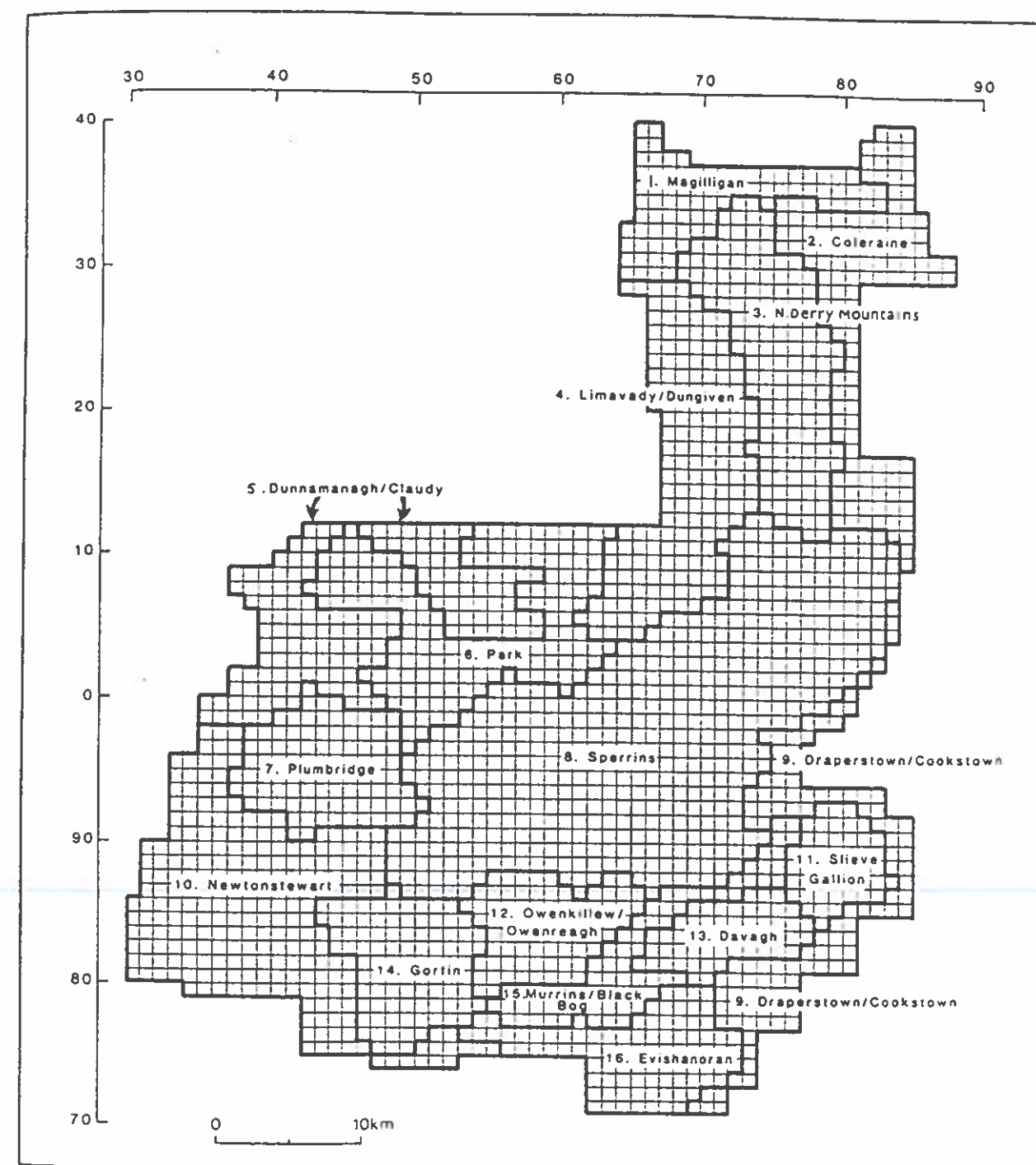


Fig. 2 Location of the provisional landscape units, derived from the Northern Ireland land classification.

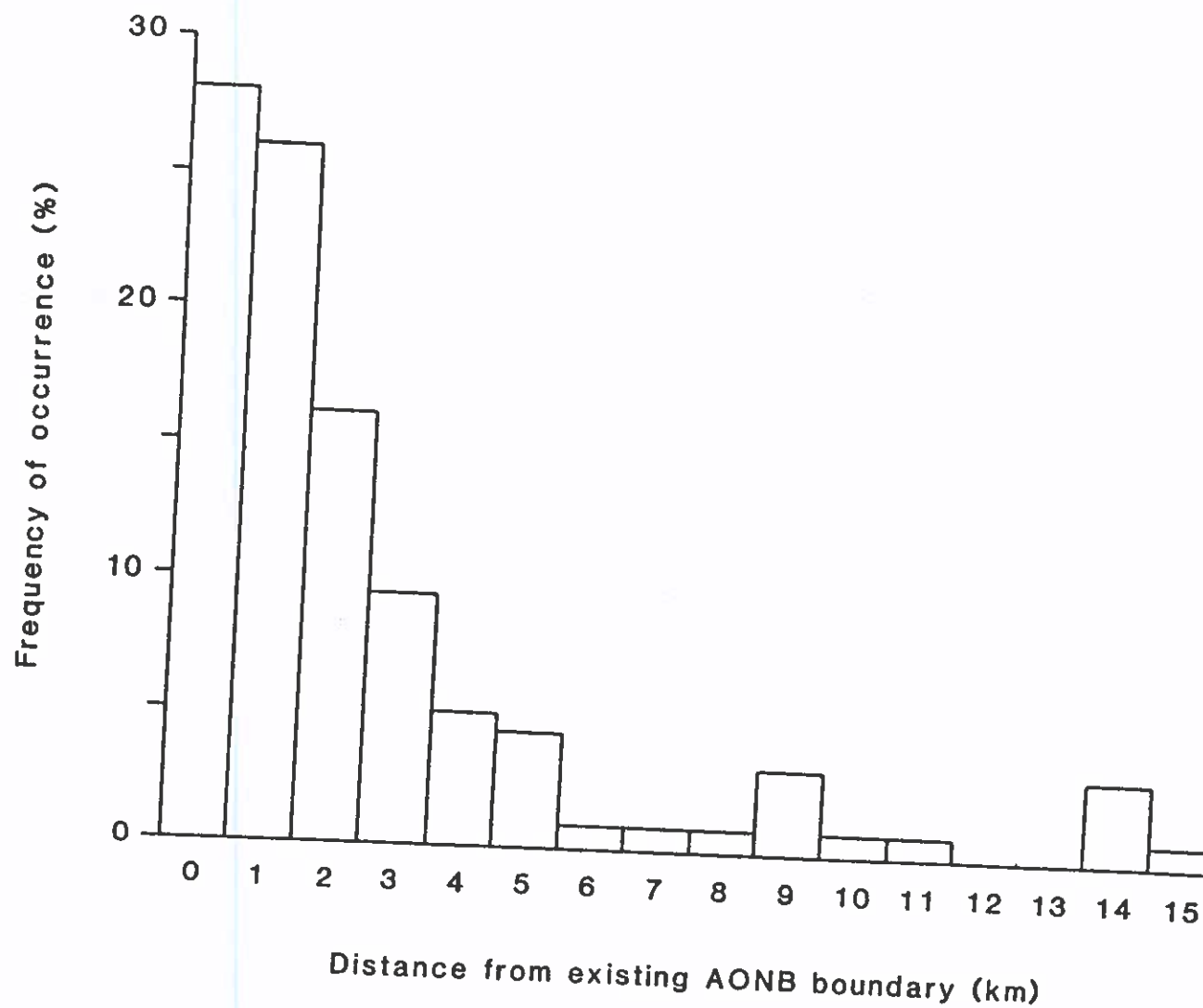


Fig. 3 Frequency distribution of distances measured in kilometre grid squares between the boundary of an area delimited by landscape units 7,8 and 11-15 and the existing Sperrins AONB boundary. Measurements were taken at kilometre intervals along the existing boundary.

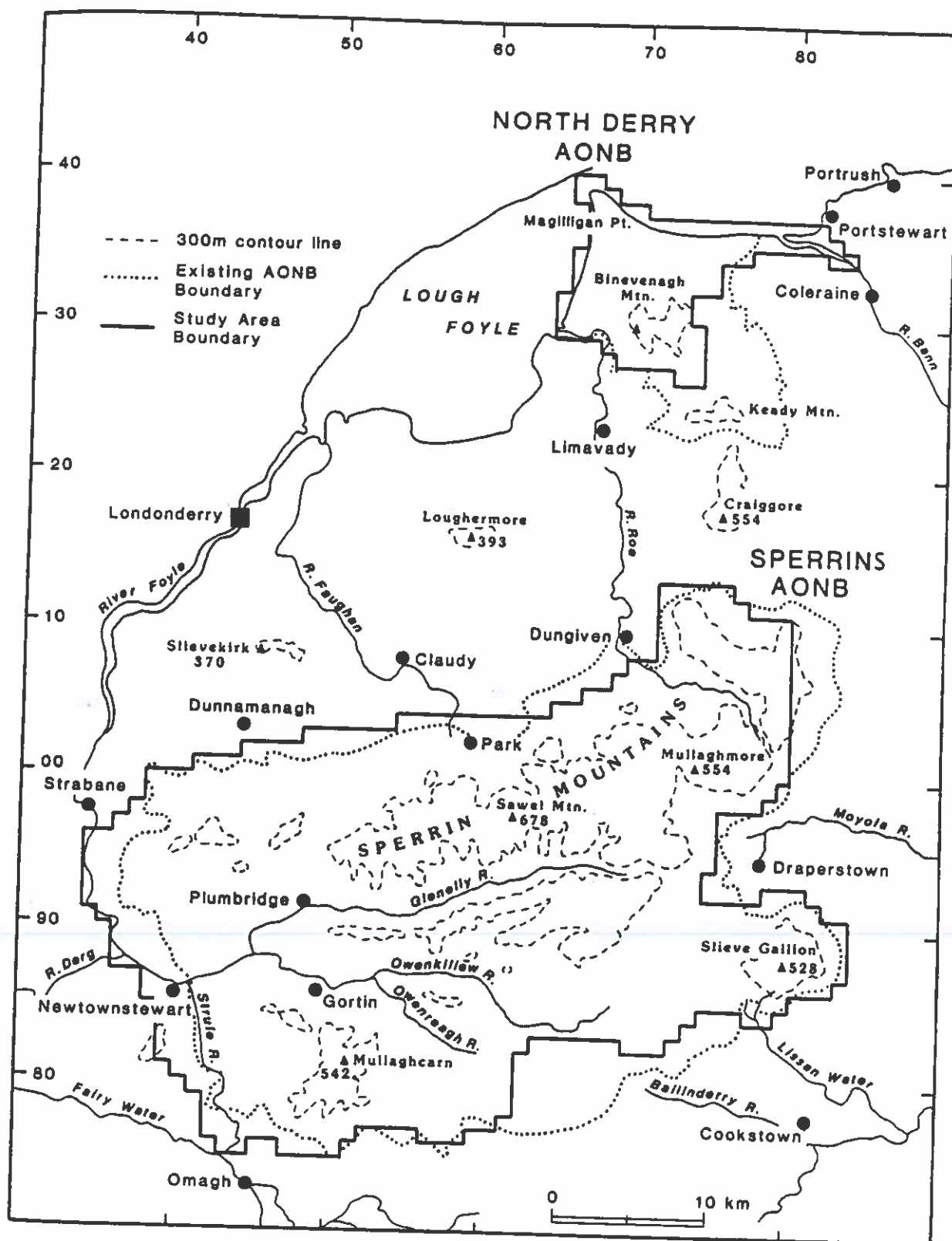


Fig. 4 Map of the field study area. The boundary follows kilometre squares of the Irish Grid and gives an indication of the extent of land with a potential for AONB status. The existing North Derry AONB and Sperrins AONB boundaries are also shown.

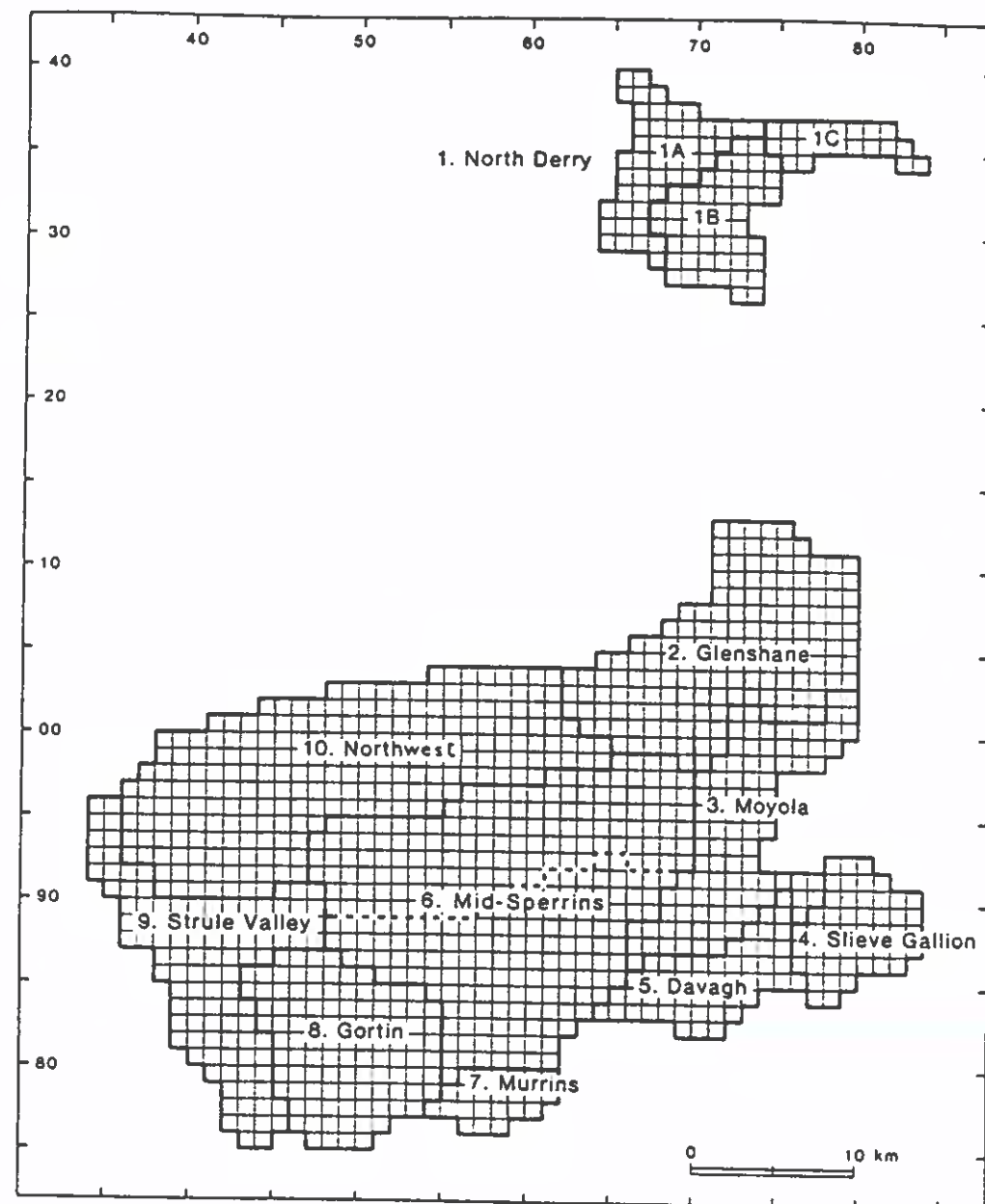


Fig. 5 Location of the refined landscape units used to stratify the study area for field survey. The units are based on the Northern Ireland land classification.

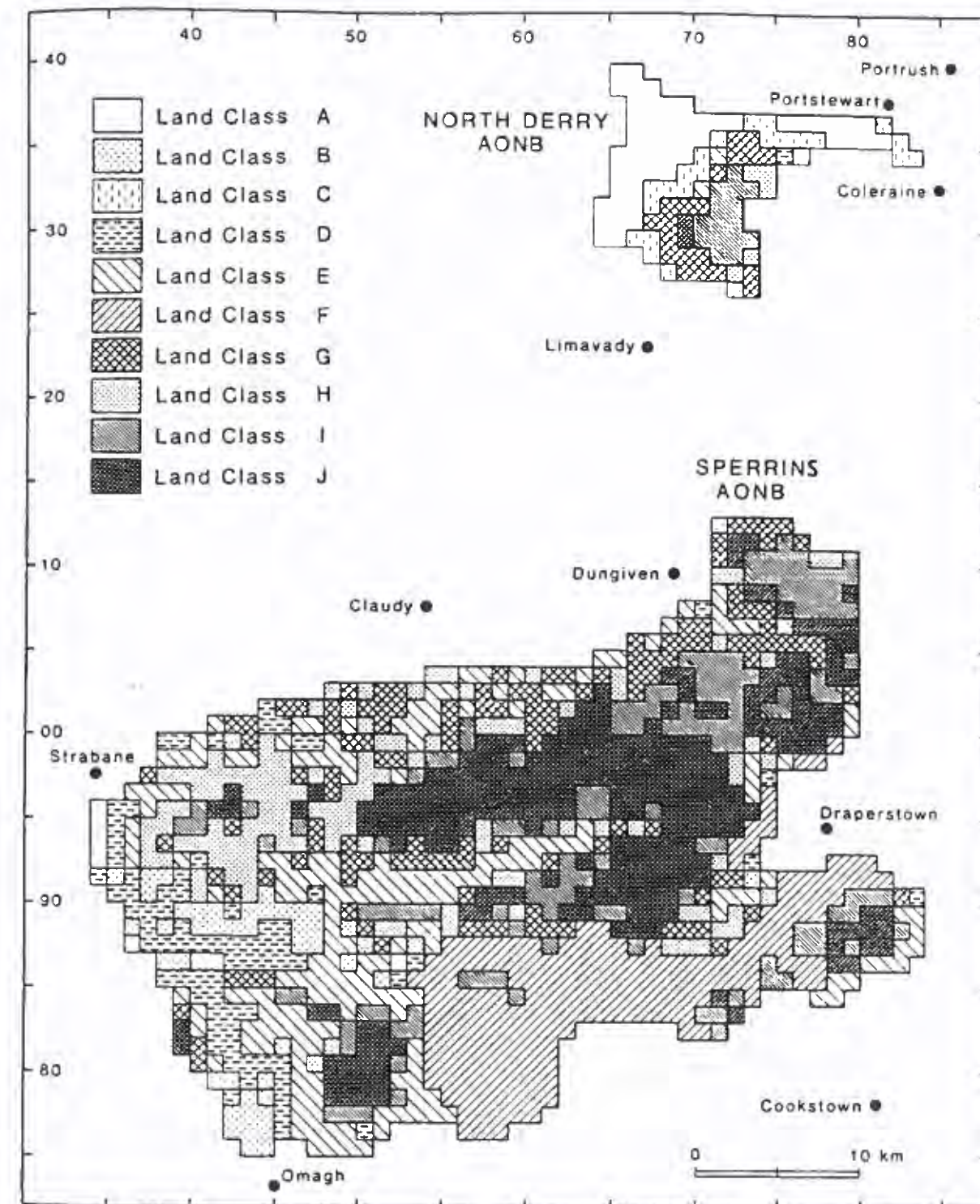


Fig. 6 Distribution map of the land class groups in the North Derry AONB and the Sperrins AONB.

This map has been removed to preserve the confidentiality of the sample square locations.

Table 1. Attributes related to landscape quality, recorded during field reconnaissance survey of the Sperrins/North Derry region.

1. Landform

flat	sea cliff	highest point
rolling	inland cliff	lowest point
undulating	coast	altitude
steep	estuary	
vertical	narrow valley	
plateau	broad valley	
hill	flat valley bottom	
mountain	rock outcrops	
lake	scree	
	peat	
	indistinct landform	

2. Woodland

Seminatural broadleaf
scrub
coniferous plantation
deciduous/mixed plantation
parkland
species

3. Seminatural vegetation

coastal
species-rich grassland
bog
heath
poor fen
fen/freshwater vegetation
gorse
bracken

4. landscape

urban site
vernacular building
derelict building
rubbish
abandoned vehicle
quarry
gravel working
mine
erosion
recreation facility
road network
non-vernacular building
village
recreation facility
antiquity
nature reserve
geomorphological feature
geological feature
soil type
peat cutting

5. Agriculture

improved sward
rough pasture
arable land
rush-infested grassland
hill farming
agricultural land reclamation
land drainage

6. Field boundaries

boundary removed
stockproof hedgebank
derelict hedgebank
stockproof dry stone wall
neglected dry stone wall
earth/wall bank
post & wire fence
dominant species
field shape/size
traditional field pattern
hedge trees

Table 2a Positive criteria used in preliminary landscape evaluation of the region.

Positive Criteria	Summary Profile															
	Areas															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
High mountain	.	.	.	.	.	.	.	*	.	.	*	.	.	*	.	.
Mountain	.	.	*	.	.	.	*	.	.	.	.	*	*	.	.	.
Hill	.	.	.	.	.	*	.	.	.	*	.	.	.	.	*	*
Coast	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estuary	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Glen/valley	.	.	.	*	*	*	.	*	*	*	*	*	*	*	*	.
Heath/bog	.	.	*	.	.	*	*	*	.	.	*	*	*	*	*	*
Species-rich vegetation	*	.	.	.	.	.	*	*	.	.	.	.	.	.	*	.
Distinct landform	*	.	*	.	*	*	*	*	.	.	*	*	*	*	*	*
Woodland	*	.	.	*	*	.	.	.	.	*	.	*	.	*	.	.
Field boundary interest	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.
Nature reserve	*	.	.	.	*	.	.	.	*	.	.	.	.	*	*	.
Recreation facility	*	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.
Antiquity	.	.	.	.	*	*	.	.	*	.	*	.	.	.	.	*
Traditional farming/field pattern	.	.	.	.	.	.	*	*	*	.	.	.	*	.	.	*
Vernacular building	.	.	.	.	.	.	*	*	*	.	.	.	*	.	.	.
Geomorphological interest	*	.	.	.	.	.	.	*	.	.	.	.	.	.	.	*
Integral to scenic area	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 2b Negative criteria used in preliminary landscape evaluation of the region.

Negative Criteria	Summary Profile															
	Areas															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Lowland	*	*	.	*	*	.	.	.	*	*	.	.	.	.	.	.
Urban area	.	*	.	*	*	.	.	.	.	*	.	.	.	.	.	*
Intensive agriculture	*	*	.	*	*	*	.	.	*	*	.	*	.	.	.	*
Poor fen vegetation	.	.	*	.	.	*	*	*	.	.	*	*	*	*	.	*
Indistinct landform	.	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.
Derelict field boundaries/post and wire fencing	*	*	.	*	.	.	.	.	.	*	.	.	.	.	.	.
Derelict building	.	.	.	.	.	.	*	.	.	.	.	.	*	.	.	.
Species-poor vegetation	.	*	.	.	*	.	.	.	.	*	.	.	.	.	.	.
Poorly landscaped conifer plantation	.	.	*	.	.	.	*	*	.	*	.	.	*	.	.	.
Reclamation or drainage, peat cutting	.	.	*	.	.	.	*	*	.	.	*	.	.	.	.	*
Large field size	*	*	.	*	*	.	.	.	.	*	.	*	.	.	.	.
Erosion	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.
Road network	.	*	.	*	*	.	.	.	*	*	.	.	.	.	.	*
Industrial site	.	.	*	.	.	.	.	.	.	.	.	*	.	.	.	*

Table 3. Sample stratification within the Sperrins AONB field study area.

Land class group	Northern Ireland land class	Number of squares in AONB	Land area (Km ²)	Number of sample 25ha squares	Sampling intensity (% area)
A-D	5,9,10,11,12 6,7,8, 16, 13,14,15	123	123	11	2.2
E	17,18,19a	194	194	17	2.2
F	19B	171	171	15	2.2
G	21	125	125	11	2.2
H	20	118	118	10	2.1
I	22	137	137	12	2.2
J	23	229	229	20	2.2
Total		1097	1097	96	2.2

Table 4. Sample stratification within the North Derry AONB field study area.

Land class group	Northern Ireland land class	Number of squares in AONB	Land area (Km ²)	Number of sample 25ha squares	Sampling intensity (% area)
A-D	5,9,10,11,12 6,7,8, 16, 13,14,15	66	56	12	4.8
E	17,18,19a	2	2	-	-
F	19B	-	-	-	-
G	21	20	20	4	5
H	20	5	5	1	5
I	22	15	15	3	5
J	23	2	2	-	-
Total		110	100	20	4.6

Table 5. Sample stratification within landscape units of the North Derry AONB and Sperrins AONB.

Landscape unit	Number of squares	Land area (km ²)	Number of sample squares	Sample intensity (% area)
North Derry				
1A + 1C	60	50	10	4.3
1B	50	50	10	5
Sperrins				
2	157	157	13	2.1
3	95	95	8	2.1
4	48	48	4	2.1
5	51	51	5	2.5
6	283	283	25	2.2
7	23	23	2	2.2
8	103	103	10	2.4
9	108	109	10	2.3
10	229	210	19	2.3
Total	1207	1197	116	2.6

Table 6. Mean values of map attributes recorded in a random sample of kilometre squares from each land class group in the Sperrins AONB.

	Land class group						
	A-D	E	F	G	H	I	J
1. Land 0-50m (ha)	34	-	-	-	-	-	-
2. Land 51-150m (ha)	65	34	13	15	8	-	-
3. Land 151-250m (ha)	1	58	82	67	74	7	3
4. Land 251-500m (ha)	-	8	5	17	17	93	87
5. Land 501-1000m (ha)	-	-	-	-	-	-	10
6. Mean elevation (m)	89	179	203	223	219	290	394
7. Highest point (m)	112	222	233	275	270	338	472
8. Lowest point (m)	66	134	171	172	168	241	310
9. Dist. between high-lowest pt. (m)	568	803	695	923	873	729	888
10. Gradient of slope (o)	4	6	5	6	7	11	10
11. Height of hill behind slope (m)	174	315	301	344	360	361	467
12. Dist. to hill behind slope (m)	1104	985	937	682	985	342	185
13. Dist. to valley bottom (m)	135	105	101	375	353	448	576
14. Number of road forks	1	1	-	-	-	-	-
15. Number of buildings	9	8	5	3	2	-	-

Table 7. Percentage mean frequency of map attributes recorded in a random sample of kilometre squares from each land class group in the Sperrins AONB.

	Land class group						
	A-D	E	F	G	H	I	J
1. Inland cliff	-	-	-	-	10	8	-
2. Quarry	9	-	-	-	-	8	-
3. Contour top or summit	18	12	7	9	20	42	55
4. Flat valley bottom	73	65	67	45	20	50	15
5. Spring	-	41	27	36	60	75	55
6. Stream	54	82	80	91	90	92	75
7. Single line river	18	47	27	27	-	25	10
8. Double line river	45	18	7	9	-	-	-
9. Waterway junction	36	35	20	27	70	42	5
10. Inland water body	9	-	20	-	-	-	5
11. Red road	18	6	7	18	-	8	-
12. Brown road	64	29	20	9	-	-	5
13. Yellow road	91	88	60	55	80	17	10
14. White road (rural)	82	53	60	36	40	8	-
15. Path, track or walk	36	53	67	64	90	42	40
16. Recreation facility	-	-	7	9	-	-	5
17. Antiquity site	9	24	7	9	-	-	5
18. Public building	9	12	-	-	-	-	-

Table 8. Percentage mean frequency of geological and soil attributes recorded in a random sample of kilometre squares from each land class group in the Sperrins AONB.

	Land class group						
	A-D	E	F	G	H	I	J
<u>Geology</u>							
1. Mullaghcarn schists	9	6	27	18	-	17	20
2. Glenelly schists	-	24	7	9	10	17	25
3. Dart schists	9	18	-	27	60	50	35
4. Dungiven limestone	9	12	-	27	-	-	-
5. Newtownstewart quartzites	27	6	-	-	10	-	-
6. Dalradian	36	18	-	36	10	8	5
7. Basic igneous complex	-	-	40	-	-	-	-
8. Sherwood sandstone	-	-	-	-	10	-	5
9. Basalt	-	12	27	-	-	8	10
10. Other rock types	9	6	-	-	-	-	-
<u>Soils</u>							
11. Peaty podzols	-	24	7	-	-	8	10
12. Peaty gleys	-	12	7	64	40	50	80
13. Blanket peat	-	6	13	-	10	8	10
14. Brown podzolics	-	-	67	-	-	25	-
15. Brown podzolics (glacial till)	100	53	-	27	50	8	-
16. Gleys (sandst. glacial till)	-	6	7	-	-	-	-
17. Grey brown podzolics	-	6	-	9	-	-	-

Table 9. Mean values of map attributes recorded in a random sample of kilometre squares from landscape sub-units in the North Derry AONB.

		Landscape sub-unit	
		1A,1C	1B
1.	Land 0—50m (ha)	76	15
2.	Land 51—150m (ha)	4	22
3.	Land 151—250m (ha)	-	25
4.	Land 251—500m (ha)	-	38
5.	Land 501-1000m (ha)	-	-
6.	Mean elevation (m)	15	161
7.	Highest point (m)	21	249
8.	Lowest point (m)	9	119
9.	Dist. between highest and lowest pt(m)	110	875
10.	Gradient of slope (o)	6	7
11.	Height of hill behind slope (m)	25	320
12.	Dist. to hill behind slope (m)	140	970
13.	Dist. to valley bottom (m)	15	451
14.	Number of road forks	-	-
15.	Number of buildings	5	4

Table 10. Percentage mean frequency of map attributes recorded in a random sample of kilometre squares from landscape sub-units in the North Derry AONB.

	Landscape sub-unit	
	1A,1C	1B
1. Sea	60	-
2. Shingle, sand or mud	60	-
3. Sea cliff	10	-
4. Inland cliff	10	30
5. Quarry	-	-
6. Contour top or summit	20	10
7. Flat valley bottom	-	10
8. Spring	10	20
9. Stream	60	70
10. Single line river	10	10
11. Double line river	10	-
12. Waterway junction	-	10
13. Inland water body	-	20
14. Red road	30	20
15. Brown road	20	-
16. Yellow road	40	60
17. White road (rural)	70	40
18. Path, track or walk	40	10
19. Tourist information, recreation facility	30	10
20. Antiquity site	-	10
21. Public building	-	-

Table 11. Percentage mean frequency of geological and soil attributes recorded in a random sample of kilometre squares from landscape sub-units in the North Derry AONB.

	Landscape Sub-unit	
	1A,1C	1B
1. Dalradian	10	-
2. Sherwood sandstone breccia	-	20
3. Mercian mudstone	20	10
4. Rhaetic	-	10
5. Chalk and Hibernian greensand	-	10
6. Lower Lias	40	20
7. Basalt	30	60
8. Blanket peat	-	60
9. Acid brown earth	20	10
10. Gleys (basalt glacial till)	10	-
11. Grey-brown podzolics	-	10
12. Gleys (alluvium)	70	20

Table 12. Percentage frequency of land class groups in the landscape units of the North Derry AONB and the Sperrins AONB.

Landscape unit	Land class group									
	A	B	C	D	E	F	G	H	I	J
1 North Derry	38	-	21	1	2	-	18	5	14	2
2 Glenshane	-	-	1	1	8	-	23	6	33	29
3 Moyola	-	1	-	2	11	19	11	15	8	33
4 Slieve Gallion	-	-	-	2	27	23	2	-	23	23
5 Davagh	-	-	-	-	-	82	-	-	14	4
6 Mid-Sperrins	<1	1	-	1	15	26	10	7	12	29
7 Murrins	-	-	-	-	9	91	-	-	-	-
8 Gortin	-	1	-	5	53	5	2	2	14	18
9 Strule Valley	6	33	-	44	10	-	4	-	-	2
10 Northwest	-	1	-	6	21	-	20	32	5	16

4. Ecological Resources, Land Use and Landscape Attributes

4.1 Sperrins AONB

4.1.1 Regional distribution

Agricultural grassland and arable crops cover 30.6% of the land surface (Fig. 8). Whilst ryegrass swards are predominant on farmland (17.5%), there is a great deal of poorer quality grassland occupying 11.4% of the AONB. This reflects the upland and wet climatic nature of the area.

There is an additional 8.1% of poor fen, representing either poorer quality agricultural land which has regressed from agricultural grassland or is derived from peatland and fen carr.

Primary and secondary wet heath and bog is the main ecological resource, covering 43.5% of the landscape. Other seminatural vegetation is very poorly represented. For example, species-rich grassland (1.0%) and seminatural woodland (1.2%) are present in only small amounts.

Field boundaries (Fig. 9) are largely earth or wall banks (46.8%) and post & wire fences (23.0%). Less frequent are derelict hedgerbanks (9.1%) and ruined dry stone walls (5.8%) although locally common. There are large numbers of derelict buildings, usually vernacular, abandoned vehicles and sites with rubbish on farmland.

4.1.2 Land class groups

The upland nature of the area together with its more complex topography gives rise to variation between land class groups that is not related so simply to elevation, as was the case in the the Mourne AONB and the Antrim AONB. For the

purpose of summarising resource distribution, therefore, land class groups A-J have been combined into more generalised land types representing a transition from low (group A-D) to high (group I-J) elevation. The computer data base does contain information, however, which can be accessed for each land class group separately.

Agricultural grassland, arable/fallow land and woodland other than coniferous plantation decrease in proportion from land class group A-D to I-J (Fig. 10). In contrast, coniferous plantation and seminatural vegetation types increase. Hedgebanks decrease in proportion from land class groups A-D to I-J (Fig. 11). Earth or wall banks increase in proportion from group A-D to G-H but are less abundant in group I-J. Post and wire fencing is most common in group I-J.

Woodland

Land class group A-D contains most of the seminatural broadleaf woodland and scrub (Table 13), centred largely around the Strule River valley. Coniferous woodland occurs mainly as a small number of large blocks, particularly in group I-J. In group E-F, small coniferous shelterbelts on farmland are frequent. Other woodland types occupy a small proportion of the landscape (0.4%).

Seminatural broadleaf woodland, generally mature (Table 16), is associated with both riversides and field parcels on farmland (Table 14). It is distributed mainly on flat terrain particularly valley bottoms or lower elevation escarpments, rather than on the steeper hills (Table 15). Scrub, found almost exclusively as field parcels or by riversides, is mainly found on flat to sloping land or escarpments. Both

types occur on drained mineral soils but regeneration of carr woodland and scrub over waterlogged and drained peat (Table 18) is found, mainly in group A-D.

The ground flora of all woodland types is predominantly species-poor or grass-dominated (Table 17), generally with a rather calcifuge flora. Scrub, however, is more species-rich (32%) than other types. Broadleaf woodland and scrub are mostly unenclosed and unmanaged, with a high proportion showing signs of active grazing by farm stock (Table 19).

Alder, ash, hazel, willow, birch, rowan, sycamore and hawthorn are the most frequent species in seminatural broadleaf woodland. In scrub, willow, rowan, hawthorn and birch (Table 20) are most common. Sitka spruce is the main conifer plantation species with some lodgepole pine and larch.

Seminatural vegetation

Species-rich grassland occurs in land class groups A-D, E-F and G-H as a minor component but its wildlife value is often poor (Table 21). Bent-fescue hill pasture is also a minor component of the better hill soils of group G-H. Mat-grass hill pasture is more abundant and is confined mainly to group I-J on the steeper, better-drained land with rocky or thin peaty soils. Bracken and gorse heath occur mainly on steep river terraces and banks throughout the lower elevation groups.

Poor fen is most abundant in group G-H. The sharp-flowered rush type is more abundant than the soft rush type.

Wet heath, wet heath mosaic and dry bog increase in abundance with elevation. Wet heath mosaic is relatively more

abundant in the lower elevation farmed land. There is a range of types encompassing those derived from peat cutting and drainage to those derived from abandoned agricultural as well as intact communities.

Wet bog occurs evenly throughout the groups. Group A-D has a large component of cut-over raised and blanket bog associated with river valleys. In the other groups, blanket bog is the main peatland type.

Peatland exploitation is extensive throughout the AONB (Table 22). There is an increase in hand-cutting with elevation due to the availability of suitable resources. Machine-cutting is less frequent than hand-cutting and is largely confined to the uplands and upland transition. It is not a feature of lowland bogs, many of which have been formerly cut by hand and are often difficult to access. Hand-cutting and machine-cutting were recorded most frequently in heath and bog parcels particularly wet heath mosaic (Table 23), often on secondary peat. Open drains, burning, erosion and other forms of disturbance are widespread, particularly in group I-J (Tables 22 & 23). Open drains largely to improve the grazing value of peatland but also in preparation for peat cutting, are associated primarily with wet heath, dry bog and wet bog. Wet heath and wet bog are the most frequently burnt parcels. Both types of vegetation occur as larger parcels, making them easier to burn.

Agriculture

Perennial ryegrass is predominant in group A-D and is a significant component of groups E-F and G-H (Table 24). It was also recorded in group I-J. Poorer grasslands represented

mainly by the type, other grassland, occur in all groups except I-J but particularly in group E-F. Rush and broadleaf weed infestations are frequent (Table 25).

Arable and fallow land were recorded mainly in group A-D with a minor component in group E-F.

Abandoned vehicles and rubbish associated with farmed land are frequent (Table 26). Sites with rubbish were recorded particularly in group A-D. Derelict buildings, often vernacular are distributed throughout, except for group I-J. This is also the case with abandoned farm tracks.

Field boundaries

A hierarchical classification of boundary type and abundance is shown in Fig. 12. Boundary removal is most extensive in groups E-F and G-H but is less frequent in the better farmland of group A-D (Table 27). In this group, field sizes have probably always been large. Stockproof hedges are a feature of group A-D but are a minor component of the other groups. Hedgebanks with scattered or overgrown shrubs are largely confined to groups A-D and the farmed parts of group E-F.

Earth or wall banks are characteristic of enclosed land throughout the area. Post & wire fences are similarly ubiquitous, on their own or as a supplement to other boundary types. They are the predominant field boundary type in group I-J.

A high proportion of stockproof hedgebanks, hedgebanks with gaps and hedgerows, are managed by farmers (Table 28), usually either to a flat top or coppiced close to the ground.

Management is a function of elevation and the degree of intensive farming. The greatest proportion of managed field boundaries occurs in group A-D.

Many field boundaries are associated with ditches (Table 29). Ditching along earth or wall banks increases in extent from the better farmed land of group A-D to the mountain group I-J. Ditches are also found associated with recent post & wire fencing.

Hawthorn, gorse and blackthorn are the most abundant shrubs (Table 30). Whilst gorse is more common in groups E-F and G-H, hawthorn and blackthorn are most common in group A-D. Gorse is mainly associated with earth or wall banks and is frequently found with dry stone walls, particularly in group E-F. Hawthorn is ubiquitous in hedgerows and hedgebanks and is also found on some earth or wall banks, mainly in groups A-D and E-F. Blackthorn is associated largely with hedges.

The most common field boundary trees (Table 31) are rowan and ash. Also frequent are sycamore, hawthorn, alder and willow. Rowan is a feature of earth or wall banks and is also associated with dry stone walls in groups A-D, E-F and G-H. Ash and sycamore are frequent in hedges and on earth or wall banks. Willow is mainly associated with earth or wall banks and alder with banks, hedges and walls. Hawthorn trees are also concentrated on earth or wall banks mainly in group A-D. These are largely derelict hedgebanks.

SPERRINS AONB

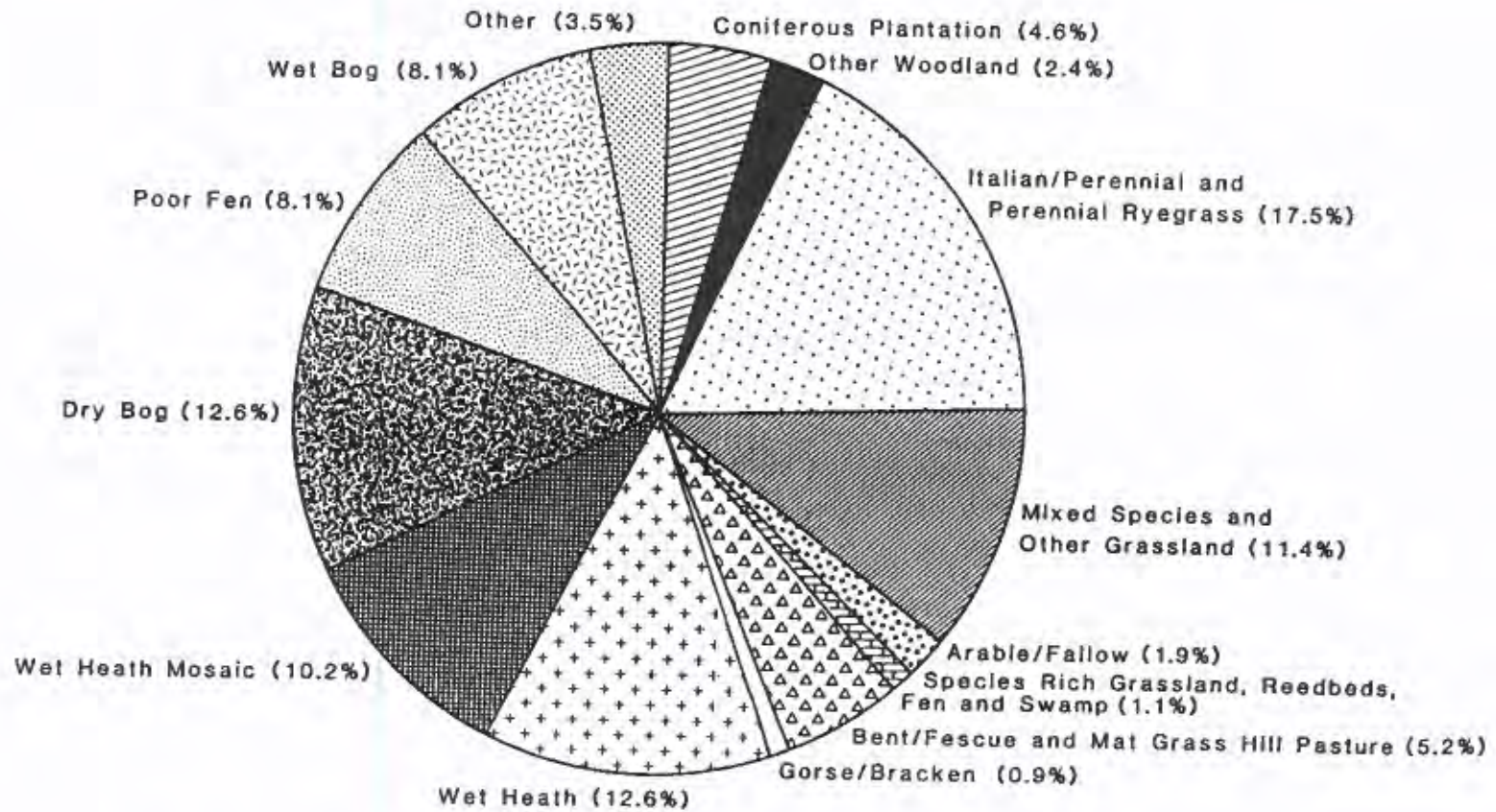


Fig. 8 Percentage area of ecological resources and land use in the Sperrins AONB.

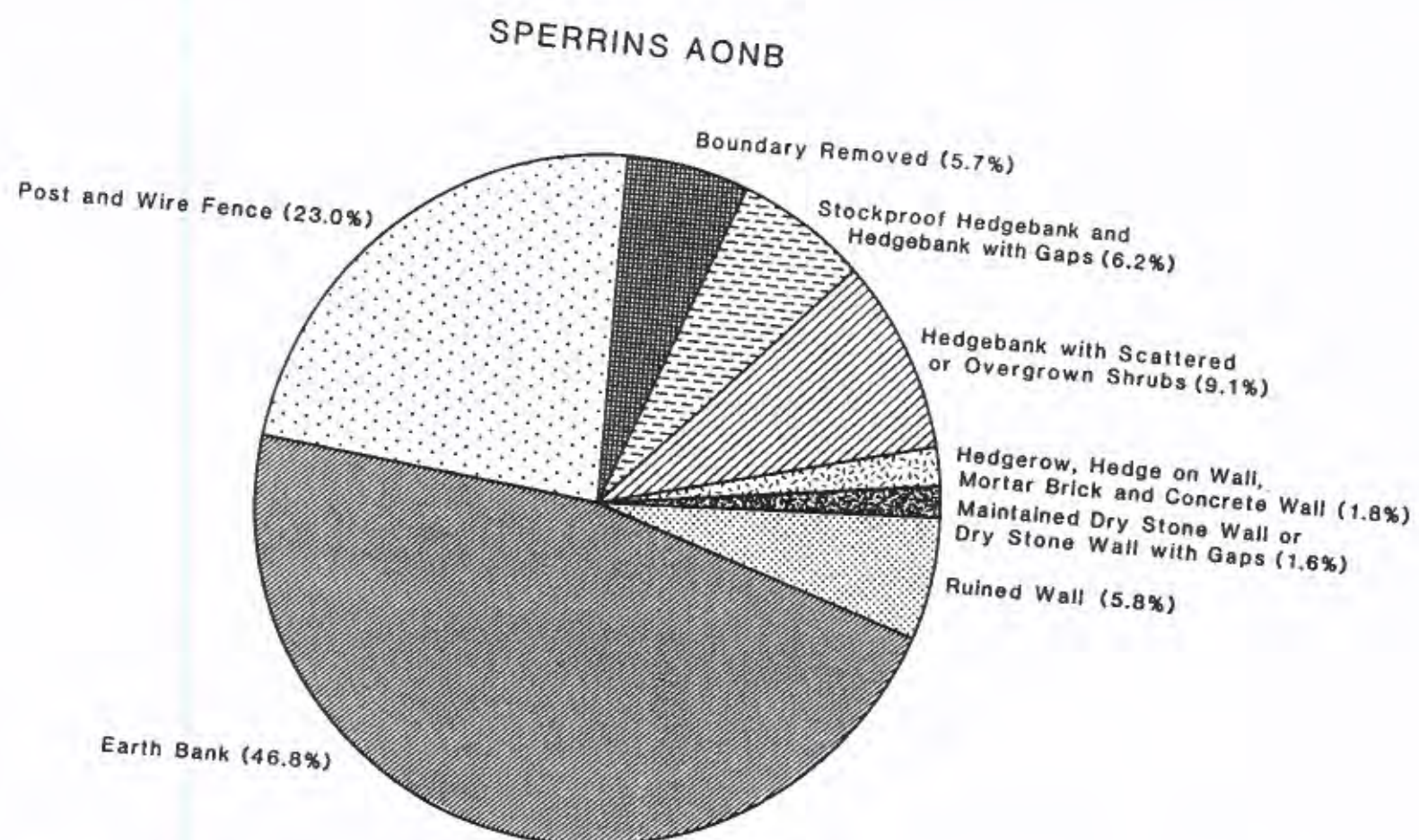


Fig. 9 Percentage length of field boundary types in the Sperrins AONB.

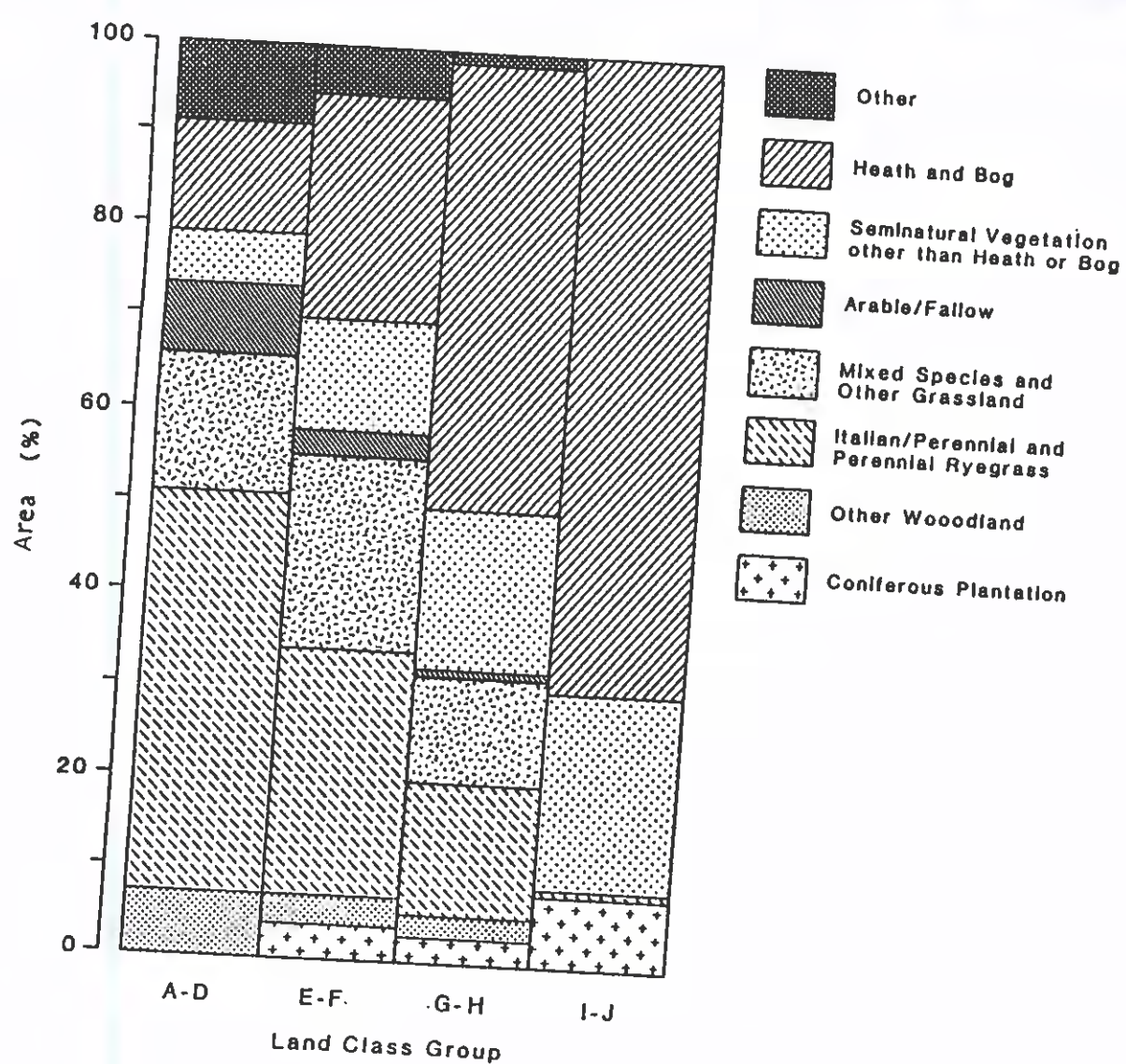


Fig. 10 Percentage area of ecological resources and land use types in combined land class groups of the Sperrins AONB.

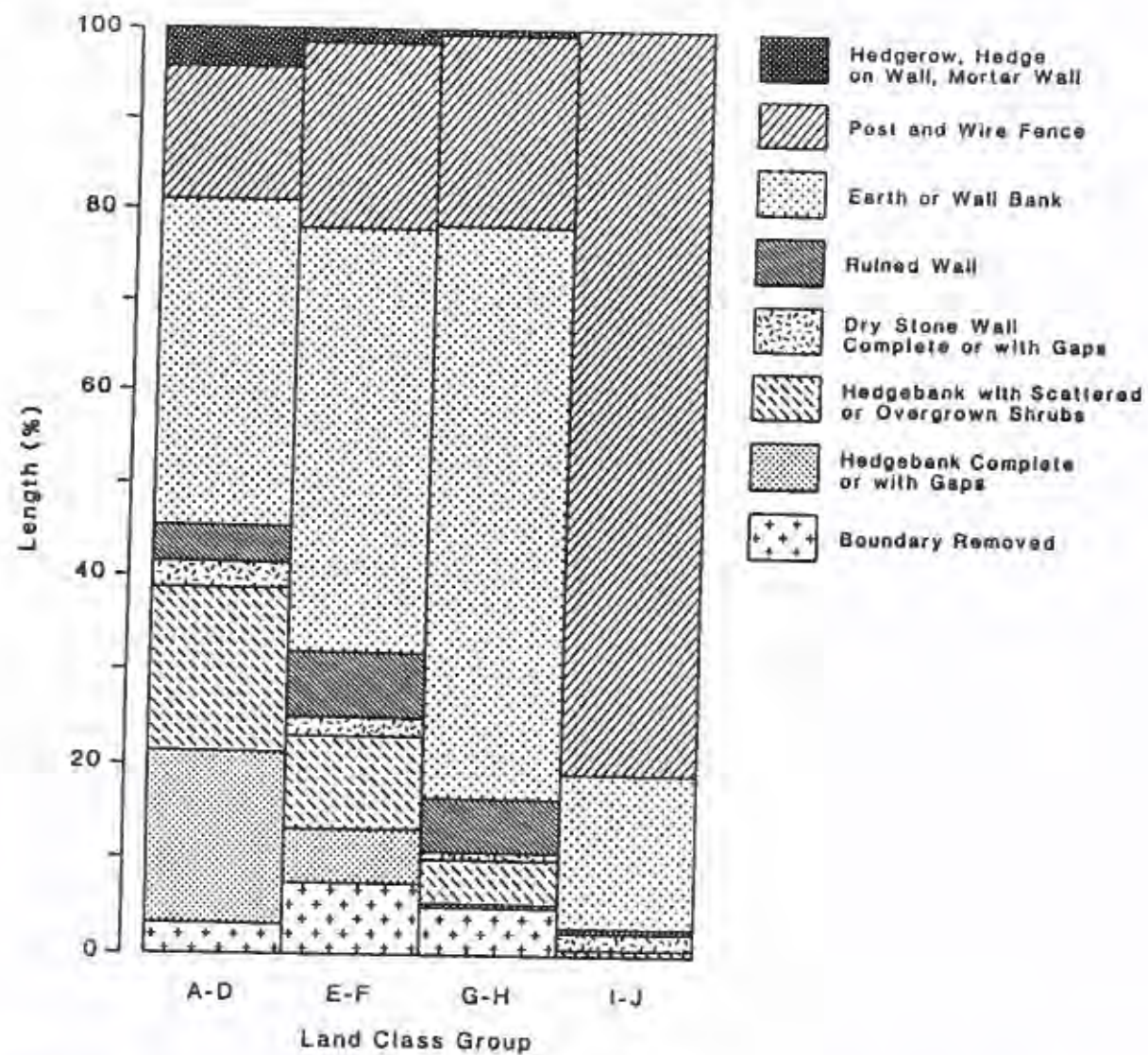


Fig. 11 Percentage length of field boundary types in combined land class groups of the Sperrins AONB.

Table 13

Percentage mean area (A) and percentage frequency (F) of woodland in combined land class groups of the Sperrins AONB. Also shown is the predicted total area (km²) in the AONB.

		Land class group					TOTAL (km ²)
		A-D	E-F	G-H	I-J	AONB	
Seminatural broadleaf woodland	A	4.6	1.4	1.0	-	1.2	13.5
	F	82	47	38		33	
Scrub	A	2.3	1.2	0.9	<0.1	0.9	9.4
	F	91	56	52	25	42	
Coniferous plantation	A	<0.1	4.0	3.2	7.7	4.6	50.4
	F	18	50	33	19	32	
Broadleaf plantation	A	<0.1	0.3	0.3	-	0.2	1.6
	F	9	6	14		6	
Mixed species woodland	A	0.2	0.5	<0.1	-	0.2	2.1
	F	36	25	10		15	
Scattered, isolated and lines of trees	A	-	-	-	-	-	-
	F	55	56	43	9	36	
TOTAL	A	7.1	7.4	5.4	7.7	7.0	77.0
	F	100	94	76	19	66	

Table 14 Location of woodland in the Sperrins AONB expressed as a percentage mean area of each woodland type

	Location				
	Riverside	Field	Farm	Roadside	Demesne
Seminatural broadleaf woodland	49	42	2	7	-
Scrub	22	74	1	2	-
Coniferous plantation	-	98	1	1	-

Table 15 Woodland topography in the Sperrins AONB expressed as a percentage mean area of each woodland type.

	Topography					
	Flat	Sloping	Steep	Hill top	Escarpment	Valley bottom
Seminatural broadleaf woodland	32	4	8	-	23	32
Scrub	38	29	6	-	20	7
Coniferous plantation	4	27	65	2	-	2

Table 16 Woodland height in the Sperrins AONB expressed as a percentage mean area of each woodland type.

	Height			
	0-1m	1-3m	3-10m	>10m
Seminatural broadleaf woodland	-	-	37	63
Scrub	-	15	84	1
Coniferous plantation	3	2	49	46

Table 17 Type of woodland ground flora in the Sperrins AONB expressed as a percentage mean area of each woodland type.

	Ground Flora		
	Species rich	Species poor	Grass dominated
Seminatural broadleaf woodland	16	44	40
Scrub	32	32	36
Coniferous plantation	2	85	13

Table 18 Woodland soil type in the Sperrins AONB expressed as a percentage mean area of each woodland type.

	Soil type			
	Waterlogged peat	Drained peat	Waterlogged mineral	Drained mineral
Seminatural broadleaf woodland	5	15	18	62
Scrub	21	17	19	43
Coniferous plantation	-	72	1	27

Table 19 Woodland management in the Sperrins AONB expressed as a percentage mean area of each woodland type.

	Management			
	Unmanaged	Unenclosed	Shelter	Grazed
Seminatural broadleaf woodland	89	73	7	22
Scrub	97	80	1	25
Coniferous plantation	-	15	3	-

Table 20

Percentage frequency in the Sperrins AONB of the most common tree species in parcels of each woodland type.

	Alder	Ash	Birch	Blackthorn	Hawthorn	Hazel	Oak	Rowan	Sycamore	Willow	Larch	Lodgepole pine	Sitka spruce
Seminatural broadleaf woodland	33	39	29	2	25	31	13	28	28	39	-	-	-
Scrub	15	8	24	18	25	6	-	40	6	45	-	-	-
Coniferous plantation	-	-	2	-	-	-	-	2	-	2	15	15	77

Table 21

Percentage mean area (A) and percentage frequency (F) of seminatural vegetation in combined land class groups of the Sperrins AONB. Also shown is the predicted total area (km²) in the AONB.

		Land class group					TOTAL (km ²)
		A-D	E-F	G-H	I-J	AONB	
Species-rich dry grassland	A F	0.3 18	0.5 22	0.4 10	-	0.3 11	2.9
Species-rich wet grassland	A F	1.0 36	1.1 41	1.0 43	-	0.7 27	7.8
Ruderal vegetation	A F	1.6 82	0.5 59	0.2 43	<0.1 6	0.4 41	4.2
Reedbeds, fen and swamp	A F	<0.1 36	0.2 31	<0.1 29	-	0.1 21	0.8
Bent/fescue hill pasture	A F	-	0.9 22	2.4 38	0.3 9	0.9 19	10.2
Mat-grass hill pasture	A F	-	0.1 6	0.1 5	12.8 34	4.3 15	47.5
Bracken	A F	0.5 36	0.3 19	0.8 14	-	0.3 14	3.7
Gorse heath	A F	0.6 55	1.4 44	0.2 38	-	0.6 29	6.2
Wet heath	A F	0.1 9	4.8 31	16.2 57	22.2 47	12.6 40	137.9
Wet heath mosaic	A F	1.8 18	7.4 44	10.7 67	15.5 56	10.2 50	111.4
Dry bog	A F	1.2 27	5.7 31	14.1 67	22.3 59	12.6 48	138.0
Soft rush poor fen	A F	0.6 45	2.6 63	4.3 52	2.8 38	2.8 50	30.7
Sharp-flowered rush poor fen	A F	1.3 18	4.3 66	7.7 67	6.2 41	5.3 54	58.4
Wet bog	A F	8.8 18	6.6 28	7.5 33	9.6 38	8.1 31	88.3
TOTAL	A F	17.8 100	36.4 100	65.7 100	91.7 100	59.1 100	648.0

Table 22

Management and structure of seminatural vegetation in combined land class groups of the Sperrins AONB. Results are expressed as a percentage mean area of each group.

	Land class group				
	A-D	E-F	G-H	I-J	AONB
Hand-cut	3	11	15	22	15
Machine-cut	-	4	3	3	3
Open drains	-	8	12	33	17
Burnt	6	6	5	10	7
Disturbed	2	6	6	14	8
Eroded	<1	2	6	24	10

Table 23

Management and structure of seminatural vegetation in the Sperrins AONB. Results are expressed as a percentage mean area of each resource type.

	Hand-cut	Machine-cut	Open drains	Burnt	Disturbed	Eroded
Mat-grass hill pasture	18	-	20	-	10	23
Wet heath	23	4	41	27	16	22
Wet heath mosaic	44	12	23	12	16	27
Dry bog	31	8	35	4	15	19
Poor fen/peaty flush	5	-	19	-	2	2
Wet bog	27	4	28	22	19	10
Other	-	-	<1	2	8	1

Table 24

Percentage mean area (A) and percentage frequency (F) of agricultural land in combined land class groups of the Sperrins AONB. Also shown is the predicted total area (km²) in the AONB.

		Land class group					TOTAL (km ²)
		A-D	E-F	G-H	I-J	AONB	
Italian/perennial ryegrass	A F	0.1 9	0.3 9	-	-	0.1 4	1.1
Perennial ryegrass	A F	44.0 100	27.0 81	14.3 62	0.4 3	17.3 53	190.2
Mixed species grassland	A F	0.2 18	1.4 34	0.9 38	-	0.7 22	7.5
Other grassland	A F	14.4 100	19.5 84	11.4 71	<0.1 6	10.7 57	116.9
Arable, fallow land	A F	7.5 64	2.6 41	0.6 14	-	1.9 24	20.3
TOTAL	A F	66.2 100	50.8 84	27.2 81	0.5 6	30.6 59	335.9

Table 25

Agricultural grassland in the Sperrins AONB infested by rushes and broadleaf weeds. Results are expressed as a percentage mean area of each grassland type.

	Rush Infested	Broadleaf Infested	Rush & Broadleaf Infested
Italian/perennial ryegrass	-	-	-
Perennial ryegrass	5	23	1
Mixed species grassland	60	40	25
Other grassland	41	34	10
Total	20	28	5

Table 26

Artefacts of landscape dereliction in combined land class groups of the Sperrins AONB. A: percentage mean area. N: sites per square kilometre. L: mean length (km) per square kilometre. F: percentage frequency. Also shown are the predicted totals.

		Land class group				AONB	TOTAL
		A-D	E-F	G-H	I-J		
Bare ground	A	0.1	0.2	0.2	0.1	0.1	2
	F	55	38	33	13	30	
Sites of abandoned vehicles	N	3.3	3.9	3.8	-	2.5	2743
	F	45	56	48	-	34	
Sites of derelict buildings	N	3.3	3.3	3.0	-	2.1	2331
	F	64	47	48	-	33	
Sites of disposed rubbish	N	4.4	2.6	2.1	0.4	2.0	2148
	F	64	34	29	9	28	
Abandoned tracks	L	0.4	0.5	0.5	0.1	0.4	387
	F	36	31	19	3	20	

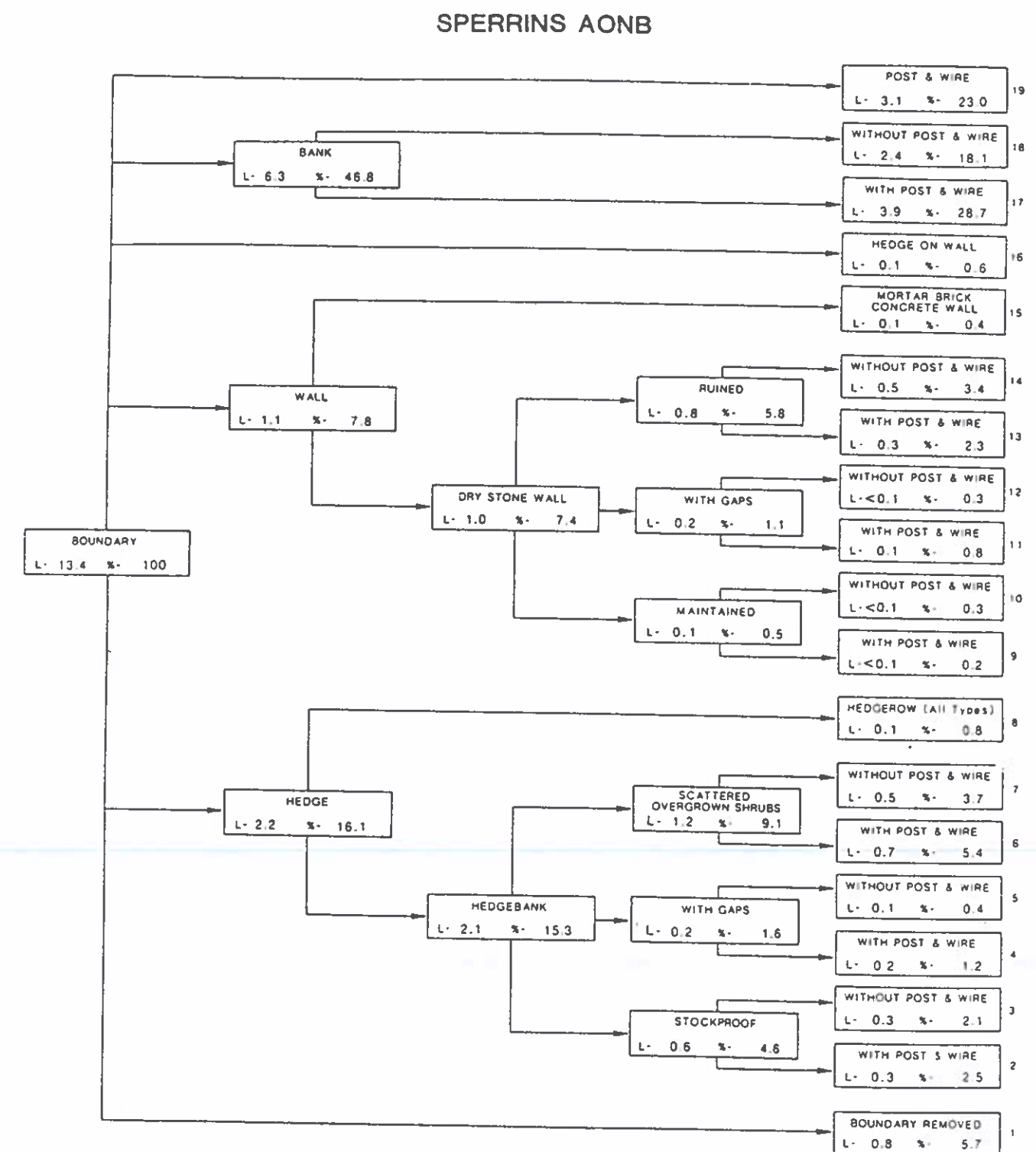


Fig. 12 Hierarchical classification of field boundary types in the Sperrins AONB.

Table 27a Hierarchical classification of field boundary types in the Sperrins AONB. Total length (km) per square kilometre and percentage mean area are shown.

Boundary type	
1	Boundary removed.
2	Stockproof hedgebank with post and wire fence.
3	Stockproof hedgebank without post and wire fence.
4	Hedgebank with gaps and post and wire fence.
5	Hedgebank with gaps, without post and wire fence
6	Hedgebank with scattered or overgrown shrubs and post and wire fence.
7	Hedgebank with scattered or overgrown shrubs, without post and wire fence.
8	Hedgerow (all conditions).
9	Maintained dry stone wall with post and wire fence.
10	Maintained dry stone wall without post and wire fence
11	Dry stone wall with gaps and post and wire fence.
12	Dry stone wall with gaps, without post and wire fence.
13	Ruined dry stone wall with post and wire fence.
14	Ruined dry stone wall without post and wire fence.
15	Mortar, brick or concrete wall.
16	Hedge on wall.
17	Earth or wall bank with post and wire fence.
18	Earth or wall bank without post and wire fence.
19	Post and wire fence.

Table 27b The mean length (km) per square kilometre of field boundary types in combined land class groups of the Sperrins AONB. Results are also expressed as a percentage (%) of each group total. Predicted total lengths (km) in the AONB are also given.

Boundary type			Land class group					TOTAL (km)
			A-D	E-F	G-H	I-J	AONB	
Boundary removed	1	km %	0.6 3.1	1.5 7.4	0.8 5.2	<0.1 0.1	0.8 5.7	837
Hedgebank	2	km %	1.4 6.8	0.5 2.5	<0.1 <0.1	-	0.3 2.5	364
	3	km %	1.6 7.6	0.3 1.5	<0.1 0.1	-	0.3 2.1	314
	4	km %	0.5 2.6	0.3 1.2	<0.1 0.2	-	0.2 1.2	170
	5	km %	0.3 1.2	0.1 0.4	<0.1 0.1	-	0.1 0.4	65
	6	km %	2.3 11.2	1.1 5.6	0.3 2.2	<0.1 0.2	0.7 5.4	792
	7	km %	1.1 5.3	0.9 4.2	0.4 2.3	<0.1 0.4	0.5 3.7	542
	8	km %	0.7 3.1	0.1 0.4	<0.1 0.1	-	0.1 0.8	117
Hedgerow	9	km %	<0.1 0.2	0.1 0.3	-	-	<0.1 0.2	25
	10	km %	0.1 0.3	0.1 0.4	0.1 0.4	<0.1 0.1	<0.1 0.3	49
	11	km %	0.4 2.1	0.2 0.8	<0.1 0.1	-	0.1 0.8	116
	12	km %	<0.1 <0.1	0.1 0.5	<0.1 0.2	-	<0.1 0.3	50
Dry stone wall	13	km %	0.3 1.5	0.7 3.5	0.2 0.9	-	0.3 2.3	341
	14	km %	0.5 2.3	0.7 3.4	0.8 4.9	<0.1 0.6	0.5 3.4	503
Mortar wall	15	km %	0.2 1.2	0.1 0.4	<0.1 0.1	-	0.1 0.4	63
Hedge on wall	16	km %	0.2 0.8	0.1 0.7	<0.1 0.2	-	0.1 0.6	83
Earth or wall bank	17	km %	4.6 22.1	6.4 31.3	5.2 32.7	0.2 6.9	3.9 28.7	4225
	18	km %	2.8 13.3	3.0 14.9	4.6 29.1	0.2 10.4	2.4 18.1	2658
Post & wire fence	19	km %	3.1 15.1	4.2 20.5	3.4 21.1	1.8 81.3	3.1 23.0	3383
Total		km %	20.7 100	20.5 100	16.0 100	2.2 100	13.4 100	14696 100

Table 28

The mean length (km) per square kilometre of managed field boundaries in combined land class groups of the Sperrins AONB. Results are also expressed as a percentage (%) of each type in each group.

		Land class group				
		A-D	E-F	G-H	I-J	AONB
Stockproof hedgebank	km	2.0	0.4	<0.1	-	0.4
	%	67	53	36	-	60
Hedgebank with gaps	km	0.4	0.1	<0.1	-	0.1
	%	54	31	19	-	40
Hedgebank with scattered or overgrown shrubs	km	0.5	0.2	-	-	0.1
	%	14	11	-	-	11
Hedgerow, hedge on wall	km	0.3	<0.1	<0.1	-	<0.1
	%	33	18	38	-	27
Total	km	3.2	0.8	<0.1	-	0.6
	%	40	24	4	-	29

Table 29

The mean length (km) per square kilometre of field boundaries with ditches in combined land class groups of the Sperrins AONB. Results are also expressed as a percentage (%) of each type in each group.

		Land class group				
		A-D	E-F	G-H	I-J	AONB
Hedgerow, Hedgebank, Hedge on wall	km	1.0	0.8	0.4	-	0.5
	%	13	22	49	-	20
Dry stone, ruined, mortar concrete, brick wall	km	<0.1	0.3	0.2	-	0.2
	%	2	16	18	-	14
Earth, wall bank	km	2.4	4.6	6.0	0.2	3.2
	%	33	49	61	66	51
Wood post & wire and other fence	km	0.3	0.8	0.6	0.3	0.5
	%	9	18	17	19	17
Total	km	3.8	6.4	7.2	0.6	4.3
	%	19	34	48	27	34

Table 30 The percentage mean number of field boundaries per square kilometre with selected shrub species, in the Sperrins AONB. Uncommon species are not shown.

HAWTHORN SHRUB	Land class group				
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	85	84	89	100	85
Dry stone, ruined, mortar concrete, brick wall	3	21	1	-	13
Earth, wall bank	20	20	7	-	16
Wood post & wire and other fence	2	2	2	-	2
Total	41	31	13	2	28
GORSE SHRUB					
	A-D	E-F	G-H	I-J	AONB
Hedgerow, Hedgebank Hedge on wall	1	6	-	-	4
Dry stone, ruined, mortar concrete, brick wall	3	23	10	-	16
Earth, wall bank	31	39	35	4	36
Wood post & wire and other fence	-	1	<1	-	1
Total	12	24	24	1	20
BLACKTHORN SHRUB					
	A-D	E-F	G-H	I-J	AONB
Hedgerow, Hedgebank, Hedge on wall	14	11	14	-	12
Dry stone, ruined, mortar concrete, brick wall	3	7	3	-	5
Earth, wall bank	5	5	2	-	4
Wood post & wire and other fence	-	<1	-	-	0
Total	7	6	3	-	5

Table 31 The percentage mean number of field boundaries per square kilometre with selected tree species, in the Sperrins AONB. Uncommon species are not shown.

ROWAN	Land class group;				
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	5	13	13	-	10
Dry stone, ruined, mortar concrete, brick wall	16	26	16	-	21
Earth, wall bank	44	33	27	4	32
Wood post & wire and other fence	2	3	1	-	2
Total	19	22	20	1	20

ASH					
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	35	30	27	-	32
Dry stone, ruined, mortar concrete, brick wall	7	14	9	-	11
Earth, wall bank	23	14	8	-	13
Wood post & wire and other fence	2	1	2	-	1
Total	23	15	8	-	15

SYCAMORE					
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	12	15	20	50	15
Dry stone, ruined, mortar concrete, brick wall	3	5	7	-	5
Earth, wall bank	11	10	7	-	9
Wood post & wire and other fence	3	2	-	-	2
Total	9	9	7	1	8

HAWTHORN	Land class group				
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	3	4	8	-	4
Dry stone, ruined, mortar concrete, brick wall	1	8	10	-	7
Earth, wall bank	14	1	7	4	11
Wood post & wire and other fence	-	1	1	-	1
Total	6	8	5	1	7

ALDER					
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	7	5	8	50	6
Dry stone, ruined, mortar concrete, brick wall	9	5	7	-	6
Earth, wall bank	14	9	7	4	9
Wood post & wire and other fence	1	1	-	-	1
Total	9	6	6	2	6

WILLOW					
	A-D	E-F	G-H	I-J	AONB
Hedgerow, hedgebank, hedge on wall	4	4	9	-	4
Dry stone, ruined, mortar concrete, brick wall	4	4	1	-	3
Earth, wall bank	14	9	7	7	9
Wood post & wire and other fence	2	3	2	-	2
Total	7	6	5	2	6

4.1.3 Landscape units

Since the land class groups are distributed differently within the AONB, it is appropriate to discuss the ecological and landscape resources within landscape units.

The small size of some units, together with the small number of sample squares in them has resulted in amalgamation for tabular descriptive purposes. Five groups are defined, comprising units 2, 3-5, 6-8, 9 and 10. Unit 1 is considered separately in section 4.2 as the North Derry AONB. Results are presented in Tables 32-37.

Glenshane (Unit 2)

There is a large area of conifer plantation (Table 32) located mainly at Bannagher and Glenshane Forests. Planting is mainly in large blocks of Sitka spruce with little mixing of species or contour planting. Disused and working sand and gravel quarries, and electricity pylons are obtrusive around Bannagher Forest. The lower elevation glens are quite well wooded with deciduous trees associated with field boundaries.

Mat-grass and bent/fescue hill pasture are more commonplace than in much of the Sperrins (Table 33). Seminatural vegetation consists largely of wet heath, dry bog and wet bog along with much poor-fen dominated by sharp-flowered rush. The unit has affinities with the seminatural vegetation of the Antrim AONB.

Peatlands have extensive heather cover although much is cutover (Table 34), particularly to the north of the Glenshane Pass. Open drains are extensive in the peat and the high summits are severely eroded, for example, on White Mountain. A

large area of uncut peat occurs in the vicinity of Bannagher Forest. Heathland reclamation for agriculture is occurring in the northwest. Most of the lower slopes and valley bottoms comprise intensive agricultural grassland in which sheep farming predominates. Field size is often large. There are new farm roads which have been constructed to give better access to the hills.

Ruined dry stone walls are frequent but banks and post and wire fences predominate, particularly at higher elevation (Table 37). In the lower elevation glen sides and valley bottoms, field boundaries have large numbers of trees.

Moyola, Slieve Gallion and Davagh (Units 3,4 & 5)

Conifer plantations in these units are centred on Davagh and Moydamlaght Forests (Table 32). Mat-grass hill pasture is largely associated with the southern slopes of Slieve Gallion and other steep escarpments. Wet heath with an abundant cover of heather occupies the northern slopes of Slieve Gallion.

Dry bog covers most of the higher mountains and less steep hill slopes where peat has been largely cut-over (Table 33). Wet bog is extensive over the Lough Fea platform. On higher mountain tops, erosion is often severe (Table 34). A large amount of peat is hand-cut and machine-cutting is widespread (Table 34). Burning and other forms of peatland disturbance are frequent.

Field boundary removal is extensive in some areas (Table 37). A large proportion of field boundaries consists of hedgebanks with scattered or overgrown shrubs and ruined dry stone walls. Most field boundaries are earth or wall banks and post & wire fences.

Moyola (Unit 3)

Moydamlaght Forest has some mixed planting making it less obtrusive. Between Bannagher and Moydamlaght Forests, however, there are unsightly sand and gravel workings and electricity pylons. The lower glens are often well wooded with deciduous trees associated with field boundaries.

There is much marginal farmland in land class group G-H, with a considerable abundance of wetland parcels. Dry bog is particularly common and a large proportion is formerly cultivated land that has regressed. On the higher mountains there is a great deal of visible erosion of primary peat bog.

There is an irregular strip field system reaching up the hill slopes, for example on Slievemoyle and Coolnasillagh. Sheep are common and there are some suckler cows. In the Lower Moyola Valley there has been field boundary removal and land improvement. At lower elevation, field boundaries have large numbers of trees including alder, rowan and holly. The more species-rich field boundaries, however, lie just outside the AONB boundary.

Deserted buildings occur on the poorer hill land and much of the population seem to live in modern bungalows at the upland/ lowland transition.

Slieve Gallion (Unit 4)

Iniscarn and Moboy Forests are less obtrusive than other forests in the area. Mat-grass hill pasture is extensive on the southern and western sides of Slieve Gallion. In contrast there is widespread wet heath with a great deal of heather covering Crocknamohil and the north side of Slieve Gallion. Dry bog and poor-fen also occupy much of the hill slopes.

Agricultural improvement of the uplands is extensive around Slieve Gallion, where the small field character of the area is being lost. Agriculture is predominantly sheep farming with some suckler cows. Post & wire fences are abundant on the hills. There are many residential bungalows skirting Slieve Gallion many of which are not associated with farm buildings. Near Lough Fea, on the western and northern slopes, sand and gravel quarries are having a detrimental effect on both wetland resources and the landscape.

Davagh (Unit 5)

Davagh forest covers a large part of this unit. Unplanted areas of peatland and a degree of contour planting have the effect of softening its effect on the landscape, despite its largely Sitka spruce monoculture.

Peat bog and wet heath of the Lough Fea platform are being extensively cut, particularly around access roads, although much primary peat remains. Sand and gravel quarries are obtrusive around Lough Fea and at other sites, for example, Mill Lough.

Glacial mounds rising above the surface of the bog have been improved for agriculture. To the south of Davagh Forest the rocky hills have much heather and poor farmland. Field size is small and any remaining peatland is usually cut-over.

Mid-Sperrins, Murrins and Gortin (Units 6,7 & 8)

There is a high frequency of small conifer plantations and shelterbelts on farms (Table 32), in addition to the larger plantations such as Gortin Glen Forest.

Wet heath and particularly wet heath mosaic, together

with dry bog make up the greatest part of the peatland in the units (Table 33). Peat cutting is largely by hand and open drains are frequent (Table 34). Considerable areas of poor-fen dominated by soft-rush and sharp flowered-rush occur, reflecting the usually poor sandy nature of the soils.

In the lower elevation glens and river valley bottoms, intensive grassland agriculture predominates (Table 35) with little seminatural vegetation. Field sizes are frequently large and recent reclamation of the steeper hill sides is commonplace.

Field boundary removal is very frequent (Table 37). The most common boundary types are earth or wall banks supplemented with post & wire fencing. Post and wire fencing itself is also a common type. Abandoned tracks associated with hill land are extensive (Table 36).

Mid-Sperrins (Unit 6)

In the west, towards Gortin and Plumbridge the land is greatly improved for agriculture. Some low lying wet heath and bog remain but it is largely cut-over and there has been recent acquisition for afforestation.

Agricultural reclamation has proceeded throughout the Glenelly Valley, even at high elevation, e.g. in land class group J at the head of the Ederlin Burn. Much of the peatland on the hill slopes is drained and erosion hags occur on the higher mountain peaks.

In the main Glenelly Valley there are few vernacular buildings except in the smaller glens leading into the mountains. Sycamore trees around abandoned farm buildings in these glens, are frequent. The strip field system is somewhat

obscure, with farms clustered around the main access roads. In the main valley at lower elevation there is a great deal of intensive agricultural grassland production. Sward quality deteriorates with elevation. Trees growing from derelict field boundaries (largely earth or wall banks), however, still maintain a wooded appearance, despite the predominance of post & wire fencing.

The same patterns exist in the Owenkillew and Owenreagh River valleys, except that the Owenkillew Valley is quite well wooded (e.g. Drumlea and Mullan Wood). Peatland associated with the hill tops is greatly modified. The higher elevation glens of Glenlark and Coneyglen Burn retain their character and still have an active population of hill farmers. Farms are located mainly on the south-facing slopes of the glens. The north-facing glen sides retain old field patterns associated with abandoned land. There is extensive wet heath and dry bog, often with a vigorous cover of heather.

In Glenlark, a private forestry company is establishing a Sitka spruce plantation. Block planting is widespread and together with new access roads cutting across contours, has detrimentally changed the nature of the landscape. Lower down the glen, conifer shelterbelts are obtrusive. To the south of the Owenkillew and Owenreagh Valleys the less steeply sloping glen sides and lower hill tops are intensively farmed. Farms and field sizes are large and the character of the valley system is lost. The pattern of new bungalow development along the valley sides continues.

Murrins (Unit 7)

The unit is similar to the Lough Fea platform of unit 5. Blanket and raised bog together with wet heath over glacial features give the unit its distinctive character. Peat cutting, however, is widespread and a number of large, obtrusive sand and gravel quarrying operations exist.

To the south, the low hills around Lough Fingrean consist of poor agricultural land and cut-over bog.

Gortin (Unit 8)

Gortin Glen Forest Park dominates the western side of the hills centred on Mullaghcarn. Lower hill slopes overlooking Omagh and the Strule Valley are intensively farmed with much upland reclamation. The steeper glens in this area, such as Glencurry, however, have an upland character with much purple moor-grass.

Hills to the west of Curraghosaly Mountain in the north are covered by wet heath with much heather. In the east, large areas of primary peat cover the lower slopes of Mullaghcarn but peat cutting is extensive. Agriculture associated with the lower slopes and valley bottoms is dominated by intensive agricultural grassland production. There is much derelict land at the upland transition.

Strule Valley (Unit 9)

This unit contains the greatest proportion of seminatural broadleaf woodland and scrub (particularly birch carr) (Table 32). There is less other seminatural vegetation compared to the other units (Table 33). Most of the wet bog recorded was lowland raised or blanket bog, associated with the north side of the Owenreagh River west of

plumbridge. There is less active peat cutting, compared with other units (Table 34). Burning, however, is frequently used for management purposes and cattle grazing was often recorded.

Almost half the area supports ryegrass pasture and there is a high proportion of arable land (Table 35). Rubbish and abandoned vehicles are frequent, despite the largely intensively farmed nature of the land (Table 36). Stockproof hedgebanks are most abundant in the unit but there is also a great deal of hedgebank with scattered or overgrown shrubs. Banks and post & wire fences are common, but not to such an extent as in other units (Table 37).

The unit is noted for its large farms and field size with well kept grand farmhouses and landscaped grounds. Dairy farming is more common.

5. Northwest (Unit 10)

Whilst seminatural woodland and scrub do not occupy a large area, they are an integral landscape element, particularly in the northwest of the unit (Table 32). They are confined largely to steep sided river and stream sides and associated wet heath and bog. Species are mainly birch, rowan, alder and willow. There are a number of small but obtrusive conifer plantations in the mountains, for example at Oughtnager, overlooking Plumbridge.

Wet heath and wet heath mosaic with a great deal of heather predominate, along with dry bog (Table 33). Much of the wet heath is centred on the lower hills of the west. Purple moor-grass is a common dominant. Whilst wet bog does

not cover large areas, a high proportion is associated with the flatter valley bottoms.

Active turf-cutting is extensive, both by hand as well as machine (Table 34). Most cutting occurs in the hills as much of the lowland bog has been cut-over. Associated with cut-over lowland bog of the river valleys, are some species-rich marsh and poor-fen communities although they do not occupy large areas. The higher mountain top peat is severely hagged and open drains are extensive. Mechanical turf cutting was recorded on the high slopes of the main Sperrin Mountains.

Soft-rush is the most common dominant of poor-fen, generally occupying farmed land of the low rounded hills of the northern and western glens. These hillsides consist mainly of improved grassland and rush-infested pasture with some seminatural parcels of wet heath and poor-fen usually near the top. There is a characteristic strip-farm structure. Some agricultural improvement in the higher mountains was recorded in the Sawel/Dart area, with inhabited farms occurring at quite high elevation.

Ryegrass and other agricultural grasslands (Table 35), often with much rush infestation are extensive in the river valley bottoms, lower glen sides and low hills. Boundary removal associated with intensive agriculture occurs throughout the lower glens (Table 37). Hedgebanks are generally in poor condition. Banks (with gorse and rowan) and post & wire fencing are ubiquitous. Field boundaries at lower elevation have large numbers of trees.

Table 32

Percentage mean area (A) and percentage frequency (F) of woodland in the landscape units of the North Derry AONB and Sperrins AONB. Also shown is the predicted total area (km²) in the AONB.

		Landscape unit									Total area (km ²)	
		1AC	1B N.Derry AONB	2	345	678	9	10	Sperrins AONB	N.Derry	Sperrins	
Seminatural broadleaf woodland	A	0.3	0.4	0.4	0.2	1.0	1.2	4.0	0.8	1.2	0.4	13.4
	F	20	30	25	23	18	32	60	42	33		
Scrub	A	1.0	0.7	0.9	<0.1	0.3	0.5	2.6	1.7	0.9	0.9	9.4
	F	30	60	45	15	18	43	90	53	42		
Coniferous plantation	A	<0.1	19.4	10.5	11.9	8.3	3.3	<0.1	1.2	4.6	10.5	50.4
	F	10	50	30	23	24	49	10	26	32		
Broadleaf plantation	A	-	0.2	0.1	-	0.2	0.2	<0.1	0.1	0.2	0.1	1.7
	F		20	10		12	5	10	5	6		
Mixed species woodland	A	0.1	0.1	0.1	<0.1	<0.1	0.4	0.2	-	0.2	0.1	2.1
	F	10	20	15	8	6	22	40		15		
Scattered, isolated and lines of trees	A	-	-	-	-	-	-	-	-	-	-	-
	F	50	30	40	15	24	46	60	32	36		
TOTAL	A	1.4	20.8	11.9	12.1	9.9	5.6	6.8	3.8	7.0	11.9	76.9
	F	50	90	70	46	41	76	100	63	66		

Table 33 Percentage mean area (A) and percentage frequency (F) of seminatural vegetation in the landscape units of the North Derry AONB and Sperrins AONB. Also shown is the predicted total area (km²) in the AONB.

		Landscape unit										Total area (km ²)	
		1AC	1B N.Derry AONB	2	345	678	9	10	Sperrins AONB			N.Derry	Sperrins
Coastal vegetation	A	13.0	-	6.0	-	-	-	-	-	-	-	5.9	-
	F	60		30									
Species-rich dry grassland	A	-	<0.1	<0.1	0.6	0.2	0.3	0.1	0.2	0.3	<0.1	2.9	
	F		10	5	15	12	11	10	11	11			
Species-rich wet grassland	A	2.4	0.3	1.3	<0.1	0.7	0.7	2.1	0.5	0.7	1.3	7.8	
	F	20	20	20	8	18	27	40	42	27			
Ruderal vegetation	A	1.2	0.3	0.7	<0.1	<0.1	0.6	1.1	0.1	0.4	0.7	4.2	
	F	30	60	45	23	18	51	70	37	41			
Reedbeds, fen and swamp	A	1.7	0.2	0.9	<0.1	<0.1	0.1	0.1	0.1	0.1	0.9	0.8	
	F	60	20	40	15	6	22	50	21	21			
Bent/fescue hill pasture	A	1.1	3.3	2.3	3.5	1.1	0.7	-	<0.1	0.9	2.3	10.2	
	F	40	40	40	38	29	19		5	19			
Mat-grass hill pasture	A	-	1.2	0.7	6.4	9.0	4.8	-	0.2	4.3	0.7	47.5	
	F		20	10	23	24	14		11	15			
Bracken	A	2.2	0.9	1.5	1.1	0.1	0.3	0.3	-	0.3	1.5	3.7	
	F	30	30	30	8	12	19	30		14			
Gorse heath	A	0.1	1.8	1.1	<0.1	1.0	0.6	1.3	0.1	0.6	1.1	6.2	
	F	20	40	30	8	24	30	70	26	29			
Wet heath	A	-	2.0	1.1	22.1	16.4	8.3	1.2	16.9	12.6	1.1	137.9	
	F		10	5	46	35	30	30	58	40			
Wet heath mosaic	A	-	5.3	2.9	5.0	3.1	14.6	2.0	15.7	10.2	2.9	111.4	
	F		20	10	46	41	54	30	63	50			
Dry bog	A	-	1.6	0.9	10.6	14.4	15.2	1.1	13.3	12.6	0.9	138.0	
	F		20	10	46	47	57	20	47	48			
Soft-rush poor fen	A	0.4	0.0	0.2	1.7	1.2	3.4	0.3	5.1	2.8	0.2	30.7	
	F	10	10	10	46	24	8	30	37	50			
Sharp flowered rush poor fen	A	-	9.0	4.9	9.6	2.9	6.4	2.5	3.9	5.3	4.9	58.4	
	F		50	25	46	41	65	30	58	54			
Wet bog	A	-	17.1	9.2	15.0	18.4	0.9	10.0	7.1	8.1	9.2	88.3	
	F		40	20	62	53	8	30	37	31			
TOTAL	A	22.2	43.3	33.6	75.7	68.5	56.8	22.3	63.1	59.1	33.5	648.0	
	F	100	100	100	100	100	100	100	100	100			

Table 34 Management and structure of seminatural vegetation in the landscape units of the North Derry AONB and Sperrins AONB. Results are expressed as a percentage mean area of each unit.

	N.Derry AONB	Sperrins landscape unit					Sperrins AONB
		2	345	678	9	10	
Hand cut	5	9	31	13	2	14	15
Machine cut	1	1	6	2	-	6	3
Open drains	1	26	20	14	1	21	17
Burnt	-	6	15	3	7	8	7
Disturbed	8	2	22	5	2	8	8
Eroded	1	15	20	5	-	11	10

Table 35

Percentage mean area (A) and percentage frequency (F) of agricultural land in the landscape units of the North Derry AONB and Sperrins AONB. Also shown is the predicted total area (km²) in the AONB.

		Landscape unit									Total area (km ²)	
		1AC	1B N.Derry AONB	2	345	678	9	10	Sperrins AONB	N.Derry	Sperrins	
Italian/perennial ryegrass	A F	1.7 10	-	0.8 5	-	0.5 18	<0.1 3	-	-	0.1 4	0.8	1.1
Perennial ryegrass	A F	35.4 70	17.9 50	25.9 60	8.4 23	10.3 35	15.2 57	45.0 100	19.3 58	17.3 53	25.9	190.2
Mixed species grassland	A F	1.0 20	2.1 20	1.6 20	0.6 15	0.6 24	0.8 19	0.3 20	0.9 32	0.7 22	1.6	7.5
Other agricultural grassland	A F	17.1 70	8.9 40	12.7 55	1.7 23	7.1 41	15.9 65	10.9 100	9.6 58	10.7 57	12.7	116.9
Arable,fallow land	A F	10.0 30	<0.1 10	4.6 20	0.7 8	<0.1 6	1.7 24	7.7 70	1.5 26	1.9 24	4.6	20.3
TOTAL	A F	65.2 80	28.9 50	45.6 65	11.4 31	18.5 41	33.7 65	63.8 100	31.3 63	30.6 59	45.5	335.9

Table 36

Artefacts of landscape dereliction in the landscape units of the North Derry AONB and Sperrins AONB. A: percentage mean area. N: sites per square kilometre. L: length (km) per square kilometre. F: percentage frequency. Also shown are the predicted totals in the AONB.

		Landscape unit									Total	
		1AC	1B N.Derry AONB	2	345	678	9	10	Sperrins AONB	N.Derry	Sperrins	
Bare or disturbed ground	A F	0.1 40	-	0.1 20	<0.1 23	0.1 12	0.2 41	0.1 40	0.3 26	0.1 30	0.1	158
Sites of abandoned vehicles	N F	0.9 20	0.8 20	0.9 20	0.3 8	2.1 41	2.5 30	4.4 50	3.4 47	2.5 34	0.9	2743
Sites of derelict buildings	N F	1.9 40	2.4 40	2.2 40	1.5 15	1.9 35	2.1 27	2.8 60	2.5 37	2.1 33	2.2	2331
Sites of disposed rubbish/litter	N F	5.7 60	2.8 40	4.1 50	0.3 8	2.1 12	2.3 35	4.0 60	1.3 26	2.0 28	4.1	2148
Abandoned tracks	L F	-	0.1 20	0.1 10	0.3 15	0.1 12	0.5 27	0.1 30	0.5 16	0.4 20	0.1	387

Table 37a Hierarchical classification of field boundary types in the Sperrins AONB and North Derry AONB. Total length (km) per square kilometre and percentage mean area are shown.

Boundary type	
1	Boundary removed.
2	Stockproof hedgebank with post and wire fence.
3	Stockproof hedgebank without post and wire fence.
4	Hedgebank with gaps and post and wire fence.
5	Hedgebank with gaps, without post and wire fence
6	Hedgebank with scattered or overgrown shrubs and post and wire fence.
7	Hedgebank with scattered or overgrown shrubs, without post and wire fence.
8	Hedgerow (all conditions).
9	Maintained dry stone wall with post and wire fence.
10	Maintained dry stone wall without post and wire fence
11	Dry stone wall with gaps and post and wire fence.
12	Dry stone wall with gaps, without post and wire fence.
13	Ruined dry stone wall with post and wire fence.
14	Ruined dry stone wall without post and wire fence.
15	Mortar, brick or concrete wall.
16	Hedge on wall.
17	Earth or wall bank with post and wire fence.
18	Earth or wall bank without post and wire fence.
19	Post and wire fence.

Table 37b The mean length (km) per square kilometre of field boundary types in the landscape units of the North Derry AONB and Sperrins AONB. Results are also expressed as a percentage (%) of each unit total. Predicted total lengths (km) in the AONB are also given.

Boundary type		Landscape unit										Total length (km) N.Derry Sperrins		
		1AC	1B N.Derry AONB	2	345	678	9	10	Sperrins AONB					
Boundary removed	1	km %	0.5 4.4	0.5 3.9	0.5 4.1	0.3 3.3	1.1 10.1	0.9 5.8	0.5 2.8	0.8 5.5	0.8 5.7	0.5	837	
	Hedgebank	2	km %	0.1 0.6	0.1 0.5	0.1 0.5	- 5.0	0.5 1.6	0.2 1.6	1.1 5.9	0.2 1.1	0.3 2.5	0.1	364
		3	km %	<0.1 0.2	<0.1 0.3	<0.1 0.3	<0.1 0.2	<0.1 0.1	0.3 2.0	1.4 7.4	0.1 0.8	0.3 2.1	<0.1	314
		4	km %	0.3 2.6	-	0.1 1.2	<0.1 0.2	0.1 0.5	0.2 1.2	0.5 2.4	0.1 1.0	0.2 1.2	0.1	170
		5	km %	-	<0.1 0.2	<0.1 0.1	<0.1 0.3	-	<0.1 0.3	0.2 1.2	0.1 0.5	0.1 0.4	<0.1	65
		6	km %	0.1 0.6	1.7 13.5	1.0 7.8	0.1 1.1	0.6 6.1	0.6 3.8	2.2 11.4	0.8 5.6	0.7 5.4	1.0	792
		7	km %	0.4 3.8	1.2 9.8	0.9 7.1	0.3 4.2	0.3 2.8	0.5 3.3	0.9 4.7	0.6 4.2	0.5 3.7	0.9	542
Hedgerow	8	km %	0.5 4.5	<0.1 0.4	0.3 2.2	-	<0.1 0.3	0.1 0.6	0.6 3.3	-	0.1 0.8	0.3	117	
	Dry stone wall	9	km %	-	0.3 2.4	0.2 1.4	-	-	<0.1 0.3	0.1 0.3	-	<0.1 0.2	0.2	25
10		km %	-	0.1 0.8	0.1 0.5	-	0.1 0.6	0.1 0.5	<0.1 0.2	<0.1 0.1	<0.1 0.3	0.1	49	
11		km %	-	0.2 1.8	0.1 1.0	-	<0.1 0.4	0.1 0.6	0.4 2.3	0.1 0.6	0.1 0.8	0.1	116	
12		km %	-	<0.1 0.2	<0.1 0.1	-	0.1 0.7	0.1 0.4	0.1 0.3	<0.1 0.1	<0.1 0.3	<0.1	50	
Ruined dry stone wall	13	km %	-	1.3 9.9	0.7 5.5	<0.1 0.4	0.8 7.3	0.2 1.3	0.2 0.9	0.4 2.9	0.3 2.3	0.7	341	
	14	km %	-	1.7 13.9	0.9 7.7	1.0 12.4	0.7 6.4	0.2 1.6	0.5 2.8	0.3 2.1	0.5 3.4	0.9	503	
Mortar wall	15	km %	0.3 2.6	<0.1 0.2	0.2 1.3	-	0.1 0.6	<0.1 0.3	0.2 1.2	<0.1 0.2	0.1 0.4	0.2	63	
Hedge on wall	16	km %	-	0.4 3.0	0.2 1.7	-	0.1 1.2	0.1 0.6	0.2 0.9	<0.1 0.1	0.1 0.6	0.2	83	
Earth or bank	17	km %	0.4 3.1	1.0 7.7	0.7 5.7	2.4 29.7	2.4 22.7	4.7 31.7	4.6 24.2	4.1 29.5	3.9 28.7	0.7	4225	
	18	km %	0.1 0.8	0.7 5.5	0.4 3.4	1.8 22.5	1.5 14.0	2.8 18.8	2.2 11.4	3.1 22.3	2.4 18.1	0.4	2658	
Post & wire fence	19	km %	9.0 76.8	3.3 25.8	5.9 48.4	2.1 25.7	2.2 21.2	3.8 25.3	3.1 16.2	3.2 23.4	3.1 23.0	5.9	3383	
Total		km %	11.8 100	12.6 100	12.2 100	8.0 100	10.6 100	14.9 100	18.9 100	13.7 100	13.4 100	12.2 100	14696 100	

4.2 North Derry AONB

4.2.1 Landscape units 1A and 1C

Landscape units 1A and 1C have been combined for analytical purposes. There is little seminatural woodland and scrub (Fig. 13, Table 32). Coastal vegetation types are a feature and except for the basalt escarpment, there is not much other seminatural vegetation (Table 32). Species-rich grassland and bracken, for example were recorded most frequently on the coast.

Agricultural grassland production is the major land use (Fig. 13), largely comprising good quality ryegrass but also a considerable amount of other grassland (Table 35). Rush and broadleaf weed infestation was recorded locally (Table 38). There is a high proportion of arable/fallow land. There are many rubbish sites in the farmed landscape. Derelict buildings are also frequent (Table 36).

Boundary removal is commonplace (Fig. 14, Table 37) but difficult to assess fully in view of the large proportion of post & wire fences (>75%). Hedgebanks largely have scattered/overgrown shrubs or gaps. Dry stone walls are mainly derelict. Stockproof hedgebanks and hedgebanks with gaps show some signs of management (Table 39). A hierarchical classification of boundary types is shown in Fig. 15.

Unit 1A

The area comprises flat farmland with large, highly productive farms. Field size is large and boundaries are mainly post & wire fencing (Table 37), often accompanied by drainage ditches (Table 40). For the most part these do not have a species-rich vegetation although marsh communities do exist.

Many parcels consist of ryegrass pasture/ley or arable land with potatoes, cereals and other crops (Table 35).

The landscape is mostly treeless except for some gorse, hawthorn and ash in field boundaries and willow along the drainage channels (Tables 41 & 42). Farm trees where present, are associated with derelict vernacular buildings. Most farm buildings are modern and there is much housing along the main A2 road. Landscape variation is greater at the transition to unit 1B where, there is more woodland.

Magilligan Foreland and Point are the major features but as well as nature reserves, the area has recreation facilities, caravan sites, a prison, an army camp and a rifle range. Part of this area has been cleared of vegetation or otherwise disturbed. There are abandoned vehicles, military and derelict buildings.

Unit 1C

Downhill Forest and estate contains some attractive seminatural and plantation woodland as well as uniform blocks of Sitka spruce. East of Downhill and the Eagle Hill escarpment, with its heterogeneous hill pasture and heath, farming is intensive with large ryegrass pastures similar to unit 1A.

Seminatural vegetation consisting of sand dune, saltmarsh and reedbeds is associated mainly with the coast, Portstewart Dunes and the River Bann estuary. There is encroachment of farmland along the River Bann leaving only a narrow corridor of woodland scrub on the steep bank sides.

4.2.2 Landscape Unit 1B

At the transition with unit 1A there is intensive farmland, largely supporting ryegrass pasture (Table 35). Poorer grassland is associated particularly with less well-drained soils. A large proportion of field boundaries are hedgebanks with scattered or overgrown shrubs and ruined dry stone walls, but post & wire fencing predominates (Table 37). Hawthorn, blackthorn and gorse are frequent hedge species (Table 41). Ash and hawthorn are the most abundant tree species (Table 42). Field boundaries often support species-rich grassland.

In the upland transition, farmland often integrades to gorse heath or poor fen dominated by sharp flowered-rush. Seepage at the lower escarpment zone is often associated with woodland and scrub in which willow, blackthorn, hawthorn and ash are found over a ground flora of species-rich wet grassland or poor-fen. There is little seminatural deciduous woodland and scrub in the rest of the unit (Table 32).

On the Binevenagh escarpment there are attractive mixed woodland and conifer plantations but Binevenagh, Grange Park and Ballyhanna Forests are mainly obtrusive Sitka spruce monocultures with some larch. There is also a considerable amount of new conifer plantation.

Bent-fescue hill pasture (Table 33) occurs on the higher escarpments with heather and bracken. It is species-rich in parts and often has a prominent woodland herb component.

On the plateau near the scarp edge, there is mainly a poor-fen/hill pasture mosaic but towards the centre of the plateau there is wet heath and bog. It is extensively cut-over mainly by hand. Burning is not widespread.

NORTH DERRY AONB

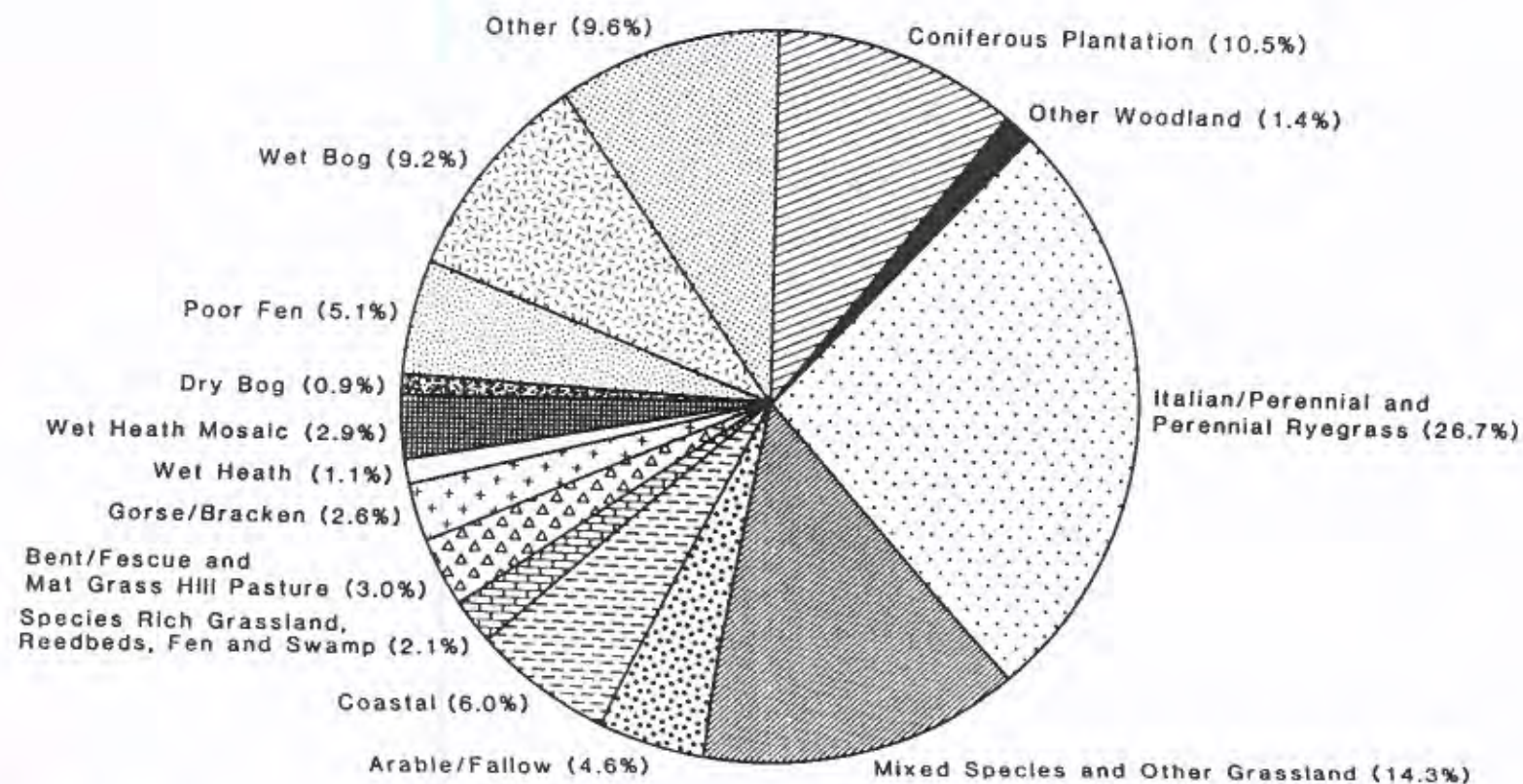


Fig. 13 Percentage area of ecological resources and land use in the North Derry AONB.

NORTH DERRY AONB

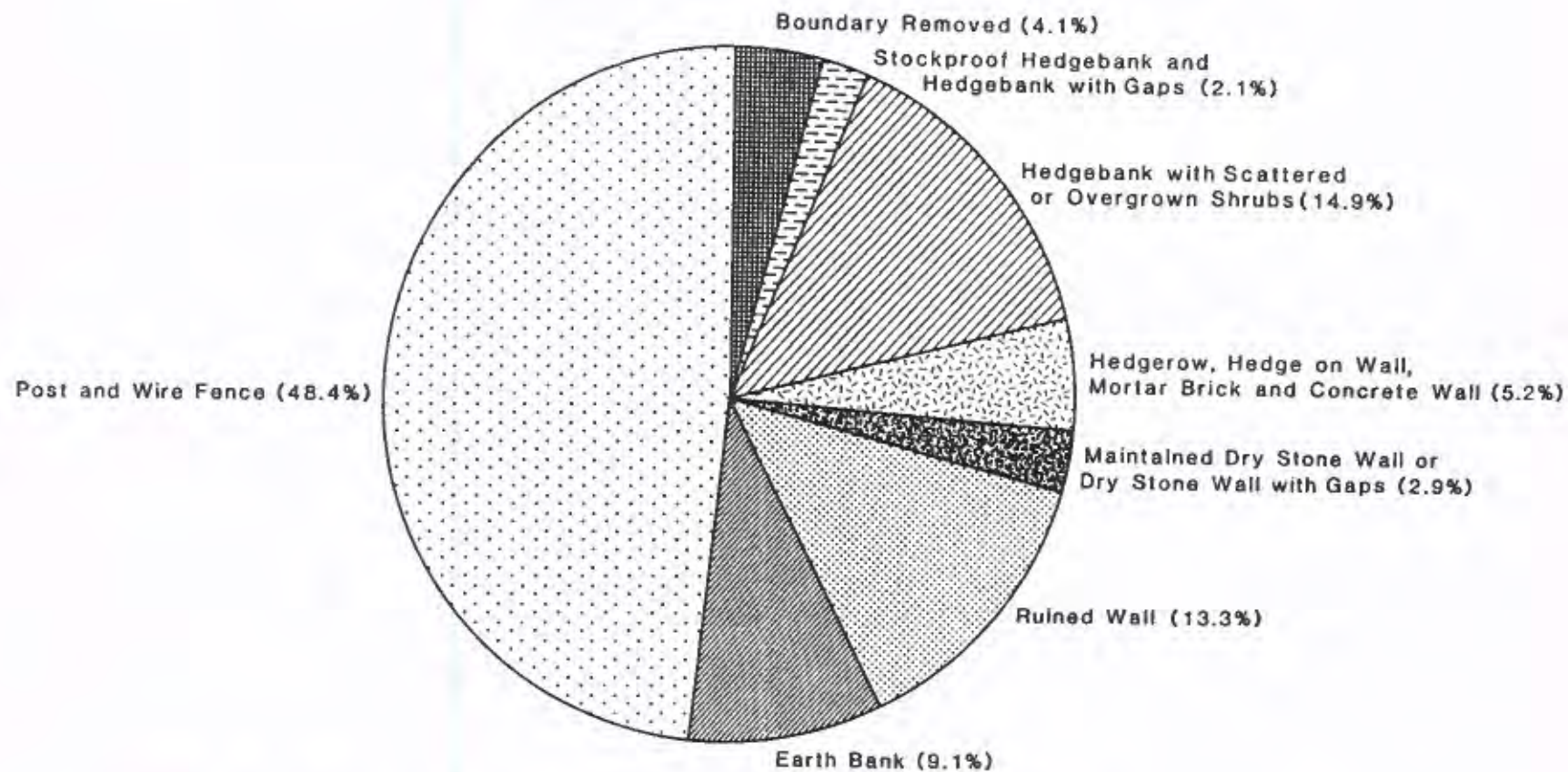


Fig. 14 Percentage length of field boundary types in the North Derry AONB.

NORTH DERRY

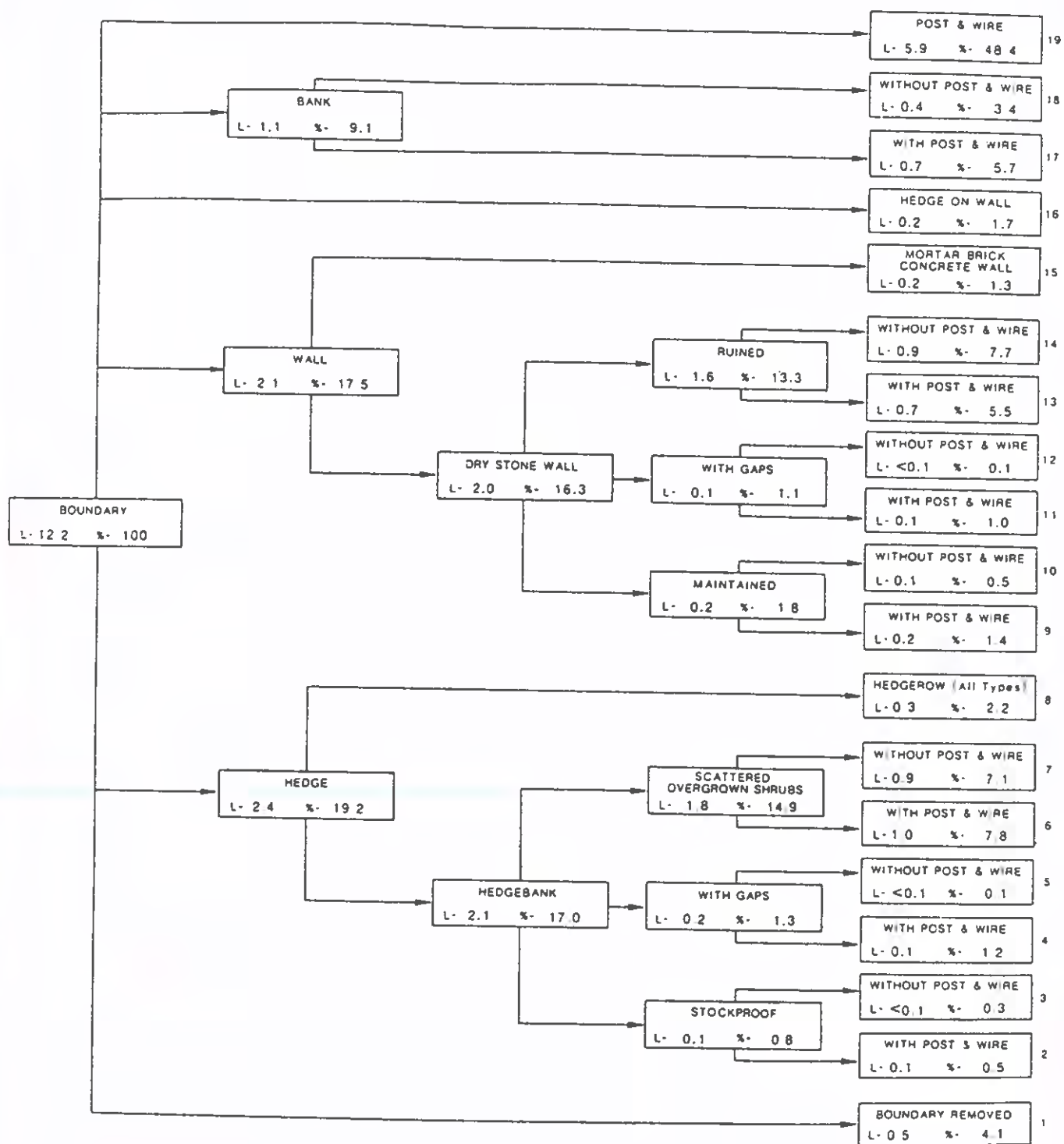


Fig.15 Hierarchical classification of field boundary types in the North Derry AONB.

Table 38

Agricultural grassland in the North Derry AONB infested by rushes and broadleaf weeds. Results are expressed as a percentage mean area of each grassland type.

	Rush Infested	Broadleaf Infested	Rush & Broadleaf Infested
Italian/perennial ryegrass	-	-	-
Perennial ryegrass	2	6	-
Mixed species grassland	29	17	-
Other grassland	30	5	-
Total	12	6	-

Table 39

The mean length (km) per square kilometre of managed field boundaries in landscape units of the North Derry AONB. Results are also expressed as a percentage (%) of each type in each unit.

		Landscape unit		
		1AC	1B	AONB
Stockproof hedgebank	km %	<0.1 22	0.1 52	0.0 40
Hedgebank with gaps	km %	0.1 44	<0.1 100	0.1 49
Hedgebank with scattered or overgrown shrubs	km %	0.1 14	0.2 8	0.2 9
Hedgerow, hedge on wall	km %	0.1 11	<0.1 8	<0.1 9
Total	km %	0.3 20	0.4 10	0.3 13

Table 40

The mean length (km) per square kilometre of field boundaries with ditches in landscape units of the North Derry AONB. Results are also expressed as a percentage (%) of each type in each unit.

		Landscape unit		
		1AC	1B	AONB
Hedgerow, Hedgebank, Hedge on wall	km %	0.6 43	1.4 41	1.1 41
Dry stone, ruined, mortar concrete, brick wall	km %	-	0.3 8	0.2 7
Earth, wall bank	km %	0.1 20	1.2 62	1.3 54
Wood post & wire and other fence	km %	3.2 35	0.6 18	1.8 30
Total	km %	3.9 34	3.3 27	3.6 30

Table 41 The percentage mean number of field boundaries per square kilometre with selected shrub species, in the North Derry AONB. Uncommon species are not shown.

HAWTHORN SHRUB	Landscape unit		AONB
	1AC	1B	
Hedgerow, Hedgebank, Hedge on wall	41	76	69
Dry stone, ruined, mortar concrete, brick wall	-	16	16
Earth, wall bank	-	29	24
Wood post & wire and other fence	2	5	3
Total	8	37	26

GORSE SHRUB	Landscape unit		AONB
	1AC	1B	
Hedgerow, Hedgebank, Hedge on wall	-	23	18
Dry stone, ruined, mortar concrete, brick wall	-	9	9
Earth, wall bank	29	42	39
Wood post & wire and other fence	5	7	6
Total	5	17	13

BLACKTHORN SHRUB	Landscape unit		AONB
	1AC	1B	
Hedgerow, Hedgebank, Hedge on wall	-	41	33
Dry stone, ruined, mortar concrete, brick wall	-	8	8
Earth, wall bank	-	10	8
Wood post & wire and other fence	-	4	1
Total	-	19	12

Table 42 The percentage mean number of field boundaries per square kilometre with selected tree species, in the North Derry AONB. Uncommon species are not shown.

ASH	Landscape unit		AONB
	1AC	1B	
Hedgerow, Hedgebank, Hedge on wall	7	44	36
Dry stone, ruined, mortar concrete, brick wall	-	13	12
Earth, wall bank	14	13	13
Wood post & wire and other fence	-	5	2
Total	2	22	15

HAWTHORN	Landscape unit		AONB
	1AC	1B	
Hedgerow, Hedgebank, Hedge on wall	19	38	34
Dry stone, ruined, mortar concrete, brick wall	-	5	4
Earth, wall bank	14	13	13
Wood post & wire and other fence	2	11	5
Total	5	19	14

4.3 Sperrin valleys study area

The central valleys of the Sperrins, defined by the Glenelly, Owenkillew and Owenreagh Rivers is shown in Fig 16. This encompasses the farmed land class groups A-H in the Mid-Sperrins unit and also in the Gortin unit where they are adjacent to the valleys (Fig. 17). Indicated, is the distribution of the 16 sample squares within the valley system (Fig. 16). These data are summarised in Table 43.

In comparison with the Sperrins AONB as a whole, there are important differences in the relative amounts of ecological and agricultural resources present. There is less hill pasture, wet heath and wet bog and a much greater amount of mixed and other agricultural grassland (Table 44). The amount of ryegrass pasture is similar. Earth or wall banks and post & wire fences are the main boundary types (Table 45).

The predominance of ryegrass and other poorer agricultural grasslands reflects the high degree of agricultural intensification which has taken place. The traditional strip field system has been altered by field boundary removal, particularly in the Glenelly Valley. Large green fields contrast starkly with upland vegetation. The large proportion of other poorer agricultural grasslands present and the degree of rush and weed infestation (Table 47), are reminders of the problems of maintaining agricultural productivity. Artefacts associated with agricultural dereliction (Table 46) are more frequent in the valley systems.

Peatland ecosystems have been heavily exploited in the past, for example, there is only 1% wet bog present and only

2.1% wet heath compared to 10% wet heath mosaic and 12% dry bog. Exploitation is mainly by hand-cutting (Table 48) but machine-cut peat is as common as in the AONB as a whole.

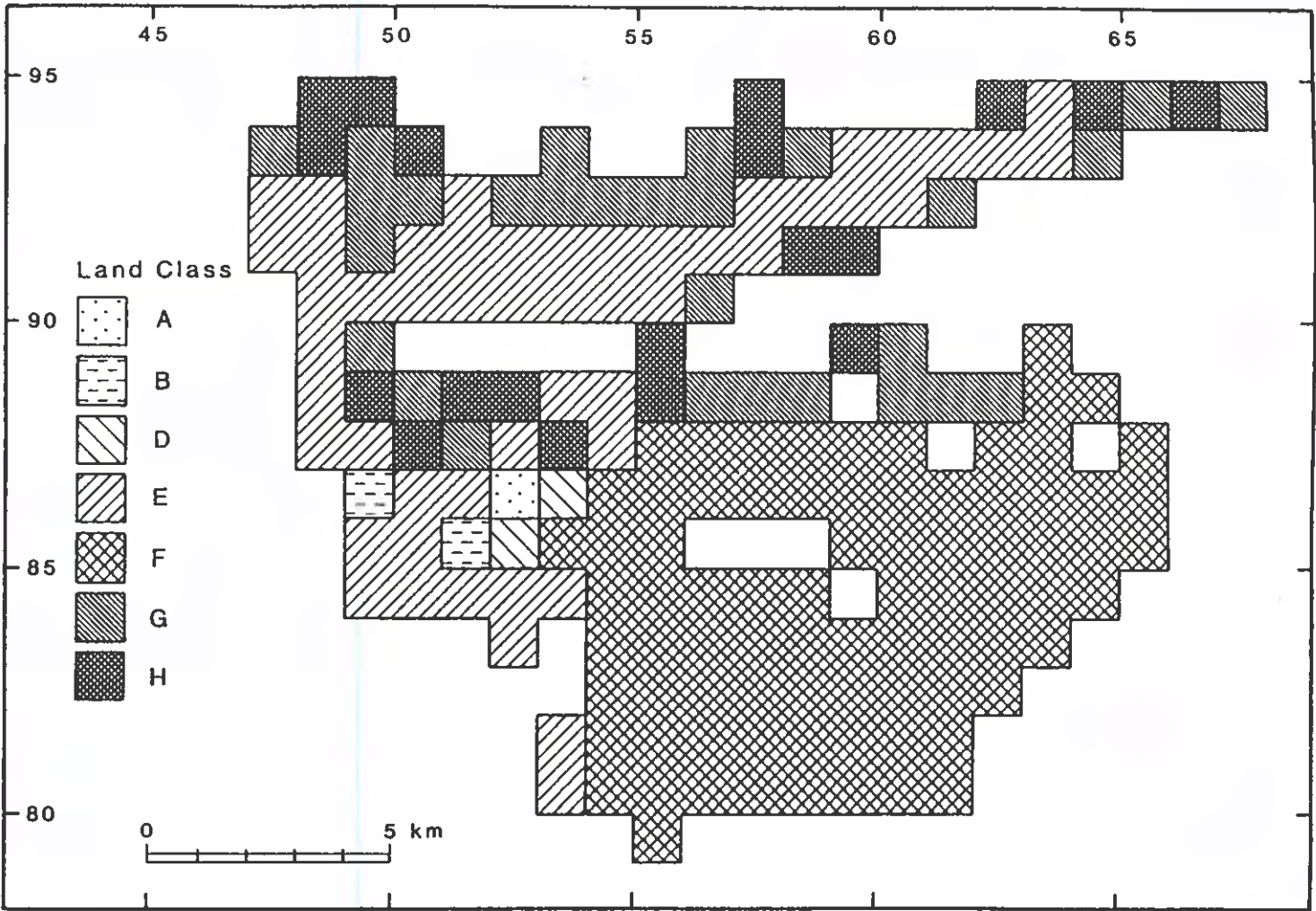
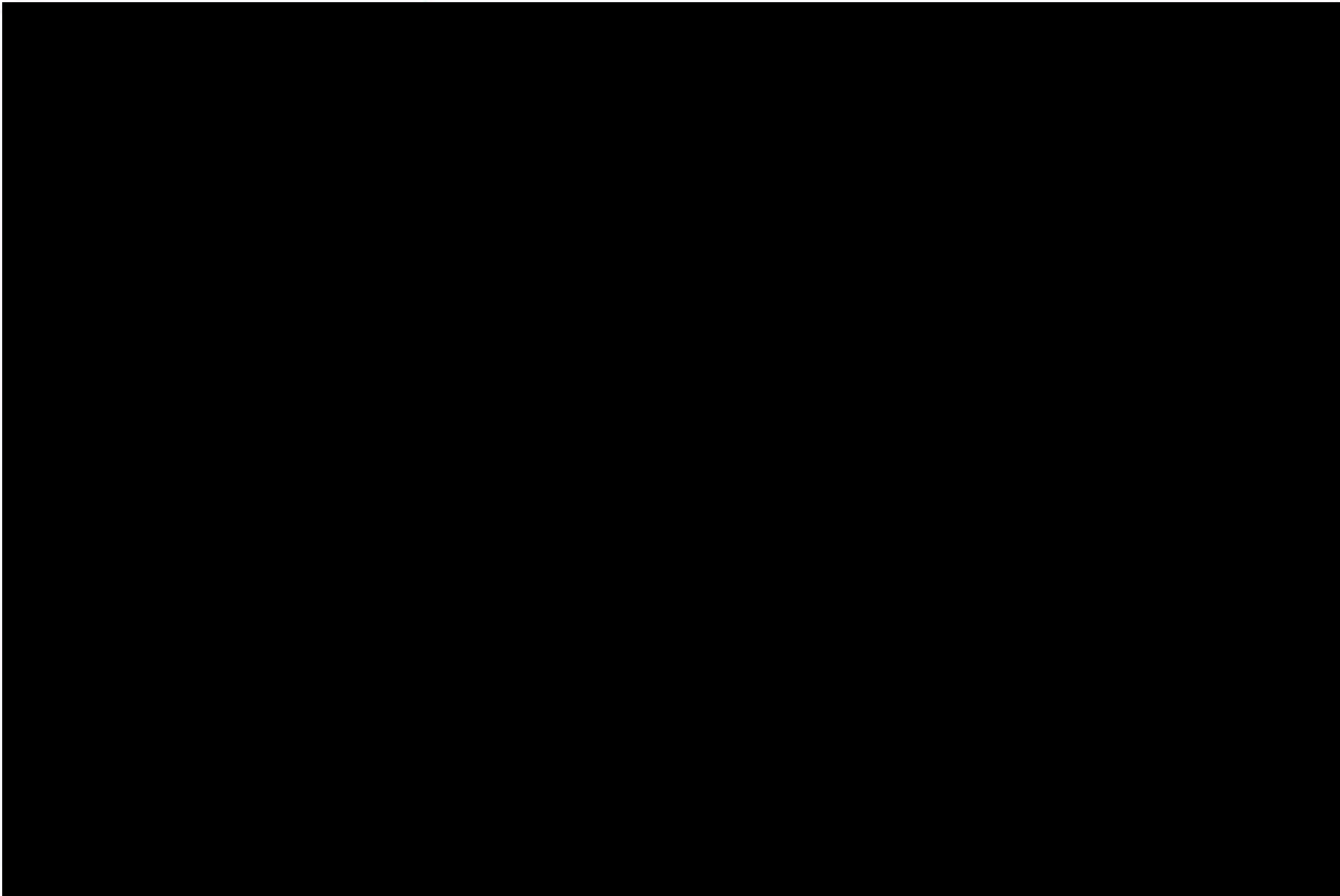


Fig. 17 Distribution map of the land class groups in the Sperrin valleys study area. Land class groups I and J were excluded from the study and are shown uncoded.

Table 43 The area of different land class groups in the Sperrin valleys study area.

Land class group	Area (km ²)	Area (%)
A	1	0.5
B	2	1.1
C	-	-
D	2	1.1
E	51	27.9
F	80	43.7
G	28	15.3
H	19	10.4
I	-	-
J	-	-
Total	183	100

Table 44 Percentage mean area of ecological resources and land use in the Sperrin valleys study area compared to the Sperrins AONB.

	Sperrin valleys	Sperrins AONB
Seminatural broadleaf woodland	1.7	1.2
Woodland scrub	0.7	0.9
Species-rich grassland, reedbeds, fen & swamp	1.6	1.1
Bent/fescue and mat-grass hill pasture	1.5	5.2
Gorse and bracken	1.7	0.9
Wet heath	2.1	12.6
Wet heath mosaic	10.0	10.2
Poor fen/peaty flush	9.2	8.1
Dry bog	12.0	12.6
Wet bog	1.0	8.1
Perennial ryegrass	21.0	17.4
Mixed species and other grassland	31.0	11.4
Arable/fallow	1.0	1.9
Other	5.5	7.5

Table 45 The mean length (km) per square kilometre of field boundary types in the Sperrin valleys study area compared to the Sperrins AONB (bracketed). Results are also expressed as a percentage of total boundary length.

	Mean length (km)		Length (%)	
Boundary removed	1.5	(0.8)	7	(6)
Hedgebank	1.9	(2.1)	8	(15)
Maintained dry stone wall or with gaps	0.6	(0.3)	3	(2)
Ruined wall	0.9	(0.8)	4	(6)
Earth or wall bank	13.6	(6.3)	60	(47)
Post and wire fence	4.1	(3.1)	18	(23)
Other	0.3	(0.2)	1	(1)
Total	22.8	(13.4)	100	(100)

Table 46 The mean number per square kilometre of artefacts of landscape dereliction in the Sperrin valleys study area compared to the Sperrins AONB.

	Sperrin Valleys	Sperrins AONB
Sites of abandoned vehicles	5.3	2.5
Sites of derelict buildings	4.5	2.1
Sites of disposed rubbish/litter	4.0	2.0

Table 47

Agricultural grassland in the Sperrin valleys study area compared to the Sperrins AONB (bracketed), infested by rushes and broadleaf weeds. Results are expressed as a percentage mean area of each grassland type.

	Rush infested	Broadleaf infested	Rush & broadleaf infested
Perennial ryegrass	3 (5)	17 (23)	- (1)
Mixed species grassland	43 (60)	20 (40)	- (25)
Other grassland	42 (41)	36 (34)	9 (10)
Total	26 (20)	28 (28)	6 (5)

Table 48

Management and structure of seminatural vegetation in the Sperrin valleys study area compared to the Sperrins AONB (bracketed). Results are expressed as a percentage mean area of each seminatural vegetation type.

	Hand -cut	Machine -cut	Open drains	Burnt	Disturbed	Eroded
Wet heath mosaic	65 (44)	14 (12)	7 (23)	9 (12)	16 (16)	11 (27)
Dry bog	52 (31)	3 (8)	2 (35)	<1 (4)	6 (15)	2 (19)
Poor fen	3 (5)	- (-)	3 (19)	<1 (-)	1 (2)	- (2)
Other	1 (21)	<1 (3)	0 (29)	<1 (19)	2 (15)	<1 (17)

4.4 Comparison with other AONB's

4.4.1 Regional comparisons

Comparison of the regional differences in the physical environment with other Areas of Outstanding Natural Beauty in Northern Ireland has been made in Table 49.

The characteristic mountain topography in the Mourne AONB is reflected in the high cover of upland and mountain land classes (56.2%), particularly the Northern Ireland land classes 17 and 23. There is also a considerable amount of intensively farmed low elevation land typified by land class 1.

In the Antrim Coast and Glens AONB, the upland and mountain land classes 20-23 predominate with a cover of 70.6%. In the Causeway Coast AONB, the coastal, lowland/upland transitional land class 16 is typical.

The North Derry AONB mainly comprises the flat estuarine land class 5, the coastal, lowland/upland transitional land class 16 and the upland/mountain land class 21 and 22 in similar proportions. The juxtaposition of these land classes determines the character of the area.

In contrast, the Sperrins AONB has the highest frequency of the mountain land class 23, which together with other upland land classes constitute 88.6% of the area.

Distribution maps and the characteristic physical attributes of the six most common land classes in the North Derry AONB and the Sperrins AONB, are presented in Fig. 18.

4.4.2 Sperrins AONB

The cover of broadleaf woodland and scrub is similar to that of the Antrim AONB (Fig. 19) but rather less than the Mourne AONB, reflecting its largely upland nature. In contrast, however, woodland and scrub in the Sperrins AONB is mainly centred on the fringing farmland and lower elevation glen sides. There is less coniferous plantation in the Sperrins.

Even compared with the Mournes there is little species-rich grassland or wetland in the Sperrins. These types are much more abundant in Antrim.

There was much less bent-fescue hill pasture, bracken, ericaceous heath and gorse heath in the Sperrins. Cover of mat-grass hill pasture was comparable with Antrim but less than the Mournes. These figures reflect the sandy, nutrient deficient soils of the Sperrins and the wetter climate.

Whilst the Sperrins and Antrim have a similar cover of bog and poor-fen, there is very much more wet heath in the Sperrins. Peatlands in the Sperrins are more abundant at lower elevation, again reflecting poorer soils and a wetter climate but there are also contributory landform features.

The amount of ryegrass pasture and other grassland is comparable to records from Antrim but much less than in the Mournes. There is less arable and fallow land in the Sperrins than in Antrim and the Mournes.

As with Antrim, post & wire fencing is ubiquitous but there is a much larger proportion of derelict earth/wall banks and hedgebank (Fig. 20). Complete hedgebanks are somewhat more frequent in the Sperrins than in Antrim but figures are

comparable with the Mournes. There are fewer dry stone walls in the Sperrins compared with Antrim and the Mournes and a much greater proportion of them are neglected or ruined. Boundary removal has taken place to a similar extent in each AONB.

4.4.3. North Derry AONB

The amount of broadleaf woodland and scrub is least in the North Derry AONB (Fig. 19). Its distribution is similar to woodland and scrub in Antrim, i.e. largely associated with escarpments. Coniferous plantation is mainly upland as in Antrim and the Mournes.

The coastal nature of North Derry is reflected in the predominance of coastal vegetation types as in Antrim. There is, however, much less hill pasture and ericaceous heath. Peatlands of all types are proportionately less common in North Derry when compared with Antrim and the Sperrins.

The large proportion of ryegrass and other grassland types also distinguish North Derry from Antrim and the Sperrins. In terms of ryegrass content, there is a similarity with the Mournes but the proportion of other grassland types in North Derry is much greater.

North Derry has a great deal of post and wire fencing compared with the Sperrins, Antrim and the Mournes. There is a high proportion of derelict hedgebank. As with the Sperrins, there are few stockproof dry stone walls in North Derry and the frequency of ruined walls is high. Boundary removal has taken place to the same extent in each AONB.

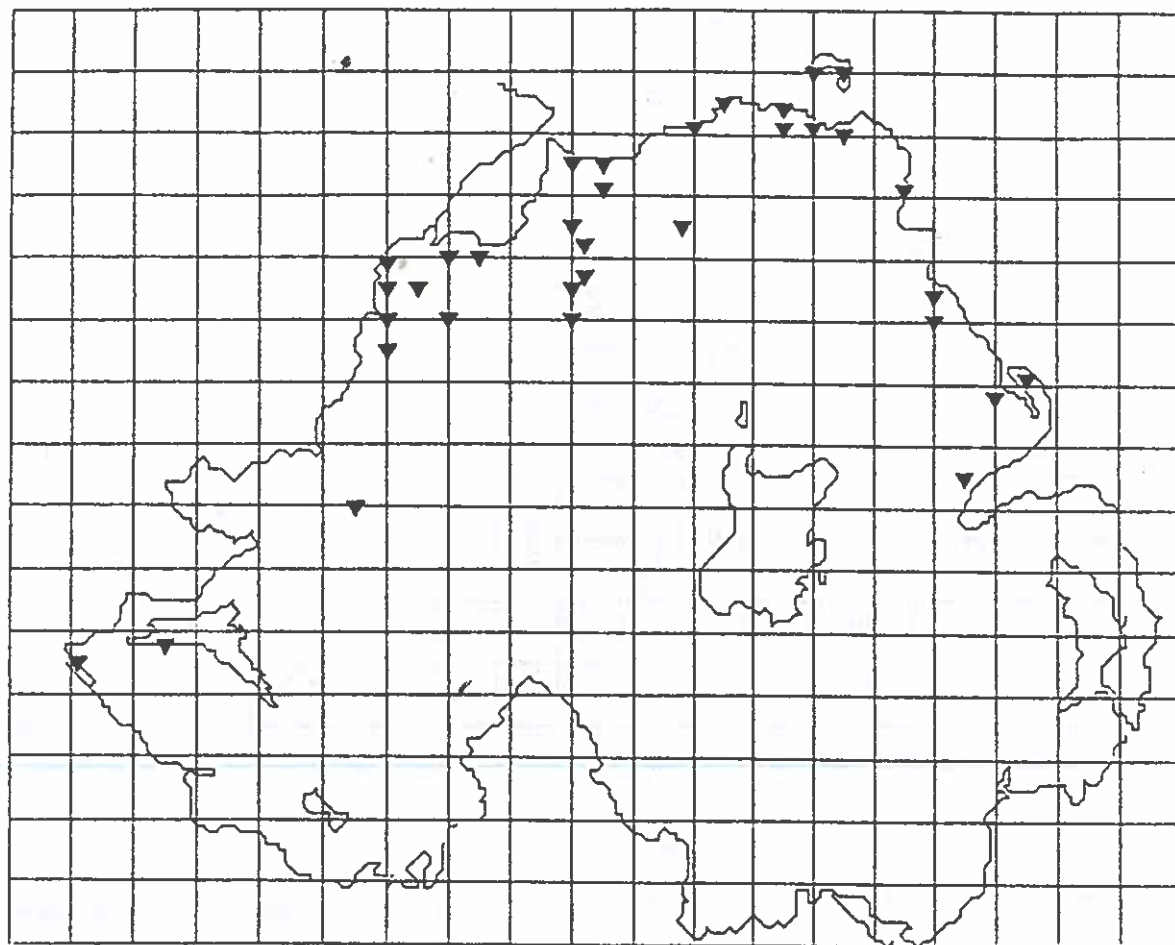
Table. 49 Percentage frequency of the Northern Ireland land classes in Areas of Outstanding Natural Beauty in Northern Ireland. Only frequencies greater than 1% in any area are shown. An asterisk marks frequencies which deviate markedly upwards from the frequency distribution of land classes in Northern Ireland.

	Northern Ireland land class	Northern Ireland	Mourne AONB	Antrim Coast and Glens AONB	Causeway Coast AONB	North Derry <u>AONB</u>	Sperrins AONB
low elevation	1	5.1	*16.8	-	-	-	-
	2	4.1	8.1	-	-	-	-
	3	7.9	5.7	-	-	-	-
	4	3.0	1.1	-	-	-	-
	5	5.0	-	-	-	*29.1	-
	6	2.9	-	-	-	-	-
	7	3.9	-	1.2	-	-	1.7
	8	3.6	-	-	-	-	1.2
	9	3.0	-	-	-	-	-
	10	5.1	-	-	-	-	-
	11	4.6	-	-	*15.8	4.5	-
	12	3.0	-	-	* 8.8	4.5	-
lowland/ upland transition	13	2.9	3.4	-	-	-	-
	14	5.4	4.1	-	-	-	2.6
	15	5.4	-	1.8	-	-	3.2
	16	4.9	-	*14.5	*71.9	*20.9	-
upland	17	3.3	*31.1	-	-	-	3.2
	18	3.7	2.6	* 8.3	-	1.8	1.2
	19	5.1	1.5	2.0	-	-	*28.9
	20	5.3	-	*9.7	-	4.5	*10.8
	21	4.6	-	*20.2	3.5	*18.2	*11.4
mountain	22	4.9	2.4	*27.4	-	*13.6	*12.5
	23	3.3	*18.6	13.3	-	1.8	*20.9

Fig. 18 Distribution maps of Northern Ireland land classes that constitute a large proportion of the North Derry AONB and the Sperrins AONB. The land classes are also described in terms of the map attributes used in the land classification. A constant attribute is one which occurs in the land class with a frequency of >80%.

Land Class 16

This has a northern, often coastal distribution. Its topography is usually dominated by steeply sloping or moderately steeply sloping, often rocky escarpments or cliffs in which all elevation classes occur. The most frequent of these is between 61m and 152m. The land is often backed by higher ground >244m. There are relatively few rivers and streams. When compared with most other land classes, the frequency of buildings and minor roads is low. Conifer plantations are not common but where they do occur, they are fairly extensive. Brown podzols and acid brown earths are the most frequent soil types but there are some gleys and hill peats.



Constant attributes (80-100%)

Land, 62-152m in surrounding squares

Highest point, 0-152m

Land, 0-61m in surrounding squares

Mean maximum July temperature, <19°C

Minor road

*Mean annual number days with fog, 5-10

*Mean distance to north, <56km

Attributes at the ultimate TWINSpan dichotomy

Mean maximum January temperature, >6.5°C

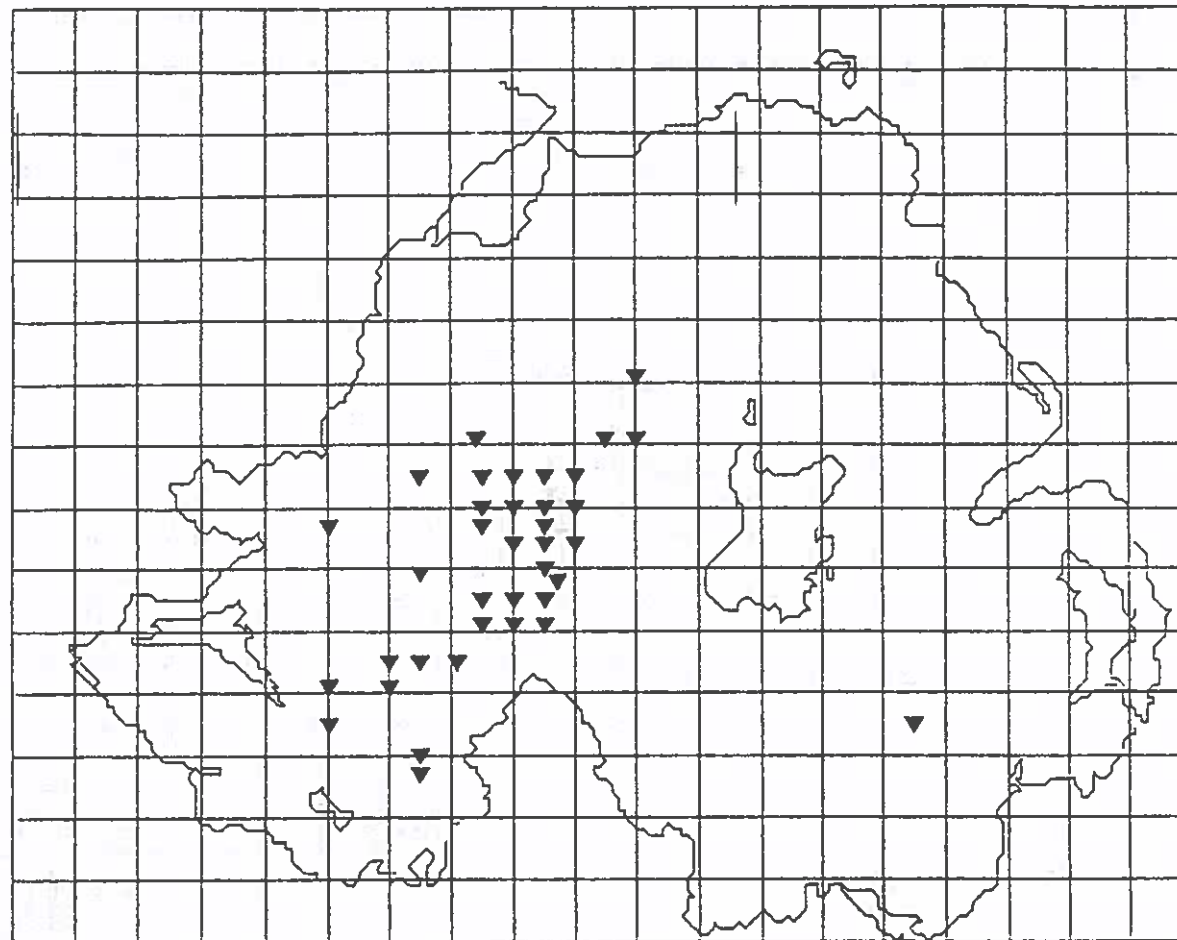
Mean maximum July temperature, <18°C

Land 0-61m in surrounding squares

Sea in surrounding squares

Land Class 19

The sandstone and quartzite hills of Tyrone between the 152m-244m contours make up the main part of this land class. The topography is steeply sloping where it is associated with escarpments but is less so where hill tops occur, often >244m. Frequently branched streams are a common feature. There is a poor road network of often unfenced minor roads and the land is relatively sparsely populated. Rough grazing comprises the predominant semi-natural vegetation and there is some afforestation with conifers. Brown podzols are common and there are acid brown earths and hill peats.



Constant attributes (80-100%)

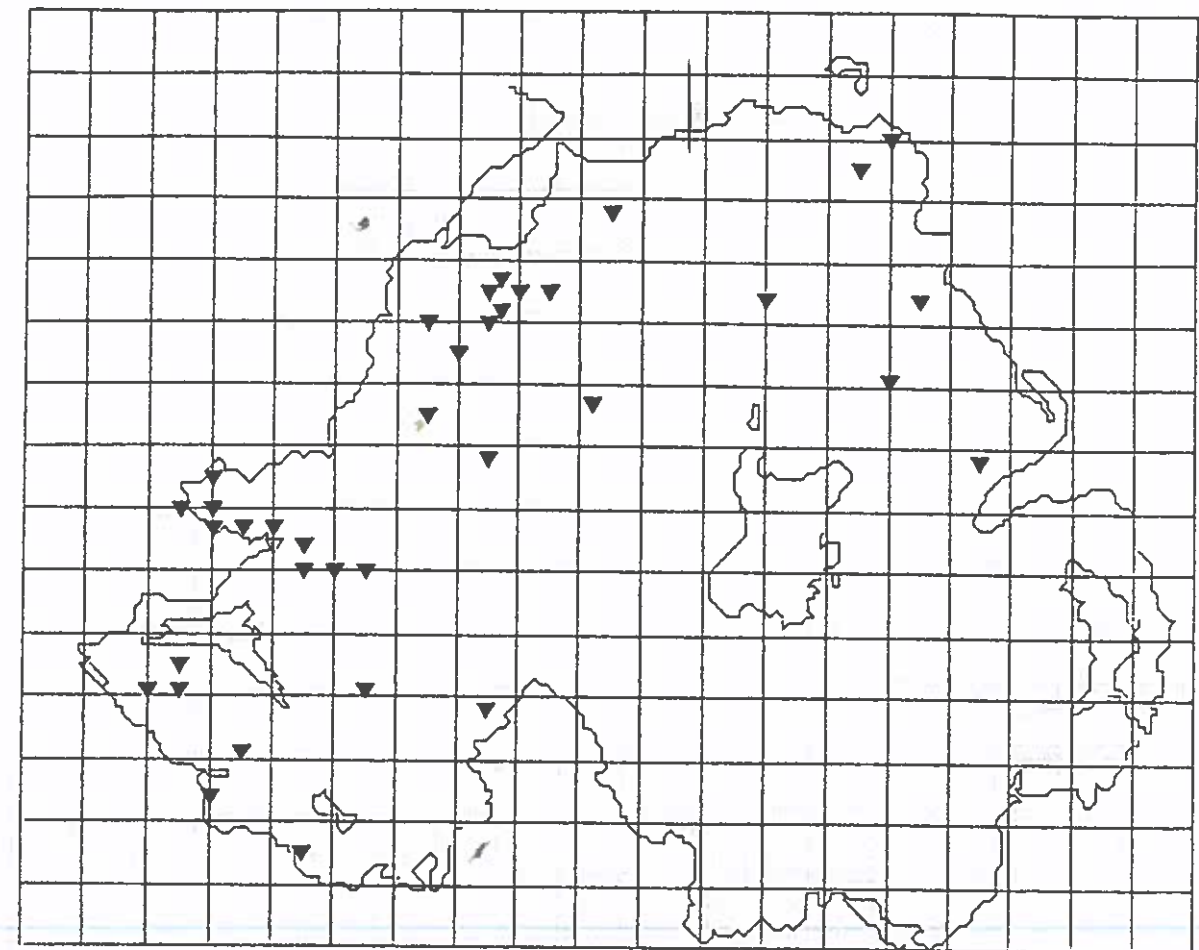
Land 153-244 in surrounding squares
*Mean annual days with fog, >10
*Mean minimum July temperature, 10.0°-10.5°C
Minor road
Highest point, 153-305m
Mean maximum July temperature, 18.0-18.5°C
*Mean annual days air frost, 40-60
Unfenced road
Height of hill behind slope, 153-305m

Attributes at the ultimate TWINSpan dichotomy

Rough grazing
Mean maximum January temperature, <6°C
Mean maximum July temperature, 18.0-18.5°C
Brown podzolics (sandstone)
Single line river/stream

Land Class 20

This upland land class occurs on a wide range of rocks in the north and west of the region but is not found in the Mourne Mountains. Elevation is largely between 152-244m but there are significant areas of land frequently over 244m. The topography is often steeply sloping, particularly where it is associated with escarpments. Frequently branched streams are generally present, often springing from within the land class and in the southwest, small loughs are characteristic. There are relatively few roads and the frequency of buildings is low. Rough grazing is very common and almost 10% of the land is afforested with conifers. Soils are mainly peaty gleys and blanket peat but there are also brown podzols and gleys.



Constant attributes (80-100%)

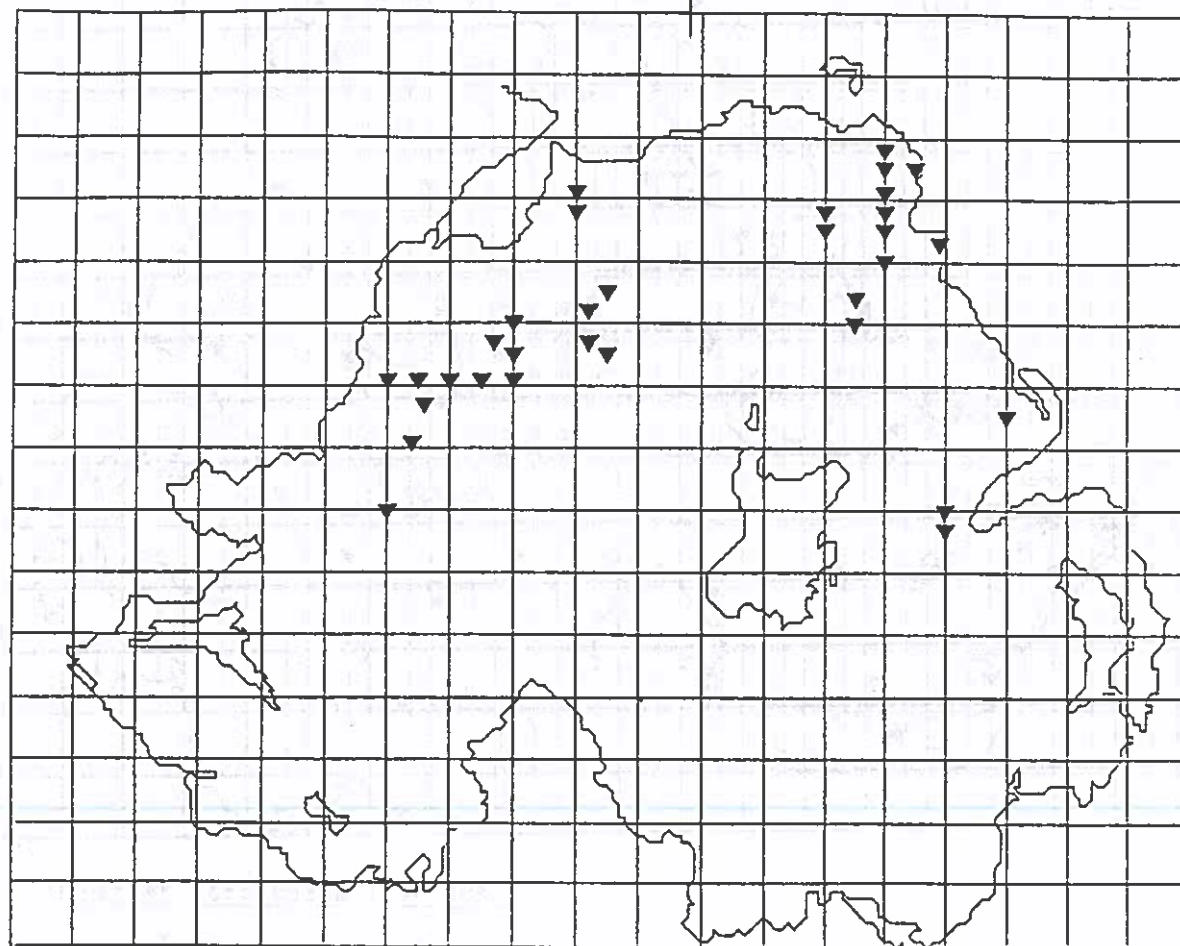
Land 153-244m in surrounding squares
Highest point, 153-305m
Lowest point, 153-305m
Single line river/stream
Mean annual number of gales, 5-10
Height of hill behind slope, 153-305m
Land 62-152m in surrounding squares

Attributes at ultimate TWINSpan dichotomy

Single line river/stream
Source of river/stream

Land Class 21

This is associated with escarpments of the Sperrin Mountains and the Antrim Hills. Most of the land lies between the 152m-244m contours but there are significant areas below and above these elevations. The relatively high frequency of land between 61m-152m and >244m gives a very steep topography of long hill slopes. The class is often backed by hill tops and mountain summits. In comparison with the upland classes, the land has a high proportion of major roads. Frequently forked minor roads, however, are also common and there is a relatively high density of buildings associated mainly with the lower elevations. Conifer plantations are frequent and cover about 10% of the land. There is also relatively high frequency of small deciduous woods for an upland class. Soils are mainly blanket peats and peaty gleys and brown podzolic soils are quite frequent. Some gleys also occur.



Constant attributes (80-100%)

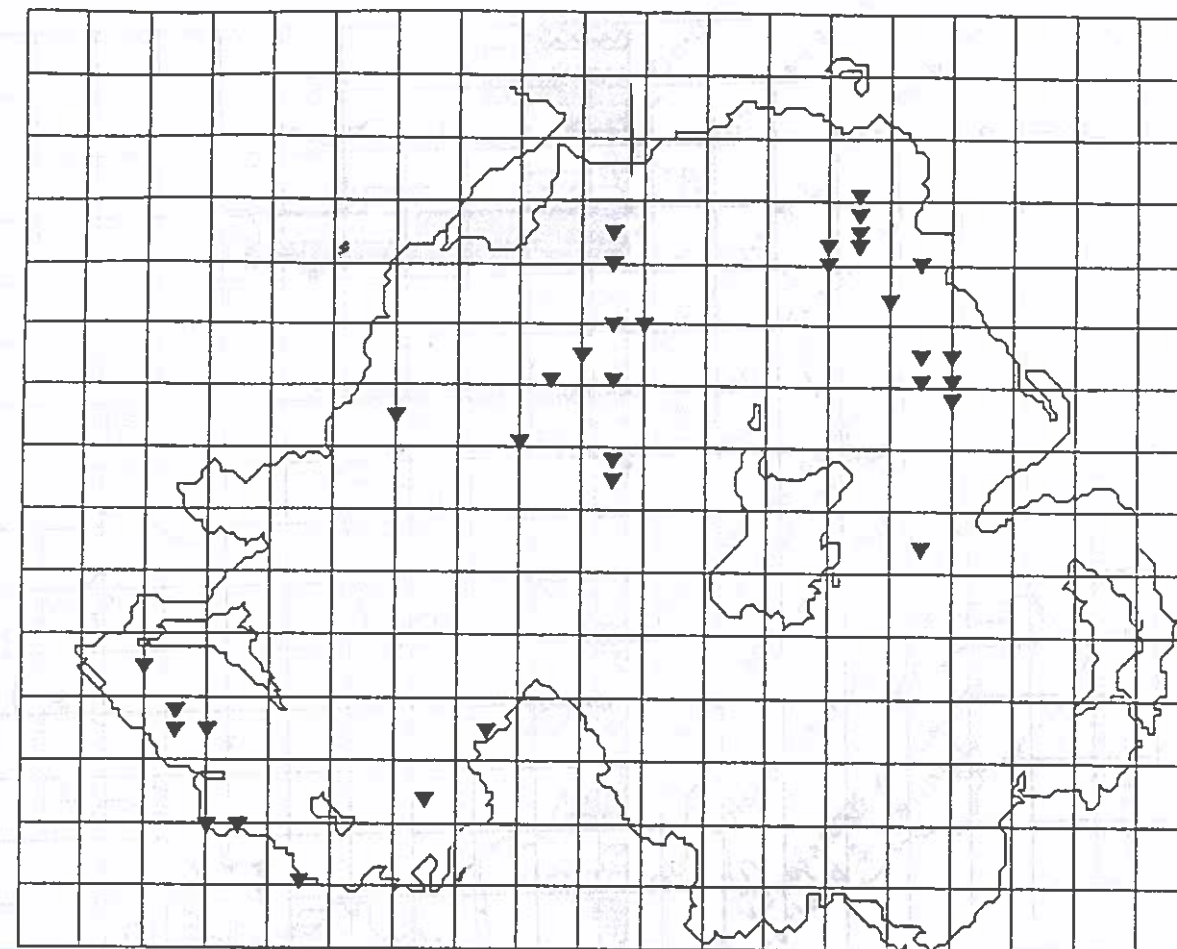
Land 153-244m in surrounding squares
Highest point, 153-305m
Land 62-152m
Minor road
Height of hill behind slope, 153-305m

Attributes at ultimate TWINSpan dichotomy

Mean annual number of days with sleet or snow, >30
Mean distance to hill behind slope, <1.0km
Land 0-61m in surrounding squares
Surrounding squares with principal road, 1-4

Land Class 22

This class mainly lies above the 244m contour but is less steeply sloping than other upland types. It is found mainly on the Antrim plateau and limestone hills of Fermanagh but also occurs in the Sperrins. Almost all of the land is associated with streams and small rivers. Roads consisting, for the most part, of unfenced minor roads, are infrequent and there are few signs of habitation. The land has the highest cover (15%) of conifer plantation. Soils are principally blanket peats and peaty gleys.



Constant attributes (80-100%)

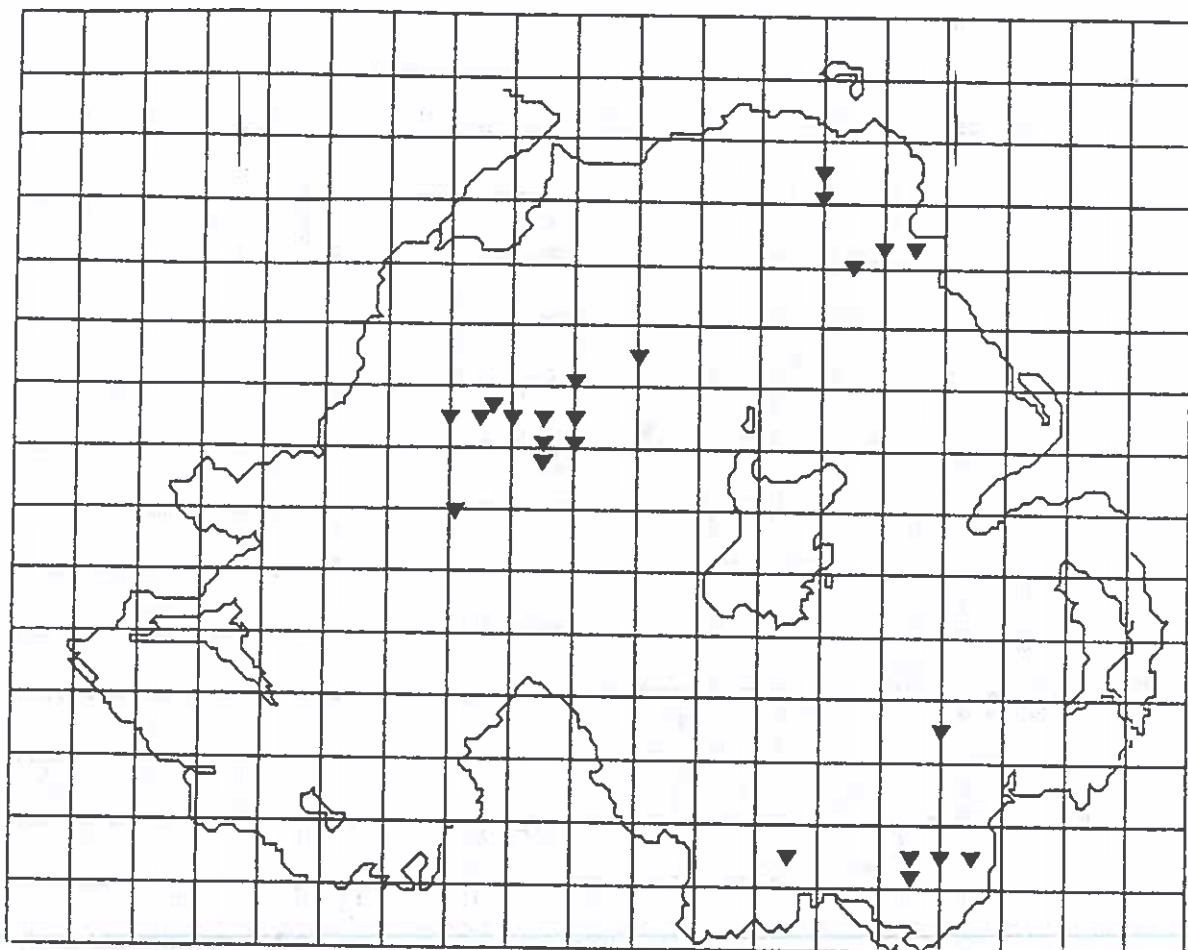
Land >244m, 76-100 ha
Land >244 in surrounding squares
Mean annual rainfall, >1200mm
Single line river/stream
*Mean minimum July temperature, 10.0°-10.5°C
*Mean annual number gales, 5-10

Attributes at ultimate TWINSpan dichotomy

Highest point, 153-305m

Land Class 23

The land class is confined to the highest elevations and summits of the Sperrin and Mourne Mountains and the Antrim Hills. Slopes are very steep and extensive, sometimes with cliffs. Unbranched streams are a common feature, often springing from within the land class, but otherwise freshwater bodies do not occur. Despite the topography, unfenced minor roads do occur and the highest frequency of footpaths except for the coastal land class 1 are recorded here. Rough grazing is extremely frequent and there is some afforestation with conifers. The soils are usually peaty podzols, peaty gleys or blanket peats.



Constant attributes (80-100%)

Land >244m in surrounding squares
Highest point >305m
Height of hill behind slope, >305m
*Mean annual rainfall, >1200mm
Gradient, 6.1°-17°
Land >244m, 76-100 ha
Rough grazing

Attributes at ultimate TWINSpan dichotomy

Height of hill behind slope, >305m

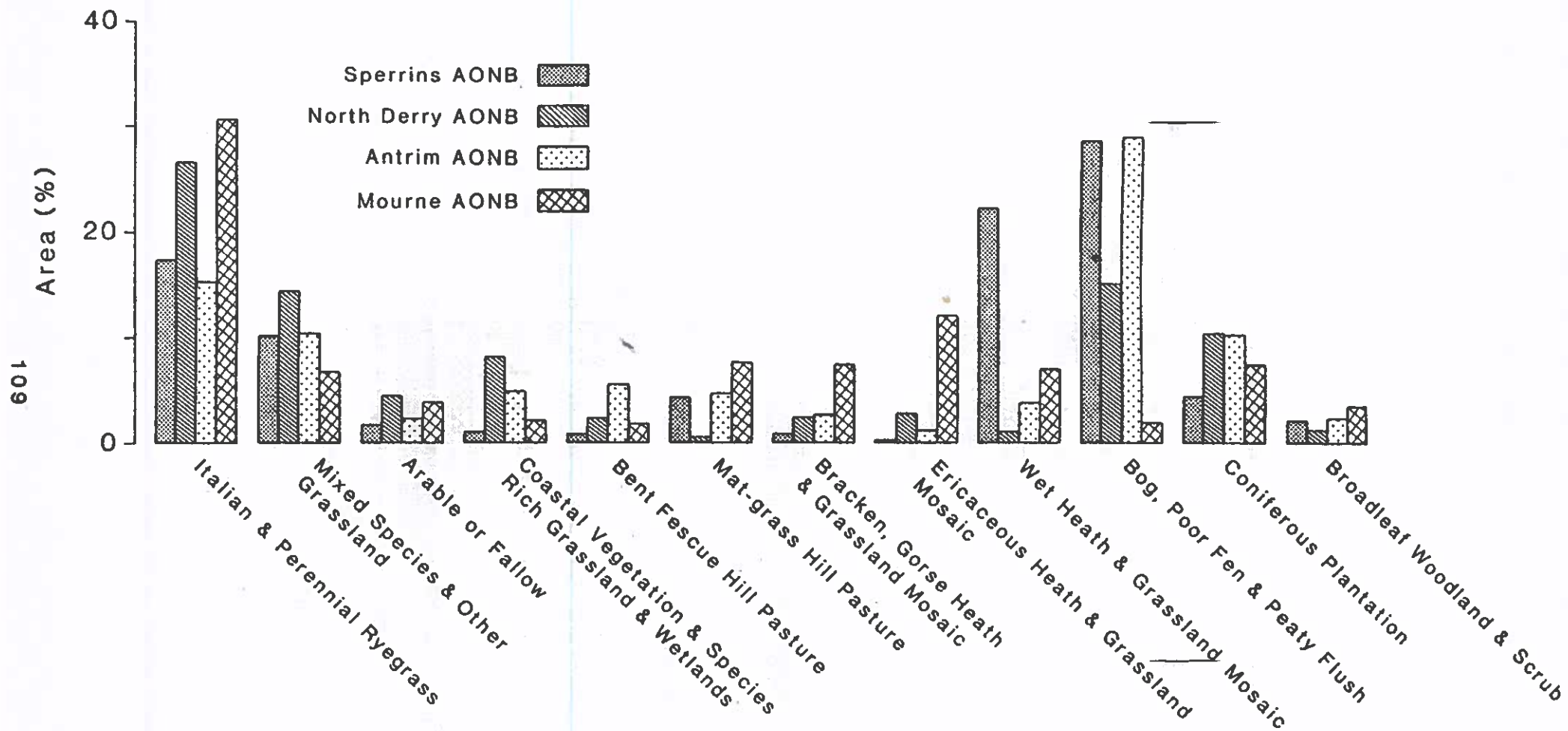


Fig. 19 Percentage area of seminatural vegetation and land use types in the Sperrins AONB, the North Derry AONB, the Antrim AONB and the Mourne AONB.

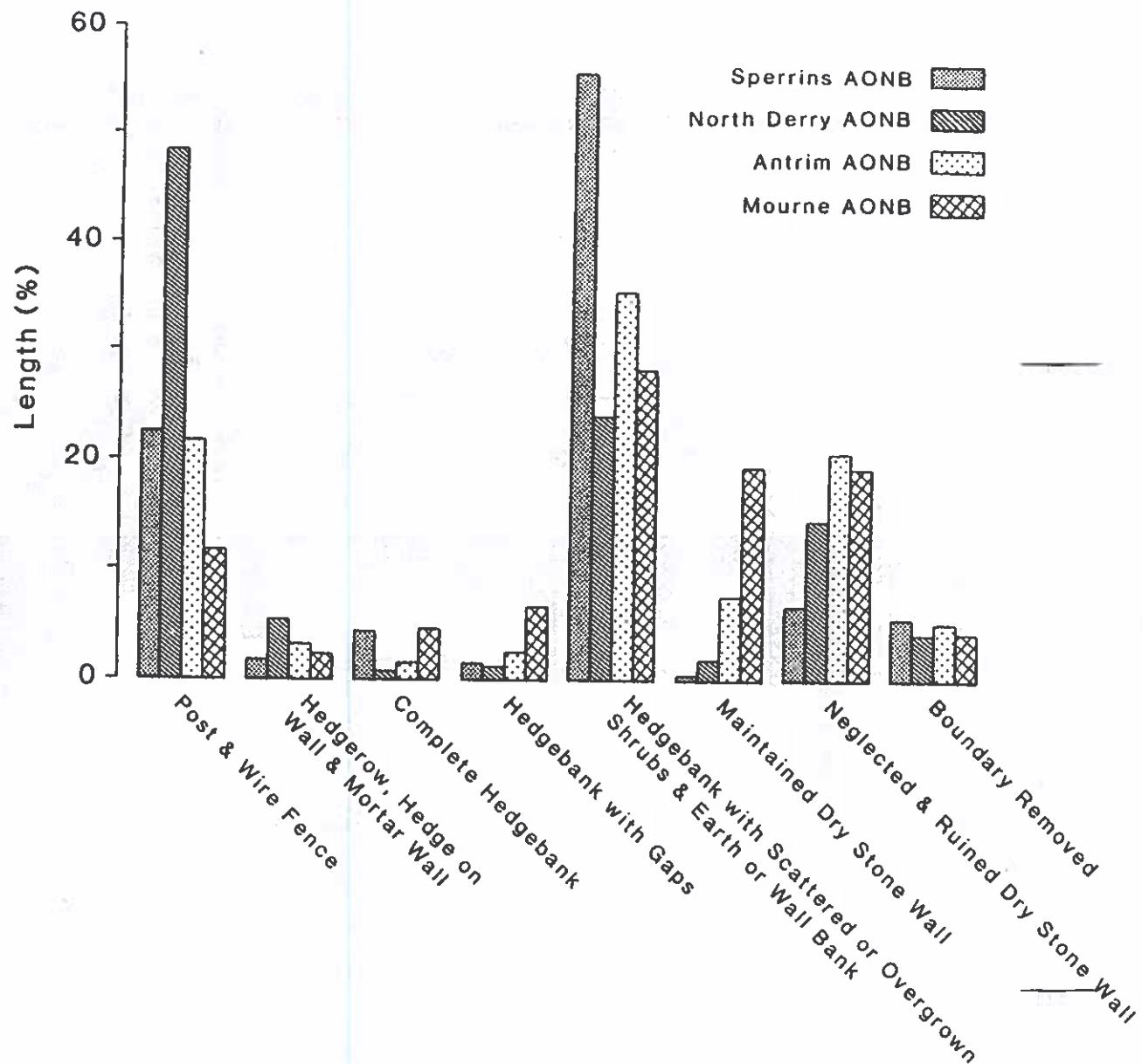


Fig. 20 Percentage length of field boundary types in the Sperrins AONB, the North Derry AONB, the Antrim AONB and the Mourne AONB.

5. Management Prescription

5.1 Sperrins AONB

5.1.1 Woodland and scrub

The scarcity of seminatural deciduous woodland and scrub in the AONB and its location within the lower elevation farmed landscape contributes to its value as a landscape resource. Of particular value is oak/hazel woodland associated with river valleys or hillsides in the central Sperrins. Examples are Boorin Wood and Drumlea Wood and also riverside woodland in general particularly in the Northwest unit (10).

The fragments of seminatural deciduous woodland and scrub should be enclosed to exclude farm stock. Heavy grazing pressure and poor soils are partly responsible for a species-poor ground flora and limited tree regeneration.

Seminatural vegetation types at the edges of the more mature Boorin and Drumlea Woods, should be incorporated into the woodland boundaries. Without grazing pressure, regeneration of oak and birch into the better drained heath communities would occur and should result in the establishment of woodland successions.

Pioneer scrub vegetation on cut-over lowland bog and wet heath offers potential for positive management. Much of this type is found in the West. Birch, rowan and willow are regenerating where grazing pressure is low. Whilst some parcels are of value for wildlife conservation as peatland ecosystems, others have degraded to the extent that tree planting into the scrub is a preferred option.

Derelict sand and gravel quarries also offer potential for woodland establishment. At older sites, where

colonisation by trees and shrubs has already occurred, successional processes can be speeded up by thoughtful planting programmes, particularly where only a limited seed source exists.

There is an abundance of species-poor seminatural vegetation and poor agricultural grassland where fertility and drainage are difficult to maintain. The establishment of broadleaf deciduous plantation is an option at these locations. Small scale planting is in keeping with the landscape.

Preferred seminatural habitats for tree planting include poor-fen vegetation and rush-infested pasture, particularly associated with streams and flushes, the sides of watercourses and lower elevation hill sides or escarpments in land class groups A-F. Birch, willow, alder and rowan should all grow well. At higher elevation (land class groups G-J), poor soils, less favourable climate and exposure will limit success. Planting on more productive agricultural land is unlikely to be received positively by farmers because of the generally small size of holdings and the need to maintain farm viability primarily through animal production.

5.1.2 Conifer plantation

The large scale afforestation of uncut peat should not form part of management policy. There are, however, extensive areas of land where forestry may be an alternative land use particularly poor-fen and dry bog vegetation types at intermediate elevation. Wet heath or bog with heather, particularly when associated with strip field boundary

patterns, is a landscape feature. Forestry proposals should be designed to consider these factors.

Such consideration has not been given for many existing plantations and a recent private forestry operation in Glenlark is one of the poorest examples of unsympathetic planting recorded. Most forests are poorly contoured and landscaped and located obtrusively in the landscape. Future management should involve improving their physical properties and species diversity. A notable exception is the often extensive area of wet bog with abundant heather that has been left unplanted by the Forest Service (DANI), for example, at Davagh. It provides an interesting contrast with, surrounding bog on which grazing pressure remains high and where heather cover is patchy.

Encouragement should be given to diversifying the composition and landscaping of conifer shelterbelts on farmland, particularly in land class groups E-F. Conifers, mainly Sitka spruce, are popular with local farmers and seem to grow well. It is probably unrealistic to expect an immediate change in attitude to more broadleaf tree planting since existing shelterbelts are functional, not totally unattractive and are not in general obtrusively large or badly sited.

5.1.3 Seminatural vegetation

Whilst management prescription for seminatural vegetation is discussed separately for each type, there are large areas of land, particularly in the uplands, where mosaics and intergradation between types is usual.

Differences between slope and drainage, often influenced by past as well as more recent agricultural activities have the effect of introducing heterogeneity in both space and time. Historical land use factors have had an enormous effect on the composition and structure of seminatural vegetation in the Sperrins.

Species-rich lowland vegetation

The species-rich grassland and fen communities associated with lower elevation basalt escarpments of the northeast, limestone outcrops in the northwest and intermediate elevation farmland around Slieve Gallion are the best examples in the area. Topographic and drainage limitations are such that they are difficult to reclaim for agriculture. In view of their limited extent, however, management effort is probably best directed to the ecological and landscape potential of woodland and peatland.

The better examples of species-rich wet grassland are dominated by sharp flowered-rush. There is often a predominance of grasses however, such as Yorkshire fog, sweet vernal-grass and bent, particularly on grazed sites. This leads to a gradation between this type and rush infested other agricultural grassland.

In comparison with the species-rich vegetation of the Antrim Coast and Glens, these vegetation types are of much less ecological and landscape interest.

Hill pasture

Except for the Benbradagh escarpment, bent/fescue hill pasture is of a wetter type, with Yorkshire fog, bent and some

rush infestation. Fescue is often a minor component. It extends to lower elevation soils, occurring in habitats such as riversides on sandy substrates. Its species diversity would benefit from a decrease in sheep grazing intensity.

At lower elevation, there is a tendency for colonisation by gorse, ericaceous shrubs or bracken where sites are neglected. At higher elevation or on wetter sites, bent/fescue hill pasture becomes more peaty and intergrades to mat-grass hill pasture and wet heath, often with heath-rush and soft-rush. Mat-grass hill pasture intergrades to dry bog with species such as Polytrichum and heath rush. It occurs particularly on steep hill sides in the high Sperrins.

Poor-fen

Fence-line observations indicate that much of this vegetation type is derived from either the agricultural use of bog and fen-carr or from the reversion of agricultural land following its abandonment. Its distribution and heterogeneity, vary greatly throughout its range. The ecological and landscape value is not very great.

The most diverse are associated with the basalts in the Glenshane unit, where sharp flowered-rush is usually predominant and where mosaics with more base-rich peaty flushes occur. Other more diverse sites are associated with seepages along river and stream courses.

On the deeper, more oligotrophic peats, the vegetation intergrades to bog. Where peat is thinner, soft-rush predominates, intergrading to rush-infested grassland, particularly where hill slopes are less steep and at lower elevation. Soft-rush communities are also characteristic of old drainage

ditches.

Large-scale agricultural reclamation should be discouraged because of the rapidity of regression. Small scale plantation woodland is a more appropriate land use.

Wet heath and bog

Peat bogs comprise a range of types from lowland to upland, raised to blanket and flushed to unflushed. Their composition, structure and peat depth are determined mainly by climate, hydrology, nutrient status, grazing, drainage, cutting and burning. The land use types recorded during field survey often contain a heterogeneous mosaic of plant communities.

Table 50. shows the frequency of the dominant species in parcels of heath and bog recorded on the field data sheets. The major dominants of wet heath and wet heath mosaic are the same except that heath-rush, wavy hair-grass and sweet vernal-grass were recorded less frequently in the wet heath parcels. The wet heath mosaic also has a greater frequency of rushes, sedges, grasses and upland forbs.

Wet bog has only a few major dominants, e.g. ling heather, bog-moss and cotton-grass. Grasses are virtually absent. Dry bog, however, contains a much wider range of species recorded as dominants. Ling heather is a more minor component of dry bog whilst Polytrichum, heath-rush, soft rush and mat-grass are particularly common. Bog-moss is common in dry bog but not ubiquitous.

It is generally accepted that wet bog surfaces have dried out over the last few hundred years. This is correlated

Table 50 Percentage frequency of dominant species in field parcels of wet heath and bog recorded in the Sperrins AONB and the North Derry AONB.

	Wet heath	Wet heath mosaic	Dry bog	Wet bog
Ling heather	100	100	18	81
Bilberry	16	21	13	3
Cross-leaved heath	9	8	1	10
Bog-moss (<u>Sphagnum</u>)	33	32	58	91
Moss (<u>Polytrichum</u>)	7	6	46	6
Moss (other)	11	3	4	-
Cotton-grass	52	46	44	84
Deer-grass	22	23	13	14
Heath-rush	16	24	47	19
Common/soft-rush	-	4	23	14
Sharp flowered/jointed rush	-	2	3	-
Sedge	-	4	13	1
Purple moor-grass	30	26	26	6
Wavy hair-grass	13	24	14	-
Mat-grass	4	7	18	1
Sweet vernal-grass	9	15	21	-
Other grasses	-	4	4	1
Bog asphodel	1	2	2	6
Tormentil	-	5	13	-
Heath bedstraw	-	2	2	-
Bog myrtle	-	2	-	-

with disturbance, mainly in the form of draining, burning and peat cutting with the more inaccessible areas affected more recently. The effects have led to a reduction in the cover of bog-moss, with an increase in dominance by species such as ling heather, cross-leaved heath, cotton grasses, heath rush and deer-grass. Hypnaceous mosses have also increased. Repeated burning, especially when combined with grazing can result in the dominance of hare's tail cotton-grass or deer-grass.

Disturbance, particularly at wet bog margins, in association with sheep grazing, can exacerbate or be causal in gully erosion at high elevation.

Raised wet bog at lower elevation is more species-rich than its higher elevation equivalent. In particular there is much bog-moss, cross-leaved heath, deer-grass, bog asphodel and sundew. Ling heather is often dominant on the older, drier, cut-over parts. Hare's-tail cotton-grass colonizes lower lying cut-over peat. Dominance by deer-grass occurs by burning the wetter areas, but on better drained peat, ling heather can become dominant. On burned sites there are fewer lichens. Burning can lead to dominance by purple moor-grass, on flushed sites, if grazing intensity is high.

Where cutting and drainage in wet bog, for example, have produced a heterogeneous topography, colonisation by birch and other shrubs can occur. When there is access for grazing animals, grasses such as sweet vernal-grass become common and there is loss of the characteristic habitat and species-diversity associated with the bog. When cutting lowers the peat surface to more base-rich groundwater, poor-fen can

develop. Management prescription for lowland raised bog is problematical, mainly because most sites have been cut-over in the past. Priority should be given to retaining bogs or bog fragments that still retain a characteristic bog hydrology or ecologically interesting species. In other cases, rehabilitation is an option.

Higher elevation raised wet bog has a lower species diversity and is more similar to the deeper blanket wet bog. There is usually less ling heather, possibly a result of the higher density of sheep in the uplands. On the flatter, wetter sites deer-grass is dominant with much bog asphodel, perhaps a result of burning and heavy grazing pressure. These higher elevation bogs are prone to severe erosion at the margins, usually where there is a change of slope.

Blanket wet bog over hill land is largely dominated by hare's- tail cotton-grass, usually with a tussock growth form resulting from heavy grazing pressure by sheep. There is less bog-moss than on lowland raised bogs and vascular plants predominate. Hypnaceous masses such as Hylocomium splendens, Rhytidiadelphus loreus and Pleurozium schreberi also occur but species diversity is low. Fence-line observation indicates that ling heather can gain dominance when the grazing intensity is reduced except at sites where no heather remains in the vegetation. Fairly large areas of blanket wet bog also occur in which ling heather and hare's- tail cotton grass are co-dominant. On the more heavily grazed peats of dry bog and wet heath, heath-rush, sweet vernal-grass, sedges and wavy hair-grass are established. On flushed, more

nutrient-rich sites poor-fen or rush-infested grassland regenerates. At lower elevation, also on flushed nutrient-poor peat, purple moor-grass can become dominant. This species is favoured if burning is frequent or if the grazing intensity is high.

In the past, peat cutting has extended up hill and mountain slopes. The lower hill tops have been cut-away but the higher, more inaccessible mountain tops still have primary peat communities. It is at the margins of this peat that gully erosion is most extensively recorded. On stabilised eroded gullies, common cotton-grass is the main pioneer species, followed by mosses. At other sites agricultural open drains and newly constructed roads are associated with erosion. Machine peat-cutting operations can initiate sheet erosion. Sheep grazing and trampling exacerbate the situations.

Wet heath communities grow on the more shallow peat overlying podzolised glacial soils or are associated with rock outcrops. On the driest of these sites ling heather is the only dominant, with ribbed sedge as a component. The most attractive examples develop a diversity of species with no single dominant. These are more often at lower elevation sites where there is less intense grazing or infrequent burning. Ling heather can regenerate freely in most areas, but overgrazing can result in the establishment of heath-rush.

The management of peatland in the Sperrins should be a major policy objective. Upland wet bog is of ecological importance and also contributes to the wilderness character of the region. Lowland raised wet bog is less prominent but has

a higher ecological value. Steep-sided mounds of glacial deposits with their characteristic wet heath also rank high in terms of their ecological, landscape and geomorphological value.

Peat cutting for domestic heating on farms and for sale occurs on a large scale and is an integral part of the local economy. Management prescription will have to work with it rather than against it. Hand cutting for domestic purposes is more acceptable in both ecological and landscape terms, than machine cutting. It is now less extensive than machine cutting and arguably less damaging to peatland plant communities. The predominance of machine cutting, often by contract workers and a recent increase in the different types and sizes of equipment for extracting peat suggests that machine cutting will continue to be the main extractive technique. This is relevant particularly in the Glenshane landscape unit and to the west of Plumbridge in the Northwest landscape unit where most machine cutting is taking place.

A contribution to integrated management would be to map the distribution of uncut peat and other peat types that are capable of being exploited for fuel. This approach would provide a framework for the conservation of the more valuable areas and the rational exploitation of the less important types. There is scope for organising more efficient and less environmentally damaging exploitation. Problems of the small scale of land ownership and multiple turbary rights, however, make this type of land use policy at best difficult to implement. The promotion of guidelines and incentives for

farmers may help to minimise environmental damage. It must be remembered, however, that farmers see the use of peat for fuel as optimising the use of land which would otherwise be uneconomic for farming. Peatland management policy should aim to work within this framework.

The reclamation of wet heath and bog to grassland should not be encouraged. Swards have only a short period of productivity before regression and high inputs are needed to maintain swards. A number of enterprises at high elevation were recorded where large areas of peatland had been reclaimed. Older examples, reclaimed from deep peat had regressed considerably leaving a vegetation with coarse grasses and unpalatable wetland species. More recent examples were unsightly because of the disruption to local field boundary patterns, the incongruity of new tracks and drainage ditches, post and wire fencing and the visual contrast with surrounding peatland. The practice of creating large open drains in peat to improve grazing is part of the general intensification of land use in the hills. It can cause peat erosion when carried out on steep slopes.

Recent increases in the numbers of sheep on the hills and mountains are likely to result in further ecological changes which it is reasonable to hypothesise will include an increase in peat erosion, a decrease in heather cover and an increase in the amount of unpalatable or resistant species such as hare's-tail cotton grass, heath-rush, purple moor-grass and mat-grass. These changes are likely to be long term. The large areas of mountain which are common grazing and the tendency to run sheep over large upland farms with

derelict field boundaries, without control contribute to the problem.

There is little information on the effects of burning on upland vegetation. It has been assumed however, that burning occurs in spring or autumn, that the effects are noticeable for 1.5 years, and that vegetation is burned regularly. Applying these assumptions, it can be estimated that the interval between burning in the region is 5.5 years for wet heath and 12.2 years for wet heath mosaic. These calculations are derived from field survey indicating that 27.3% of wet heath and 12.3% of wet heath mosaic were burned at the time of survey.

For wet heath, a time interval of 5.5 years between burning is too short to allow recovery when compared with the generally accepted interval of 10-15 yrs for heather moorland in Scotland (Gimingham 1985). On Exmoor in England, however, figures of between six and ten years have been quoted (Miller, Miles and Heal 1984). Heather regeneration at many sites in the Sperrins is good, suggesting current burning intervals are not generally having a detrimental effect on heather cover. If management policy for controlled burning is implemented, therefore, it will probably be successful in promoting a better, agriculturally more productive cover of heather on the hills. The purple and brown tones associated with heather are an attractive visual element in the landscape compared to the rather drab greens and yellows of dry bog and poor fen vegetation.

Quarrying operations are taking place in localities with ecologically interesting peatland communities and glacial deposits. They are particularly common in areas where glacial sands and gravels underlie podzolised soils that support wet heath, bog and small lakes, for example, at Lough Fea and north of Lough Macrory. Both working and disused quarries are obtrusive. In the past there have been few visible attempts to moderate their effect on the environment. Working quarries are not much more successful in this respect. There is potential for rehabilitating disused quarries to make best advantage of associated wetland habitats and reinstating heath communities over bare earth.

In addition to development control, principles of landscape design to lessen the impact of quarries on the landscape and ecology are needed, together with studies on methods of heath restoration.

5.1.4 Agriculture

Poor, sandy soils and high rainfall are the main limiting factors to agriculture, even at lower elevation. In order to remain productive, soils need regular drainage and fertilizer inputs. The best quality agricultural land is in the Strule River valley. Over much of the enclosed hill land and glen sides, field sizes are small. This makes controlled grazing easier and since fields are commonly surrounded by earth banks with ditches, facilitates drainage.

Ryegrass pasture shows a general trend of regression on the poorer land. Broadleaf weeds, e.g. creeping buttercup, bent, Yorkshire fog, daisy and rough-stalked meadow-grass

regenerate easily. Wetland species, e.g. floating sweet-grass, occur where drainage is poor at lower elevation. Marsh foxtail is also a component of lower elevation grassland whilst blinks and pearlwort occur on the higher elevation peaty soils. Crested dog's-tail grass is found on the drier soils. New grassland on upland, waterlogged peat regresses rapidly. Many farmers on poorer land, however, only improve small blocks of better drained land on hillsides or drumlins.

Older, more neglected grassland is dominated by grasses such as Yorkshire fog, sweet vernal-grass and bent. There is much rush-infestation. Rough-stalked meadow-grass is also a common constituent. At higher elevation it eventually regresses to dry bog wet heath or poor-fen. Some control of rush infestation and a transition from poor-fen to useable grassland can be achieved by heavy grazing.

The course of regression depends on local soil conditions, wetness, mineral nutrition, management and time since cultivation. In abandoned grassland without grazing, regression involves the eventual establishment of wet heath and bog. On the better farmland, management prescription is largely limited to the maintenance and rehabilitation of fragmentary seminatural vegetation and field boundaries. The implementation of less intensive farming techniques on this type of land is not appropriate since it will lead mainly to the degeneration of grassland without any major ecological or landscape benefits. Variation in land-use history is a diversifying agent which is responsible for the attractive patchwork of small field systems at the upland transition. Environmental management should aim to retain this feature.

More recent agricultural practices such as field boundary removal and upland reclamation are obtrusive and are particularly noticeable in and near the better farmland of the main valleys and glens around Gortin, Plumbridge, Omagh, Newtownstewart, Draperstown and the Northwest landscape unit. New farm roads into the hills are also obtrusive and need to be better routed, for example, along contours, existing tracks or field boundaries.

There is mainly sheep farming in the area with some suckler cows. Dairy farming is limited to the better land at lower elevation, notably in the Strule Valley. Outfarms are a common feature, giving farm units which are probably quite large but scattered in the landscape. Related to this is depopulation of the higher elevation land of the central Sperrins, although some areas such as Coneyglen Burn and Glenlark, still have an active farming population. Depopulation has left a heritage of derelict vernacular farm buildings particularly in the upper glens, of the main Sperrin Mountains.

Vernacular outbuildings on farms notably in the Northwest unit are often maintained and functional but are now usually roofed with corrugated iron or asbestos sheet. Their walls are often whitewashed. The siting and design of modern bungalows, many of which are owned by farmers, needs consideration in the more sensitive areas. Near Omagh, housing development in the countryside is a problem that needs to be considered.

5.1.5 Field boundaries

Field boundary removal is associated with upland reclamation and farm rationalisation and is therefore an integral part of agriculture. In sensitive areas, however, thought should be given to retaining key field boundaries so as to maintain local patterns of field systems.

At low elevation the landscape generally has a wooded appearance largely due to hedge dereliction. In order to maintain a hedged, wooded landscape a tree planting and hedge rehabilitation policy is necessary.

Trees in the Sperrins are a low elevation feature. At higher elevation, soils are so poor that planting programmes for field boundaries would probably not succeed. The distribution of gorse in field boundaries can be used as a rough guide as to whether tree planting will be successful. Local hedge composition can also indicate the types of species to plant. There is also scope, however, for introducing other suitable species. Oak is found in field boundaries in parts of the Owenreagh valley. It would probably grow well if planted more widely.

Hedge management at lower elevation was observed particularly in the Strule River valley, with some care taken to maintain neat field boundaries by coppicing or cutting to a flat top. For the most part, however, field boundary dereliction was widespread and needs attention if the character of the area is to be maintained.

Earth or wall banks need little management, except for associated ditches which usually need to be cleared and where there has been damage by sheep or farm vehicles. Ditch

management would also improve field drainage. The problem of bank erosion by sheep is related to overstocking, particularly in the uplands.

Field boundary patterns can be used as a guide for planting small farm woods if this becomes popular. Field sizes and patterns determine the scale of variation within which the plots would not be obtrusive.

5.2 North Derry AONB

Since much of units 1A and 1C consists of intensively farmed amalgamated enterprises, positive measures to enhance the land and its ecological resources are needed. Planting farmstead trees, particularly willow and alder in subunit 1A, would go some way towards masking the obtrusive nature of large farm buildings and large fields. Attention should also be paid to building design principles and lay-out so that farms are more in keeping with the landscape. These comments refer particularly to Magilligan Foreland, where there is scope for rehabilitating the many derelict vernacular farm buildings, perhaps as tourist accommodation.

Design principles should also be applied to the structure and siting of the extensive development of modern bungalows in the area, particularly along the main roads.

On farms, hedge maintenance should be given priority because there are so few. A planting programme to supplement post and wire fencing and to add to field boundary diversity should also be carried out. Tree planting along drainage channels and ditches would enhance the landscape in subunit 1A. Willow and alder would grow well.

The ecological management of ditches and drainage channels and measures to reduce the eutrophication of water caused by intensive agriculture, would improve the diversity and ecological status of their plant communities. In comparison with the rich fen vegetation of the Benone area for example, ditch vegetation is extremely poor and there is much potential for natural recolonisation. Rubbish dumping in ditches by farmers should be discouraged and guidelines

provided for appropriate ecological management. Ditch rehabilitation should recognise the ecological function of waterways as wildlife corridors and physical links should be encouraged with coastal ecosystems and the seminatural vegetation associated with the basalt escarpments.

Whilst coastal ecosystems represent the most extensive seminatural vegetation in subunits 1A and 1C, they are threatened by recreation and agriculture at the Umbra, Magilligan, Ballymaclarry, Portstewart, Downhill and the Bann Estuary. The resulting loss of nature conservation value and landscape interest should be recognised in management policy. Habitat protection at these sites should receive priority. There may be scope for new development such as caravan parks and recreation facilities to take place on agricultural land near the coast, rather than on the coastal ecosystems which are a major attraction of the area. Rubbish dumping, clearance, disturbance and derelict buildings associated with the military ranges and prison at Magilligan need also to be considered in management policy.

The escarpment and lowland/upland transition zone of subunit 1B where woodland and scrub are major features, is integral to the character of the AONB. The retention and enhancement of woodland and scrub is a particular priority. Felling and reclamation should be discouraged and management guidelines implemented, most importantly to establish stockproof boundaries. Coppice management is appropriate for most of the seminatural woodlands recorded, since most are neglected, scrubby and dense. New woodland plantings should

be encouraged.

Any broadleaf woodland planting programme established on the escarpment should aim to exclude land with species-rich grassland or wetland plant communities. Replacement of the more obtrusive conifer plantations with broadleaf species should be considered when they are clear-felled.

Contrasting land use on the escarpment, of large monoculture conifer plantations and agricultural reclamation, together with agricultural dereliction, present difficult management problems. A more sensitive approach to reafforestation will be needed in the future. Whilst farm rationalisation involving field boundary removal may be necessary, consideration should be given to the retention or replanting of key field boundaries that are a feature of the landscape. Hedge management/rehabilitation and dry stone wall management are also priorities.

Reclamation for agriculture is depleting and fragmenting seminatural vegetation of all types at the lowland/upland transition, particularly at the junction with the more uniformly intensively managed farmland. Farmers should be encouraged to retain and manage this vegetation, particularly where it has a landscape function or is of ecological value.

On coastal escarpments around Eagle Hill, special attention should be given to retaining gorse heath and ericaceous heath. Species-rich grassland, fen, poor-fen and peaty flushes on the lower escarpments of the west and south of Binevenagh are also valuable. Whilst this seminatural vegetation is usually associated with difficult terrain and is therefore less threatened, the farming community should be

made aware of its ecological value and encouraged to maintain it. More usually the vegetation is derelict or used for the uncontrolled grazing of farm stock. Successional processes associated with dereliction need to be managed and overgrazing/poaching by farm stock needs to be controlled if these vegetation types are not to deteriorate further.

The character of upland parts of subunit 1B has been changed by established extensive coniferous plantation and extensive recent planting in the region of Binevenagh and Harkins Hill. New planting has almost doubled the area of conifer plantation in last 10 years. Afforestation policy and planting design need to be examined to avoid Sitka spruce monoculture, poor landscape design and obtrusive visual appearance against the escarpment.

Recent increases in the numbers of sheep in the uplands are likely to lead to the loss of heather, an increase in the abundance of mat-grass and progressive damage to unmanaged field boundaries. The long-term effects of sheep-grazing in the uplands should be monitored.

Peatlands have been extensively cut-over on the plateau leaving mainly dry bog vegetation. The amount of primary peat is correspondingly small so that priority should be given to its conservation. Management should concentrate on controlling further exploitation and developing a peatlands use policy on cut-over areas to optimise economic, nature conservation, recreation and aesthetic benefits. Policy will need to consider the fact that peat cutting by machine on secondary peat is frequent.

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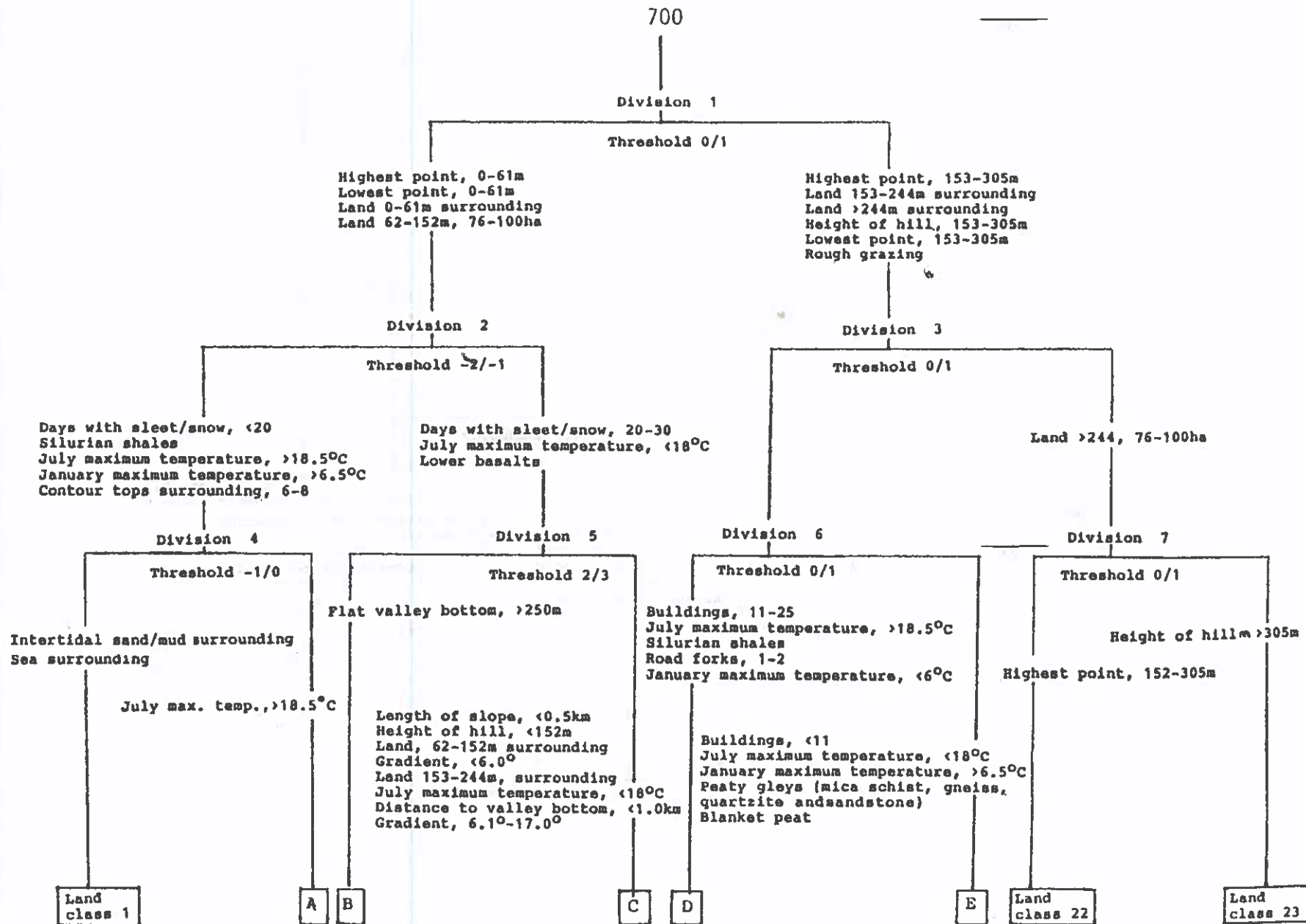
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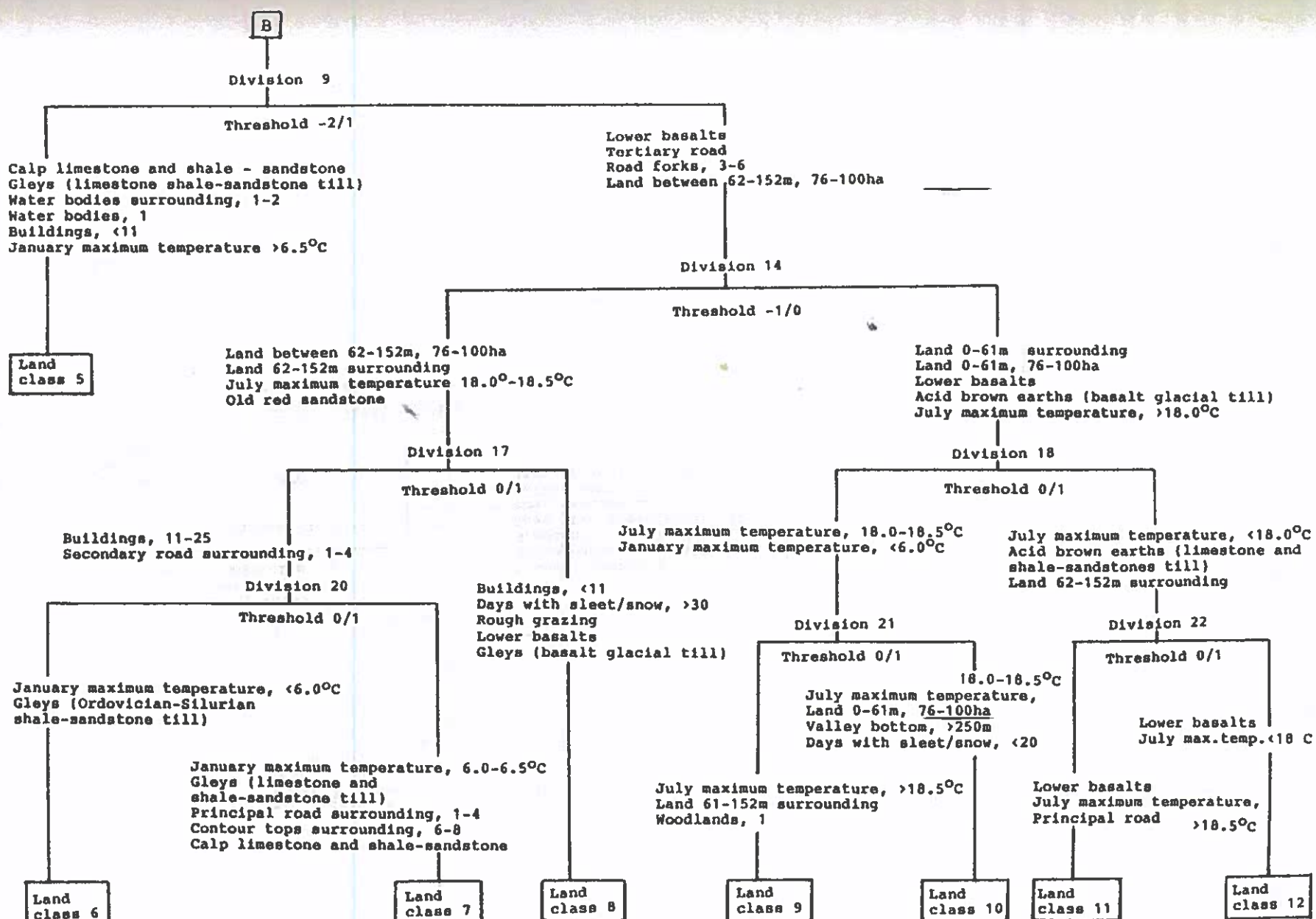
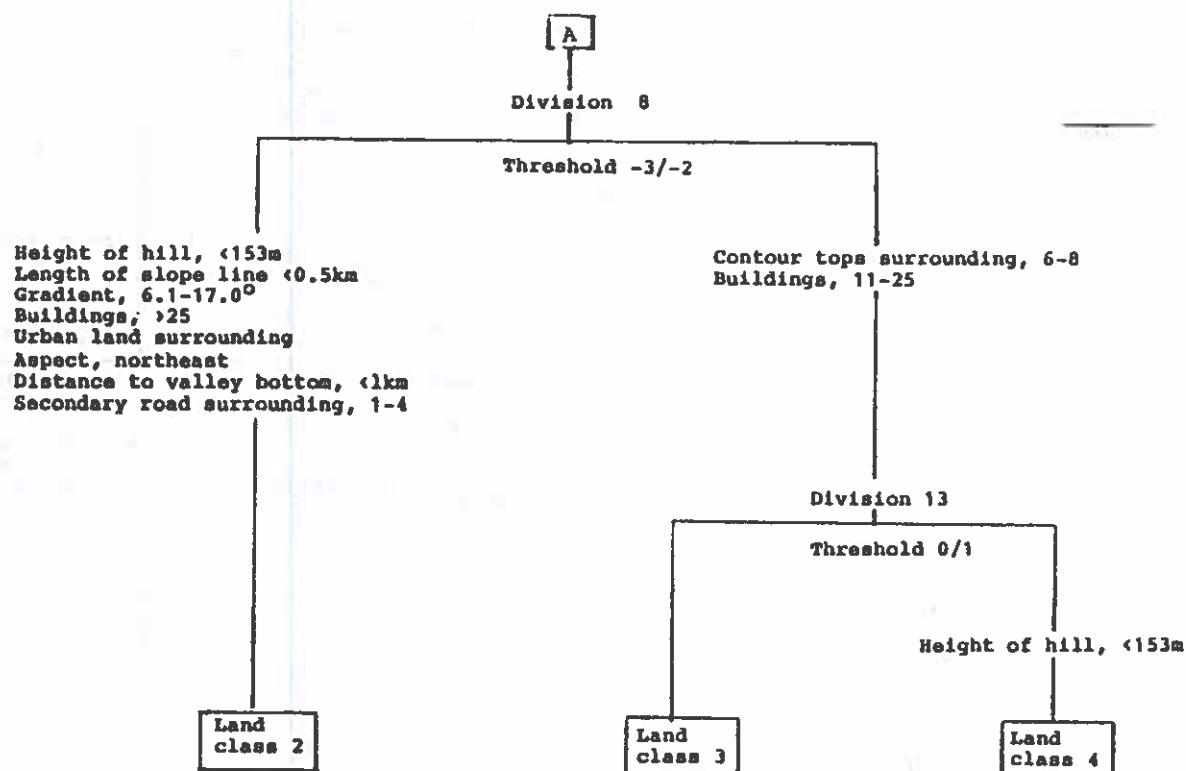
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1. Classification hierarchy



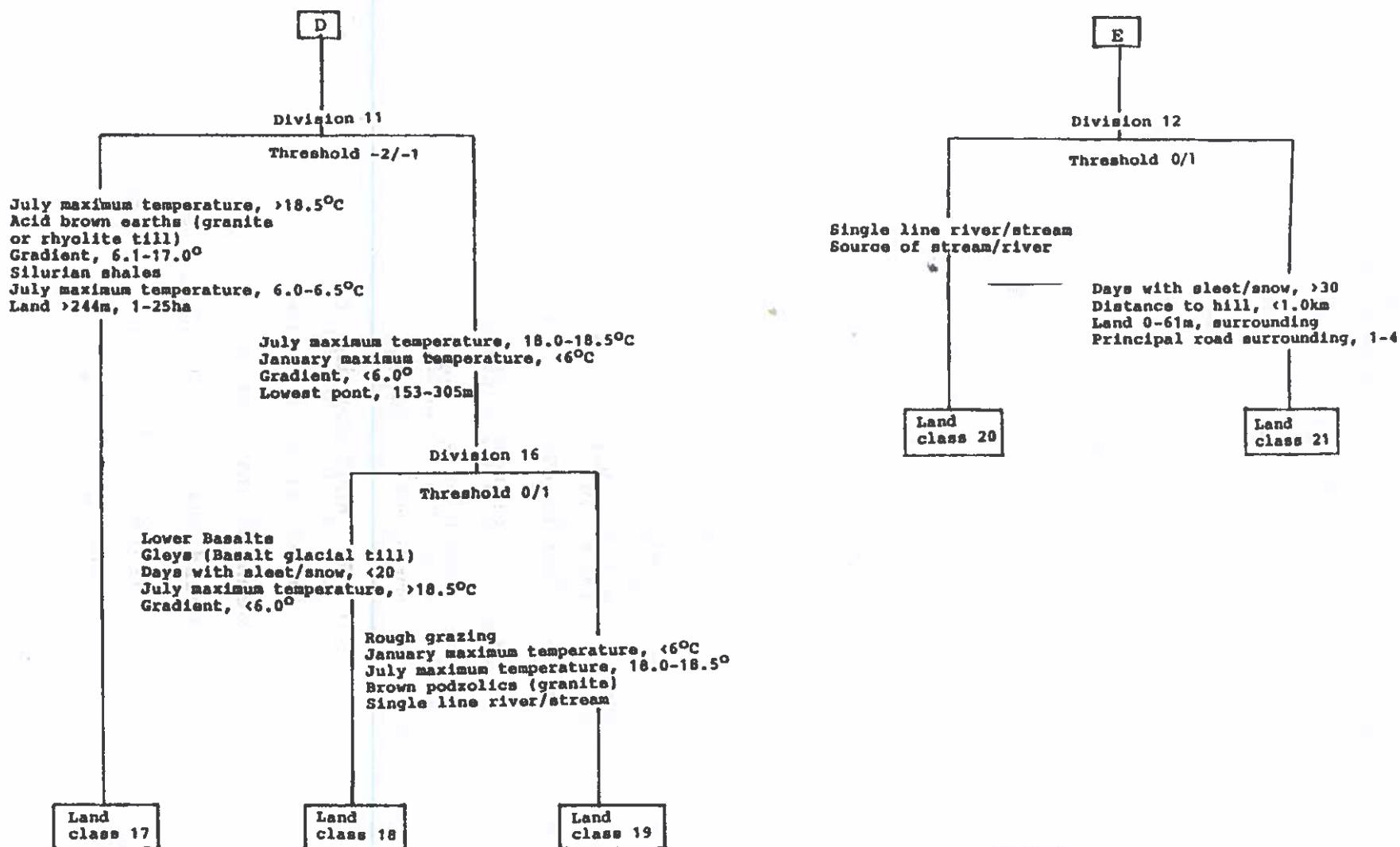
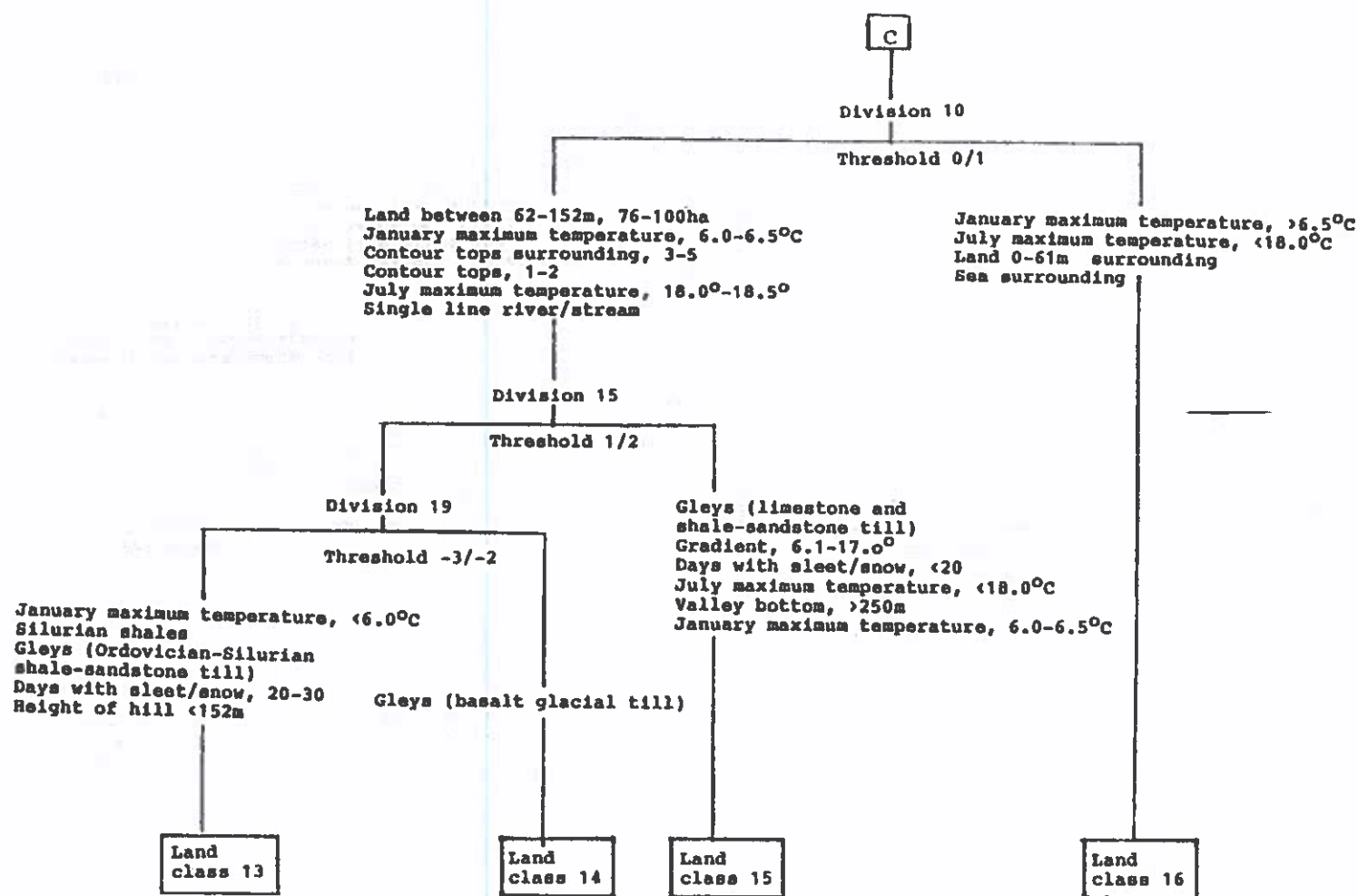


July maximum temperature, >18.5°C
Land 61-152m surrounding
Woodlands, 1

Land class 11

Lower basalts
July maximum temperature, Principal road >18.5°C

Land class 12



2. Method of Recording Map Attributes

The map attributes used to classify the sample squares were recorded either in qualitative form or as continuous variables. The following source maps were used: climatic maps of Northern Ireland (Meteorological Office, 1983); Ordnance Survey of Northern Ireland (1:62,630); Geological Survey of Northern Ireland (1:625,000); Generalised Soil Map of Ireland at a scale of 1:575,000 (Gardiner and Radford 1980).

A tracing film template outlining surrounding kilometre squares was divided into 4ha grid squares to facilitate the location of samples and the recording of area. Data were written onto a standardised data sheet with space for converting each continuous variable into a number of presence-absence attributes. For this purpose, the range of each variable was divided into classes. The recording procedure is self-evident for most attributes but guide notes are given below where this is not the case.

When recording the altitude classes, reference was made only to contours, not bench marks and summit altitudes. All mapped altitudes were employed, however, when recording the highest and lowest points. When working from contours, slope gradients were calculated from a line representing the shortest distance between the highest and lowest points. The height of the hill behind the slope line was defined by the altitude recorded immediately before contour dips, parallel but equal contours, streams, rivers and water bodies. Similarly, a valley bottom below a slope line was defined by a contour rise, two parallel but equal contours, streams,

rivers or water bodies. Distance to a hill or valley bottom was recorded from the edge of the sample square. Zero was recorded for any attribute related to slope if the highest and lowest contours were coincident. A valley bottom >250m was defined by any pair of parallel contours at the same altitude which cross any two sides of the sample square.

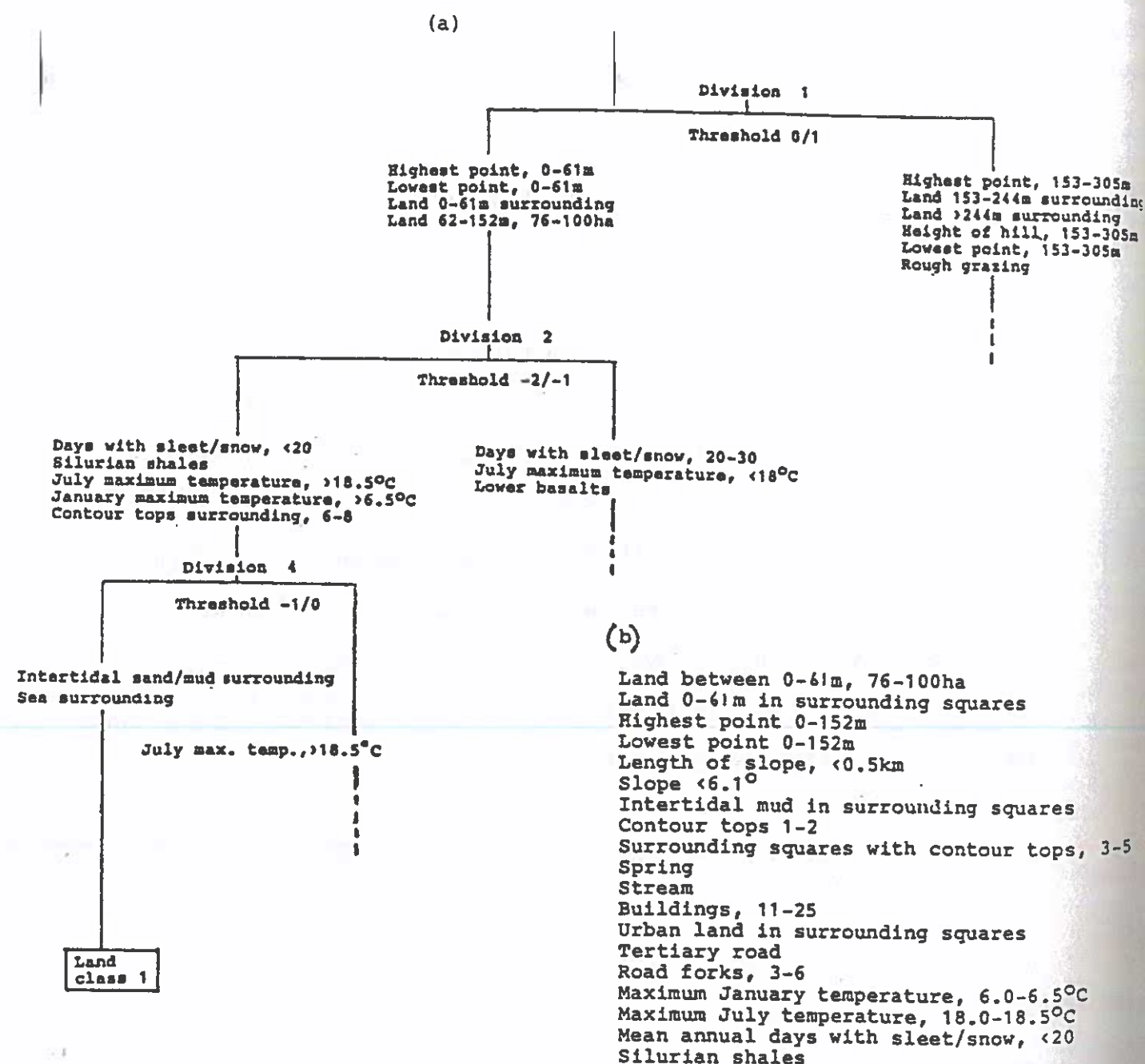
A contour top was defined as any area of land enclosed by a single contour. Presence in a sample square was recorded if 50% or more of a contour top occurred within a square.

A spring on Ordnance Survey maps was taken as the source of a stream, itself defined by a single blue line. A river was referred to as being represented by a double line.

The roads at a junction must each lead to another junction. Any road leading to an isolated building, for example, was not considered to form a junction. A church, post office, public convenience, public house or school was recorded as a community building. Places whose names were in heavy, lower case letters were designated as villages e.g. Charlemont (H8555). Urban land was defined by multiple buildings in rows or blocks. Rows of buildings or an industrial complex were counted as units.

3. An example of the hierarchical classification of a kilometre square belonging to land class 1.

- hierarchical structure of the key running to land class 1
- attribute composition of the square J 2812
- summary of the mechanism of dichotomy using indicator attributes



(c)

At each successive division, attributes on the left of the dichotomous key, score -1 when present in the square whilst attributes to the right score +1. The total score for the square is then compared with the threshold score for the division and this determines the direction that further dichotomy proceeds.

Appendix 2 Procedure for circumscribing provisional landscape units

- Mountain areas were delimited as land class groups I, J. Uplands which were transitional to mountain blocks were delimited as groups E, F, G, H. For inclusion with mountain areas a square must have had 3 sides surrounded by groups E-I. This excluded squares of group E, made up of the N.I. land class 18, which has lowland affinities. Mountain and upland areas are represented by provisional landscape units 3, 6-8 and 11-16.
- Areas outside the delimited mountain and upland boundary, comprising groups A, B, C, D and groups E, F, G, H not meeting the criteria for inclusion in the high elevation areas, were circumscribed as lowland areas (provisional landscape units 1, 2, 4, 5, 9, and 10).

The criteria used for defining boundaries within the two major groups to produce the 16 provisional landscape units are described below.

- Magilligan: Delimited from landscape unit 2 by including land within 2km of the coast, west of the River Bann estuary.
- Coleraine: See 1. Discontinuous with 9.
- North Derry Mountains: See 8.
- Limavady/Dungiven: See 1.
- Dunnamanagh/Claudy: Delimited from 10 by narrow juncture and Strabane town.

6. Park: Delimited from 7 by narrow juncture and land class group E.
7. Plumbridge: See 6 and 8.
8. The Sperrins: Delimited from areas 3,6,7,12,15 by mountain foot or lower slope. The lower boundary is a square adjacent to land class groups I and J of the Sperrin mountain range. Delimited from 14 by groups A,B,E associated with Owenkillew river valley.
9. Draperstown/Cookstown: Discontinuous with other areas.
10. Newtownstewart: See 5.
11. Slieve Gallion: Delimited from 13 by land class groups E,F associated with the Lissan Water valley. Delimited from 15 by the juncture of mountain with flat bogland.
12. Owenkillew/Owenreagh: See 8 and 14. Delimited from 15 by juncture of area with flat bogland.
13. Davagh: See 11. Delimited from 15 by juncture of flat bogland. Delimited from 16 by narrow juncture and land class group E.
14. Gortin: See 8. Delimited from 12 by mountain foot or lower slope. The lower boundary is a square adjacent to group I,J of the Gortin mountain range. Delimited from 15,16 by a narrow juncture and land class group E.
15. Murrins/Black Bog: See 12,13 and 14. Delimited from 16 by the juncture of flat bog land with undulating terrain.
16. Evishanoran See 13, 14 and 15.

These grid references, pg 146-148, have been removed to preserve the confidentiality of the sample square locations.

Appendix 3 The location of sample squares selected for field survey in the North Derry AONB.

Unit	N. Derry land class group	N. Ireland land class	Field survey sample no.	O.S. grid ref.
1C	A	5	1	
1C	C	16	2	
1C	C	16	3	
1A	A	5	4	
1A	A	5	5	
1A	A	5	6	
1A	A	5	7	
1A	A	5	8	
1A	A	5	9	
1B	C	16	10	
1A	C	16	11	
1B	C	16	12	
1B	G	21	13	
1B	G	21	14	
1B	G	21	15	
1B	G	21	16	
1B	H	20	17	
1B	I	22	18	
1B	I	22	19	
1B	I	22	20	

Appendix 4 The location of sample squares selected for field survey in the Sperrins AONB. The symbol * indicates sample squares in the Sperrin valleys study area.

Unit	Sperrins land class group	N. Ireland land class	Field survey O.S. sample no. grid ref.
Unit 2 - Glenshane			
2	E	18	1
2	G	21	2
2	G	21	3
2	G	21	4
2	H	20	5
2	I	22	6
2	I	22	7
2	I	22	8
2	I	22	9
2	J	23	10
2	J	23	11
2	J	23	12
2	J	23	13
Unit 3 - Moyola			
3	E	19A	14
3	F	19B	15
3	G	21	16
3	H	20	17
3	I	22	18
3	J	23	19
3	J	23	20
3	J	23	21
Unit 4 - Slieve Gallion			
4	E	19A	22
4	F	19B	23
4	I	22	24
4	J	23	25
Unit 5 - Davagh			
5	F	19B	26
5	F	19B	27
5	F	19B	28
5	F	19B	29
5	I	22	30
Unit 6 - Mid Sperrins (O= Owenkillew/ Owenreagh sub-unit; G= Glenelly sub-unit)			
* 60	D	14	31
* 60	E	19A	32
* 60	F	19B	33
* 60	F	19B	34
* 60	F	19B	35
* 60	F	19B	36
* 60	F	19B	37
* 60	F	19B	38
* 60	G	21	39
* 60	H	20	40
60	I	22	41

60	J	23	42
60	J	23	43
* 6G	E	19A	44
* 6G	E	17	45
* 6G	E	17	46
* 6G	G	21	47
* 6G	H	20	48
6G	I	22	49
6G	I	22	50
6G	J	23	51
6G	J	23	52
6G	J	23	53
6G	J	23	54
6G	J	23	55
Unit 7 - Murrins			
7	F	19B	56
7	F	19B	57
Unit 8 - Gortin			
8	D	13	58
8	E	19A	59
8	E	19A	60
8	E	19A	61
8	E	19A	62
8	E	19A	63
* 8	F	19B	64
8	I	22	65
8	J	23	66
8	J	23	67
Unit 9 - Strule Valley			
9	D	15	68
9	B	7	69
9	D	15	70
9	D	13	71
9	B	8	72
9	D	15	73
9	A	10	74
9	B	6	75
9	E	19A	76
9	G	21	77
Unit 10 - Northwest			
10	D	15	78
10	E	19A	79
10	E	18	80
10	E	19A	81
10	E	19A	82
10	G	21	83
10	G	21	84
10	G	21	85
10	H	20	86
10	H	20	87
10	H	20	88
10	H	20	89
10	H	20	90
10	H	20	91
10	H	20	92
10	I	22	93
10	J	23	94
10	J	23	95
10	J	23	96

Appendix 5 Field data recording sheets.

DEPARTMENT OF ENVIRONMENTAL STUDIES
UNIVERSITY OF ULSTER

THE SPERRINS AND NORTH DERRY LANDSCAPE ECOLOGICAL STUDY
FIELD DATA SHEET

O.S. Grid ref [REDACTED]
Unit 1B (North Derry)
Land Class C/16
Field Sample Square No. 12
Date Surveyed 22/4/88
Surveyor RM/TMcC

These maps, pg 149-153, have been removed to preserve the confidentiality of the sample square locations.

TYPE

01.	Broadleaf woodland, seminatural
02.	Broadleaf woodland, plantation
03.	Coniferous woodland, seminatural
04.	Coniferous woodland, plantation
05.	Mixed woodland, seminatural
06.	Mixed woodland, plantation
07.	Dense scrub
08.	Scattered scrub
09.	Parkland
10.	Scattered/isolated trees
11.	Lines of trees

LANDSCAPE

12.	Riverside	18.	Flat
13.	Field	19.	Sloping
14.	Farm buildings	20.	Steep
15.	Roadside	21.	Hill top
16.	Danescne	22.	Escarpment
17.	Coast	23.	Valley bottom

STRUCTURE

24.	Woodland height 0-1m
25.	1-3m
26.	3-10m
27.	>10m

GROUND FLORA

28.	Species-rich ground flora
29.	Species-poor ground flora
30.	Grass dominated flora
31.	Other

SOILS

32.	Waterlogged peat
33.	Drained peat
34.	Wet mineral
35.	Drained mineral
36.	Chalk/limestone

MANAGEMENT

37.	Unmanaged	42.	Felling
38.	Managed	43.	Shelter
39.	Thinning	44.	Grazed
40.	Coppice	45.	Planting
41.	Unenclosed	46.	Other
		47.	Amenity

Landclass		Square		Unit		Filename																	
1C		1,2		1,8		N.D.W.O.D.O.D.A.T																	
Par	Area (ha)	Typ	Land		Str	Gr	Soi	Manag.				Undrst.			Regen.			Trees					
			1	2				1	2	3	1	2	3	1	2	3	4						
6	8		13	15	17	19	21	23	25	27	29	31	33	36	39	42	45	48	51	54	57	60	62
01	00.33	0.7	1.5	1.8	2.6	2.9	3.5	3.7	4.1				RUF				SASPRS			SASPRS	GRAMSAE		
02	00.44	0.4	1.3	2.0	2.5	3.0	3.5	3.8									SASPRS			PIS			
03																							
04																							
05																							
06																							
07																							
08																							
09																							
10																							
11																							
12																							
13																							
14																							
15																							
16																							
17																							
18																							
19																							
20																							
21																							
22																							

SEMINATURAL VEGETATION

GRASSLAND

01. Species-rich dry grassland
02. Species-rich wet grassland
03. Bent/fescue hill pasture
04. Mat grass hill pasture
05. Molinia grassland
06. Calcareous grassland

HEATH

07. Gorse heath-continuous
08. -scattered
09. Ericaceous heath
10. Wet heath
11. Lichen/bryophyte heath
12. Dry heath/grassland mosaic
13. Wet heath/grassland mosaic
57. Mixed upland vegetation
58. Gorse heath/bracken mosaic

MIRE

14. Wet bog
15. Dry bog
16. Poor fen/peaty flush
17. Reedbeds
18. Fen/swamp
19. Freshwater vegetation

COASTAL

20. Intertidal
21. Saltmarsh
22. Shingle gravel/ridge
23. Strandline
24. Fore-dune
25. Dune grassland
26. Dune heath
27. Dune scrub
28. Bird cliff vegetation
29. Crevice/ledge vegetation
30. Cliff top grassland
31. Cliff top heathland
59. Dune slack vegetation

TALL HERB/FERN

32. Bracken - continuous
33. - scattered
34. Ruderal
35. Other

Landclass Square Unit

1 2 3 4 5

Par	Area (ha)	Type	Struct.				Manag.				Species			
			1	2	3	4	1	2	3	4	1	2	3	4
8	8	13	15	17	19	21	23	25	27	29	31	34	37	40
01	0.0	0.5	1.3	4.1	6.0									
02	0.0	0.0	1.2	4.1										
03	0.0	2.4	0.8	3.6										
04														
05														
06														
07														
08														
09														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														

Filename

M.D.S.E.N.T.O.D.A.H

BOUNDARIES

TYPE

01. Boundary removed
02. Hedge bank
03. Hedgerow
04. Dry stone wall (old)
05. Dry stone wall (new)
06. Ruined dry stone wall
07. Mortar/brick/concrete wall
08. Hedge on wall
09. Stone heap
10. Earth bank
11. Wood post and wire fence
12. Other fence
24. Vernacular gatepost

STRUCTURE

13. Boundary with gaps
14. Boundary with filled gaps
15. Boundary complete
16. Hedge with scattered shrubs
17. Hedge with overgrown shrubs
18. With wood post and rail fence
19. With other fence
20. Species rich
21. Permanently wet ditch
22. Seasonally wet ditch
23. Managed

Landclass Square Unit

1 2 3 4 5

Filename

M.D.S.E.N.T.O.D.A.H

Par	Len m	Typ	Struct					Shrubs			Trees 2-5m			Trees >5m		
			1	2	3	4	5	1	2	3	1	2	3	1	2	3
6	8	11	13	15	17	19	21	23	26	29	32	35	38	41	44	47
01	0.4	0.8	1.6					12.3	C.A.M.F.R.E.		U.L.S.			14.0	F.R.E.A.C.	
02	0.4	0.8	1.6						C.A.M.							
03	0.1	0.4	1.5						R.U.F.F.R.E.S.A.S.							
04																
05																
06																
07																
08																
09																
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28																
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30																
31																
32																
33																

AGRICULTURE

CROPS		HORTICULTURE	
01.	Wheat	12.	Orchard
02.	Barley	13.	Soft fruit
03.	Oats	14.	Vegetables
04.	Potatoes	15.	Flowers
05.	Brassicas	16.	Other
06.	Legumes		
31.	Root crops		
07.	Italian ryegrass		
08.	Perennial ryegrass		
09.	Mixed species		
10.	Ploughed/fallow		
11.	Other grassland		

MANAGEMENT/STRUCTURE	
17.	Conservation hay/silage
18.	Grazed
19.	Reclamation
20.	Rush infested
21.	Weed infested (broadleaf)
22.	Drainage
23.	Neglected
24.	New sown
31.	Erosion

FARM ANIMALS			
25.	Store cattle	32.	Calves
26.	Dairy cattle	33.	Lambs
27.	Suckler Cattle	34.	Horses
28.	Sheep	35.	Pigs
29.	Donkey	36.	Poultry
38.	Goat	37.	Geese

Landclass Square Unit

1 2 3 4 5

Filename

MOA.A.M.D.S.A.

Par	Area (ha)	Typ	Man/struct	Animals	Species	Par	Area (ha)	Typ	Man/struct	Animals	Species
				Typ No	1 2 3					Typ No	1 2 3
0.1	0.0	1	1	1	1	25	0.0	1	1	1	1
0.2	0.0	1	1	1	1	26	0.0	1	1	1	1
0.3	0.0	1	1	1	1	27	0.0	1	1	1	1
0.4	0.0	1	1	1	1	28	0.0	1	1	1	1
0.5	0.0	1	1	1	1	29	0.0	1	1	1	1
0.6	0.0	1	1	1	1	30	0.0	1	1	1	1
0.7	0.0	1	1	1	1	31	0.0	1	1	1	1
0.8	0.0	1	1	1	1	32	0.0	1	1	1	1
0.9	0.0	1	1	1	1	33	0.0	1	1	1	1
1.0	0.0	1	1	1	1	34	0.0	1	1	1	1
1.1	0.0	1	1	1	1	35	0.0	1	1	1	1
1.2	0.0	1	1	1	1	36	0.0	1	1	1	1
1.3	0.0	1	1	1	1	37	0.0	1	1	1	1
1.4	0.0	1	1	1	1	38	0.0	1	1	1	1
1.5	0.0	1	1	1	1	39	0.0	1	1	1	1
1.6	0.0	1	1	1	1	40	0.0	1	1	1	1
1.7	0.0	1	1	1	1	41	0.0	1	1	1	1
1.8	0.0	1	1	1	1	42	0.0	1	1	1	1
1.9	0.0	1	1	1	1	43	0.0	1	1	1	1
2.0	0.0	1	1	1	1	44	0.0	1	1	1	1
2.1	0.0	1	1	1	1	45	0.0	1	1	1	1
2.2	0.0	1	1	1	1	46	0.0	1	1	1	1
2.3	0.0	1	1	1	1	47	0.0	1	1	1	1
2.4	0.0	1	1	1	1	48	0.0	1	1	1	1

LANDSCAPE

URBAN-RURAL ARTEFACTS	
01.	Urban area
02.	New urban
03.	New domestic building
04.	New agricultural building
35.	Other new buildings
37.	Vernacular building
38.	Historic monument
07.	Silo
05.	New metalled road
06.	New unmetalled road
07.	Silo
42.	Pylon

DERELICTION	
08.	Derelict farm building (vernacular)
09.	Derelict modern building
10.	Derelict industrial building
11.	Abandoned road/track
12.	Old railway
13.	Domestic rubbish
14.	Commercial rubbish
36.	Other rubbish
15.	Litter
16.	Spill
17.	Abandoned vehicles
18.	Land fill
19.	Bare/disturbed ground
20.	Quarry- used
21.	disused

RECREATION	
22.	Recreation trails
23.	Path/track erosion
24.	Managed footpath
25.	Land erosion
26.	Amenity grassland
27.	Caravan park/camping
39.	Car park/layby
40.	Roadside verge

EXPOSURE	
29.	Sea Cliff
30.	Inland Cliff
31.	Scree
32.	Rock outcrops
33.	Surface boulders
34.	River bank canalised
41.	Moraine

Landclass Square Unit

1 2 3 4 5

Filename

MOA.A.M.D.S.A.

Par	Area (ha)	Length (m)	U-R Type	Dereltn	Recrtn	Expos
				1 2 3 4	1 2 3 4	1 2 3 4
0.1	0.0	0.0	3.7			
0.2	0.0	0.0	0.8			
0.3	0.0	0.0	1.3			
0.4	0.0	0.0	3.5			
0.5	0.0	0.0				
0.6	0.0	0.0				
0.7	0.0	0.0				
0.8	0.0	0.0				
0.9	0.0	0.0				
1.0	0.0	0.0				
1.1	0.0	0.0				
1.2	0.0	0.0				
1.3	0.0	0.0				
1.4	0.0	0.0				
1.5	0.0	0.0				
1.6	0.0	0.0				
1.7	0.0	0.0				
1.8	0.0	0.0				
1.9	0.0	0.0				

[illegible]

Appendix 6. Field data sheet descriptors

Self-evident items on the field data sheets are not described.

1. Woodland

1.1 Type

1. Seminatural broadleaf woodland: woodland which has not been planted and where conifers comprise <10% of trees.
2. Seminatural mixed woodland: woodland which has not been planted, comprising broadleaf species with planted conifers as a minor (<10%) component.
3. Scrub: immature seminatural broadleaf woodland and scrub cover. The category includes both dense and scattered scrub but excludes gorse scrub without trees.
4. Coniferous plantation: planted stands with uniform age structure, primarily (<90%) of conifer species. Sites include new plantings and mature plantations.
5. Broadleaf plantation: planted stands of broadleaf trees with <10% conifers.
6. Parkland: scattered individual, usually mature trees, mainly >10m apart with pasture or amenity grassland beneath.
7. Mixed plantation: primarily planted stands comprising 10-90% broadleaf or conifer species.
8. Scattered, isolated trees: occur singly or in small groups (<10m²).
9. Lines of trees: one tree wide.

1.2 Structure

Height: mean height of woodland canopy.

1.3 Ground flora

Species-rich: high plant species diversity, particularly of forbs.

Species-poor: low plant species diversity or predominantly bare ground.

1.4 Management

Unenclosed: open to farmstock on at least one side.

2. Seminatural vegetation

2.1 Type

1. Coastal vegetation: saltmarsh, shingle/gravel ridge, strandline, fore-dunes, dune grassland, dune scrub, bird cliff vegetation, coastal crevice/ledge vegetation and cliff top grassland/heath vegetation with maritime species.
2. Species-rich dry grassland: unimproved grassland, moderately well drained and forb-rich where ryegrass species are absent. The grasses crested dog's-tail, bent, fescue and sweet vernal are usually conspicuous, together with yellow rattle.
3. Species-rich wet grassland: unimproved, poorly drained grassland containing soft rush and/or compact rush with an abundance of forbs. These include creeping buttercup, cuckoo flower, meadowsweet, marsh marigold and lesser spearwort. The grasses sweet vernal-grass and Yorkshire fog

- are also usually present. The category includes some grassland with abundant forbs but dominated by sharp rush. This type occurred on the wettest soils.
4. Ruderal vegetation: vegetation associated with disturbed or waste ground. Species commonly found include nettle, bramble, thistle and dock.
 5. Reedbeds and fen/swamp: vegetation of waterlogged nutrient-rich soils. Reedbeds were recorded infrequently and mainly comprise stands of common reed. Sweet-grass, marsh horsetail, yellow flag, marsh cinquefoil, forget-me-not and marsh marigold are common components of fen/swamp. Rush species also often occur.
 6. Bent/fescue hill pasture: moderately well-drained grassland where bent and fescue are dominant. Sweet vernal-grass, field woodrush, tormentil and yarrow are common components.
 7. Mat-grass hill pasture: grassland where mat-grass is co-dominant. Sweet vernal-grass is usually associated. This vegetation type is often intermediate to dry bog comprising rush species, sedges and moss.
 8. Bracken: areas where bracken is dominant or more dispersed but invading other vegetation types, principally grassland. The category combines continuous and scattered bracken recorded on the data sheets.

9. Gorse: areas where European gorse is dominant or more dispersed but invading other vegetation types, principally grassland. For analytical purposes, continuous and scattered gorse and a small amount of gorse/bracken mosaic have been combined with this category. Gorse is taken to be dominant.
10. Wet heath: an even dominant cover of ling heather in association with wetland species as a sub-dominant component. Cotton grasses, purple moor-grass, heath rush, deer-grass, wavy hair-grass and mosses are commonly present but not dominant. The ericaceous shrubs cross-leaved heath and bilberry occur occasionally as co-dominants with ling heather.
11. Wet heath mosaic: mainly ling heather forming a patchy mosaic with other wetland species or mat-grass. Included in this category for analytical purposes is a small amount of ericaceous heath mosaic (see below) found in North Derry.
12. Ericaceous heath and ericaceous heath mosaic: even dominant cover of ling heather in association with other ericaceous shrubs or ling heather forming a patchy mosaic with bent-fescue hill pasture.
13. Dry bog: less wet peat comprising a mixture of wetland species from other vegetation types and a grass component. Bog-moss, cotton-grass, Polytrichum, rush species and deer-grass are the

main species. Sweet vernal grass, wavy hair-grass, mat-grass and purple moor-grass are common components. Heather is not predominant. Land dominated by purple moor-grass, often found as a mosaic with dry bog, have been included in this category for analytical purposes.

14. Mixed upland vegetation: similar to dry bog on moderately wet sites, usually with shallow peat, but containing bilberry as a dominant. This is included with dry bog for analytical purpose.

15. Poor-fen: rush-dominated vegetation over waterlogged peaty soils. It is divided into two types. Where soft rush is dominant, sedges, bog-moss, tormentil, Polytrichum, Rhytidiadelphus, common sorrel and marsh rag-weed, are usually associated. Where sharp flowered-rush is dominant or co-dominant with soft-rush, associated species include sedges, tormentil, bog-moss, marsh violet and common sorrel.

The grass species sweet vernal-grass and Yorkshire fog occur with both types. Poor-fen or peaty flush dominated by sedges, generally without dominant rush species have been included in the sharp flowered-rush category.

On drier sites, grasses such as sweet vernal-grass, fescue or mat-grass are more prominent, whereas more acidic sites contain bog-moss and Polytrichum.

Base-rich sites usually at lower elevations, may be species-rich.

16. Wet bog: waterlogged peat comprising bog-moss, cotton grasses and ling heather as dominants. Heath-rush, deer-grass, bog asphodel and soft-rush are common components.

2.2 Structure

1. Mosaic: vegetation containing patches of different species or vegetation types or a patchy distribution of the main type.
2. Disturbed: Bare ground or vegetation with bare patches, created by either animals, machines or burning.

3.0 Field boundaries

1. Boundary removed: boundaries shown as present on the 1:10,000 O.S. maps but absent at the time of survey.
2. Hedge: a linear boundary comprising shrubs.
3. Hedgebank: a hedge associated with either an earth bank, or a wall bank.
4. Hedgerow: a hedge not associated with a bank.
5. Stockproof hedge: a complete hedge with no gaps.
6. Hedge with gaps: a hedge with gaps forming <10% of its length.
7. Scattered shrubs: a hedge with gaps forming >10% of its length. It is generally not stockproof unless the gaps have been filled with wire strands or miscellaneous items.

8. Overgrown shrubs: a hedge with shrubs >2m tall and gaps between adjacent individuals, especially near the base. It is also generally not stockproof.
9. Managed hedge: a hedge with signs of recent cutting or trimming.
10. Dry stone wall: a stone wall constructed without mortar.
11. Maintained dry stone wall: a complete wall with less than 2 gaps or gaps forming <15% of its length.
12. Dry stone wall with gaps: an otherwise maintained wall with more than 2 gaps or >15% of its length with gaps.
13. Ruined dry stone wall: a mainly derelict wall with no agricultural function.
14. Hedge on wall: a hedge planted on top of a dry stone wall.
15. Mortar, brick or concrete wall: a stone wall constructed with mortar or made from brick or concrete.
16. Bank: an earth bank or an earth bank with a dry stone component on one side with no accompanying planted shrubs.
17. Post and wire fence: mainly comprising fences of wood post and wire but also concrete post and wire alone or in association with other boundary types.

4. Agricultural Land

4.1 Type

1. Italian/perennial ryegrass: relatively recently sown grassland with these species.
2. Perennial ryegrass: grassland in which perennial ryegrass is dominant. Timothy and white clover are commonly sown with perennial ryegrass.
3. Mixed species grassland: long established grassland comprising various forbs and grass species especially crested dog's-tail and usually but not always some perennial ryegrass.
4. Other grassland: occurs mainly on less well-drained soils or shallow peat. The principal species are sweet vernal-grass, rough-stalked meadow-grass, bent, Yorkshire fog, white clover, creeping buttercup and daisy. On the poorest soils often at higher elevation, sweet vernal-grass is notably abundant together with tormentil, blinks, procumbent pearlwort and mosses.
5. Arable and fallow land: Mainly barley and potatoes with some brassicas and other cereals. Some land had no grass or crop at the time of survey.

4.2 Management/Structure

1. Reclamation: reseeding or cultivation of seminatural vegetation.
2. Rush infested: species ubiquitous and forming a major component of sward.

3. Broadleaf infested: either nettle ragwort, dock or thistle ubiquitous and forming a major component of the sward.

4. Drainage: either open or closed drains.

5. Neglected: under-utilized, rank vegetation.

5. Landscape

1. Urban area and domestic building: land forming part of towns or areas developed for housing other than isolated groups which comprise rural domestic buildings.

2. Derelict building: unmaintained and not used for its primary purpose.

3. Rubbish, litter, spoil, abandoned vehicles: sites of artefact.

Appendix 7 Species codes used on the field data sheets together with botanical and common names.

Code	Botanical name	Common name
ABG	<i>Abies grandis</i>	Giant fir
ACM	<i>Achillea millifolium</i>	Yarrow
ACP	<i>Acer pseudoplatanus</i>	Sycamore
ACR	<i>Acer rubrum</i>	Red maple
AEH	<i>Aesculus hippocastanum</i>	Horse chestnut
AEP	<i>Aegopodium podagraria</i>	Ground elder
AGS	<i>Agrostis</i> spp.	Bent
ALG	<i>Alnus glutinosa</i>	Alder
ALP	<i>Alopecurus pratensis</i>	Common foxtail
AMA	<i>Ammophila arenaria</i>	Marram-grass
AML	<i>Amelanchier laevis</i>	Snowy mespil
ANN	<i>Anemone nemorosa</i>	Wood anemone
ANO	<i>Anthoxanthum odoratum</i>	Sweet vernal-grass
ANS	<i>Anthriscus sylvestris</i>	Cow parsley
AOG	<i>Alopecurus geniculatus</i>	Marsh foxtail
ARA	<i>Araucaria araucana</i>	Monkey-puzzle tree
ARE	<i>Arrhenatherum elatius</i>	False oat-grass
AUM	<i>Arum maculatum</i>	Lords and Ladies
BEP	<i>Bellis perennis</i> (seminat. veg.)	Daisy
BEP	<i>Betula</i> spp. (woodland)	Birch
BES	<i>Berberis</i> spp.	Berberis
BRH	<i>Bromus hordeaceus</i>	Soft brome
BRS	<i>Brachythecium</i> spp.	Moss
CAP	<i>Caltha palustris</i>	Marsh marigold
CAS	<i>Carex</i> spp.	Sedge
CAV	<i>Calluna vulgaris</i>	Ling heather
CHS	<i>Chamaecyparis/Cupressocyparis</i> spp.	Cypress
CIS	<i>Cirsium</i> spp.	Thistle
CLS	<i>Cladonia</i> spp.	Lichen
CMS	<i>Chamomilla suaveolens</i>	Pineapple-weed
COA	<i>Corylus avellana</i>	Hazel
COD	<i>Cochlearia danica</i>	Scurvy-grass
COS	<i>Cotoneaster simonsii</i>	Cotoneaster
CRH	<i>Cardamine hirsuta</i>	Hairy bittercress
CRM	<i>Crataegus monogyna</i>	Hawthorn
CRP	<i>Cardamine pratensis</i>	Lady's smock
CST	<i>Callitriche stagnalis</i>	Water starwort
CUM	<i>Cupressus macrocarpa</i>	Monterey cyprus
CYC	<i>Cynosurus cristatus</i>	Crested dogstail
CYS	<i>Cystisus scoparius</i>	Broom
DAG	<i>Dactylis glomerata</i>	Cocksfoot
DAM	<i>Dactylorhiza maculata</i>	Heath spotted orchid
DEC	<i>Deschampsia caespitosa</i>	Tufted hair-grass
DEF	<i>Deschampsia flexuosa</i>	Wavy hair-grass
DFM	<i>Dryopteris filix-mas</i>	Male fern
DIP	<i>Digitalis purpurea</i>	Foxglove
ELC	<i>Elodea canadensis</i>	Water thyme
EPP	<i>Epilobium palustre</i>	Marsh willowherb
EQS	<i>Equisetum</i> spp.	Horsetail
ERC	<i>Erica cinerea</i>	Bell heather
ERS	<i>Eriophorum angustifolium/vaginatum</i>	Cotton-grass
ERT	<i>Erica tetralix</i>	Cross-leaved heath
ESS	<i>Escallonia</i> spp.	Escallonia
FAS	<i>Fagus sylvatica</i>	Beech
FES	<i>Festuca</i> spp.	Fescue

FIU Filipendula ulmaria
 FRE Fraxinus excelsior
 FUM Fuchsia magellanica
 GAA Gallium aparine
 GAS Galium saxatile
 GLS Glyceria spp.
 HIS Hieracium spp.
 HNS Hyacinthoides non-scriptus
 HOL Holcus lanatus
 HOM Holcus mollis
 HYS Hylocomium splendens
 ILA Ilex aquifolium
 IMG Impatiens glandulifera
 IRP Iris pseudacorus
 JNS Juncus squarrosus
 JUA Juncus acutiflorus/articulatus
 JUB Juncus bufonius
 JUG Juncus gerardii
 JUS Juncus effusus/conglomeratus
 LAD Larix decidua
 LAP Lathyrus pratensis
 LBS Laburnum spp.
 LFC Lychnis flos-cuculi
 LIO Ligustrum ovalifolium
 LIV Ligustrum vulgare
 LOC Lotus corniculatus
 LOM Lolium multiflorum
 LOP Lolium perenne
 LUC Luzula campestris
 LUO Lotus uliginosus
 LUS Luzula sylvatica
 MAS Malus sylvestris
 MEP Mercurialis perennis
 MET Menyanthes trifoliata
 MOC Molinia caerulea
 MOF Montia fontana
 MYG Myrica gale
 MYS Myosotis spp.
 NAO Nasturtium officinale
 NAS Nardus stricta
 NRO Narthecium ossifragum
 OXA Oxalis acetosella
 PEA Potentilla anserina
 PES Pedicularis sylvatica
 PHA Phalaris arundinacea
 PHC Phragmites australis
 PHP Phleum pratense
 PIA Picea abies
 PIC Pinus contorta
 PIN Pinus nigra
 PIS Picea sitchensis
 PLL Plantago lanceolata
 PNS Pinus sylvestris
 POA Poa annua
 POC Polytrichum commune
 POD Prunus domestica
 POE Potentilla erecta
 PON Potamogeton natans
 POP Poa pratensis
 POS Populus spp.

Meadowsweet
 Ash
 Fuchsia
 Cleavers
 Heath bedstraw
 Sweet-grass
 Hawkweed
 Bluebell
 Yorkshire fog
 Creeping soft-grass
 Moss
 Holly
 Himalayan balsam
 Yellow flag
 Heath rush
 Sharp flowered/jointed rush
 Toad rush
 Saltmarsh rush
 Soft rush/compact rush
 Larch
 Meadow vetchling
 Laburnum
 Ragged robin
 Garden privet
 Privet
 Birdsfoot trefoil
 Italian ryegrass
 Perennial ryegrass
 Field rush
 Greater birdsfoot trefoil
 Great wood rush
 Crab apple
 Dog's mercury
 Bogbean
 Purple moor-grass
 Blinks
 Bog myrtle
 Forget-me-not
 Water cress
 Mat-grass
 Bog asphodel
 Wood sorrel
 Silverweed
 Lousewort
 Reed canary-grass
 Common reed
 Timothy
 Norway spruce
 Lodgepole pine
 Corsican pine
 Sitka spruce
 Ribwort plantain
 Scot's pine
 Annual meadow-grass
 Moss
 Plum
 Tormantil
 Broad-leaved pondweed
 Smooth-stalked meadow-grass
 Poplar

POT Poa trivialis
 PRA Prunus avium
 PRC Prunus cerasifera
 PRL Prunus laurocerasus
 PRP Prunus padus
 PRS Prunus spinosa
 PRV Primula vulgaris
 PTA Pteridium aquilinum
 PTP Potentilla palustris
 PUS Puccinellia spp.
 PUV Prunella vulgaris
 PYP Polygonum persicaria
 QUS Quercus spp.
 RAA Ranunculus acris
 RAF Ranunculus ficaria
 RAR Ranunculus repens
 RAS Rhacomitrium lanuginosum
 RBS Rubus spectabilis
 REJ Reynoutria japonica
 RHM Rhinanthus minor
 RHP Rhododendron ponticum
 RHS Rhytidadelphus spp.
 RIC Ribes uva-crispa
 RIS Ribes sanguineum
 RNA Ranunculus aquatilis
 RNF Ranunculus flammula
 ROS Rosa canina/tomentosa
 RUA Rumex acetosa
 RUF Rubus fruticosus
 RUS Rumex spp.
 SAN Sambucus nigra
 SAP Sagina procumbens
 SAS Salix spp.
 SCC Scirpus caespitosus
 SEA Senecio aquaticus
 SEJ Senecio jacobea
 SES Sequoia sempervirens
 SEV Senecio vulgaris
 SOA Sorbus aucuparia
 SPI Spiraea spp.
 SPS Sphagnum spp.
 SPT Spartina townsendii
 SRA Sorbus aria
 STM Stellaria media
 SYM Symphoricarpos rivulare
 TAB Taxus baccata
 TAO Taraxacum officinalis
 THP Thuja plicata
 TIS Tilia spp.
 TRA Triticum aestivum
 TRP Trifolium pratense
 TRR Trifolium repens
 ULE Ulex europaeus
 ULS Ulmus spp.
 URD Urtica dioica
 VAM Vaccinium myrtillus
 VEB Veronica beccabunga
 VIP Viola palustris
 VIR Viola riviniana
 VIS Vicia sepium

Rough-stalked meadow-grass
 Gean
 Cherry plum
 Cherry laurel
 Bird cherry
 Blackthorn
 Primrose
 Bracken
 Marsh cinquefoil
 Saltmarsh-grass
 Selfheal
 Redshank
 Oak
 Meadow buttercup
 Celandine
 Creeping buttercup
 Moss
 Wild raspberry
 Japanese knotweed
 Yellow rattle
 Rhododendron
 Moss
 Gooseberry
 Flowering currant
 Common water crowfoot
 Lesser spearwort
 Wild rose
 Common sorrel
 Bramble
 Dock
 Elder
 Pearlwort
 Willow
 Deer-grass
 Marsh ragweed
 Ragweed
 Coast redwood
 Groundsel
 Rowan
 Spiraea
 Bog-moss
 Townsend's cord-grass
 Whitebeam
 Chickweed
 Snowberry
 Yew
 Dandelion
 Western red cedar
 Lime
 Wheat
 Red clover
 White clover
 European gorse
 Elm
 Nettle
 Bilberry
 Brooklime
 Marsh violet
 Dog violet
 Bush vetch

Appendix 8 Field data sheets and map archive.

The originals are held by the Department of Environmental Studies, University of Ulster and copies by the Countryside and Wildlife Branch, Department of the Environment for Northern Ireland.

Appendix 9 The computer data base.

The field data is stored in the form of dBASE III PLUS (Ashton-Tate 1985) data base files on floppy disks. These are suitable for use on an IBM personal computer or some compatible machine. The files, together with the field data sheets, are held by the Department of Environmental Studies, University of Ulster and the Countryside and Wildlife Branch, Department of the Environment for Northern Ireland. Each main resource type described on the data sheet is held on disk as follows:

<u>Resource</u>	<u>Data base file (.DBF)</u>		
	North Derry AONB	Sperrins AONB	Sperrin valleys study area
Woodland	NDWOOD.DBF	SPWOOD.DBF	SVAWOOD.DBF
Seminatural vegetation	NDSENT.DBF	SPSENT.DBF	SVASENT.DBF
Field boundaries	NDBOUN.DBF	SPBOUN.DBF	SVABOUN.DBF
Agriculture	NDAGRI.DBF	SPAGRI.DBF	SVAAGRI.DBF
Landscape attributes	NDLAND.DBF	SPLAND.DBF	SVALAND.DBF

Data base fields and numeric codes are detailed on the field data sheets in Appendix 5. All records in each file are indexed in numerical order by unit, square number and parcel number with index (.NDX) files.

Report form files (.FRM) group records separately by unit and square number and lists data from specified fields either on screen or to the printer when used with the dBASEIII software.

Appendix 10. Statistical summary

With such a wide variation in the frequency, amount and distribution patterns of resources, cases of undersampling and oversampling of particular types is inevitable unless different sampling strategies are used for each resource type. Separate sampling strategies matched to different resources have not been used so far in our work, mainly because they are costly and often inappropriate, given the large size of the areas studied and the range of resources recorded.

A sampling intensity of about 2.5% by area, however, has been shown by validation tests, carried out in the present and previous studies, to give a reasonable estimate of the more common, widely spread resources such as coniferous forest, seminatural broadleaf woodland, peatlands, agricultural grasslands and crops. Sampling intensity in the Sperrins was rather less at 2.2%.

The purpose of this section of the report is to provide an indication of the variation that exists in a range of resource types. It is not intended that the information should be used in a conventional sense to test the significance of differences in means although we have carried out analysis of variance. Conventional significance tests are not altogether appropriate since in many cases the data do not usually conform to conditions of normality. Data sets are generally positively skewed, a feature that is accentuated by zero values. The more ubiquitous resources of moderate abundance, however, do tend more towards normality.

Upper and lower quartiles, maximum, minimum and median

values have been calculated for selected resources (Tables 51 & 52). Running means are also presented (Tables 53-55) and show that variation in final mean values for the Sperrins is minimal in each combined land class group. There is greater variation in North Derry, despite a greater sampling intensity (4.6%), largely due to greater environmental heterogeneity and the clumped distribution of resources (Table 55).

Analysis of variance between land class groups in the Sperrins is presented in Table 56. Only selected resource types have been tabulated. Significant differences between means are linked to variation in physical differences between the land class groups and landscape units. The reasons for non-significant differences between means is also usually apparent, for example, the ubiquitous distribution of wet bog in the Sperrins, the small area and low frequency of species-rich wet grassland and the distribution of coniferous forests as a small number of large plantations.

Table 51 Statistical summary of selected landscape resources and field boundary types in sample squares of the Sperrins AONB. Results are expressed as a percentage mean area for landscape resources and length (km) per square kilometre for field boundaries. Max: maximum recorded value. UQ: upper quartile. Median. LQ: lower quartile. Min: minimum recorded value.

Seminatural broadleaf woodland						Coniferous plantation					
Land class group						Land class group					
	A-D	E-F	G-H	I-J	AONB		A-D	E-F	G-H	I-J	AONB
max	21.5	9.6	7.2	0	21.5	max	0.2	92.8	44.7	87.2	92.8
UQ	6.6	1.5	0.4	0	0.9	UQ	0	1.4	0.3	0	0.3
median	2.6	0	0	0	0	median	0	0	0	0	0
LQ	0.7	0	0	0	0	LQ	0	0	0	0	0
min	0	0	0	0	0	min	0	0	0	0	0
Species-rich wet grassland						Wet heath					
	A-D	E-F	G-H	I-J	AONB		A-D	E-F	G-H	I-J	AONB
max	7.4	10.2	10.9	0	10.9	max	0.9	91.8	97.7	100	100
UQ	1.0	0.7	0.5	0	0.1	UQ	0	2.4	17.2	46.9	9.3
median	0	0	0	0	0	median	0	0	1.5	0	0
LQ	0	0	0	0	0	LQ	0	0	0	0	0
min	0	0	0	0	0	min	0	0	0	0	0
Wet bog						Perennial ryegrass					
	A-D	E-F	G-H	I-J	AONB		A-D	E-F	G-H	I-J	AONB
max	94.0	84.7	37.3	100	100	max	86.8	76.4	64.5	13.7	86.8
UQ	0	1.7	3.8	5.9	2.4	UQ	55.6	48.5	19.7	0	32.4
median	0	0	0	0	0	median	43.1	21.6	8.1	0	3.5
LQ	0	0	0	0	0	LQ	30.2	5.2	0	0	0
min	0	0	0	0	0	min	1.1	0	0	0	0
Other grassland						Arable/fallow					
	A-D	E-F	G-H	I-J	AONB		A-D	E-F	G-H	I-J	AONB
max	36.0	66.0	51.0	0.9	66.0	max	33.8	28.5	7.8	0	33.8
UQ	23.6	30.1	20.6	0	18.8	UQ	14.1	2.5	0	0	0
median	13.2	16.6	4.7	0	2.3	median	0.3	0	0	0	0
LQ	3.8	5.7	0	0	0	LQ	0	0	0	0	0
min	0.7	0	0	0	0	min	0	0	0	0	0
Hedgebank with scattered or overgrown shrubs (all conditions)						Earth/wall bank					
	A-D	E-F	G-H	I-J	AONB		A-D	E-F	G-H	I-J	AONB
max	6.5	8.3	3.0	0.3	8.3	max	23.1	23.4	21.6	5.7	23.4
UQ	5.6	2.3	1.1	0	1.8	UQ	13.0	14.9	17.1	0	11.6
median	2.9	1.3	0.3	0	0.2	median	3.3	8.2	9.9	0	3.0
LQ	1.5	0.2	0	0	0	LQ	1.9	5.1	3.2	0	0
min	0	0	0	0	0	min	1.8	0	0	0	0
Wood post & wire and other fence											
	A-D	E-F	G-H	I-J	AONB						
max	12.3	12.4	8.0	6.0	12.4						
UQ	4.4	6.4	3.9	2.7	4.4						
median	1.6	3.7	2.9	1.4	2.5						
LQ	1.0	1.3	2.2	0	1.1						
min	0.7	0	1.3	0	0						

Table 52 Statistical summary of selected landscape resources and field boundary types in sample squares of the North Derry AONB. Results are expressed as a percentage mean area for landscape resources and length (km) per square kilometre for field boundaries. Max: maximum recorded value. UQ: upper quartile. Median. LQ: lower quartile. Min: minimum recorded value.

Seminatural broadleaf woodland				Coniferous plantation			
Landscape unit				Landscape unit			
	1AC	1B	AONB		1AC	1B	AONB
max	1.3	2.6	2.6	max	0.1	78.8	78.8
UQ	0.3	0.4	0	UQ	0	48.3	1.3
median	0	0	0	median	0	0.9	0
LQ	0	0	0	LQ	0	0	0
min	0	0	0	min	0	0	0
Wet bog				Reedbeds, fen and swamp			
	1AC	1B	AONB		1AC	1B	AONB
max	0	97.9	97.9	max	12.5	1.0	12.5
UQ	0	26.8	0	UQ	0.8	0.1	0.4
median	0	0	0	median	0.1	0	0
LQ	0	0	0	LQ	0	0	0
min	0	0	0	min	0	0	0
Other grassland				Hedgebank with scattered or overgrown shrubs (all conditions)			
	1AC	1B	AONB		1AC	1B	AONB
max	73.4	38.9	73.4	max	4.1	17.4	17.4
UQ	34.0	16.8	16.8	UQ	0.2	6.4	1.7
median	5.6	0	2.2	median	0	0.2	0
LQ	0	0	0	LQ	0	0	0
min	0	0	0	min	0	0	0
Earth/ wall bank				Wood post & wire and other fence			
	1AC	1B	AONB		1AC	1B	AONB
max	2.2	8.9	8.9	max	16.0	7.4	16.0
UQ	0.5	2.5	1.9	UQ	13.1	4.3	8.4
median	0	0.4	0	median	8.4	2.3	3.5
LQ	0	0	0	LQ	2.7	2.2	2.2
min	0	0	0	min	0	0.8	0

Table 53 Running means of percentage area with increase in sample size, for selected landscape resources in combined land class groups of the Sperrins AONB.

Seminatural broadleaf woodland

Land class group				
A-D	E-F	G-H	I-J	AONB
2.6	0.8	0.1	0.0	0.6
3.3	5.0	0.6	0.0	2.2
3.0	3.3	0.4	0.0	1.5
3.9	3.1	0.3	0.0	1.6
4.6	2.5	0.2	0.0	1.4
4.0	2.1	1.2	0.0	1.4
3.4	1.8	1.1	0.0	1.2
3.0	1.6	1.8	0.0	1.3
2.8	1.4	1.6	0.0	1.1
4.6	1.3	1.5	0.0	1.3
4.6	1.1	1.3	0.0	1.2
	1.0	1.2	0.0	1.1
	1.0	1.1	0.0	1.1
	1.2	1.0	0.0	1.2
	1.8	1.0	0.0	1.3
	1.7	0.9	0.0	1.3
	1.7	1.0	0.0	1.3
	1.6	0.9	0.0	1.3
	1.6	1.1	0.0	1.3
	1.5	1.1	0.0	1.3
	1.4	1.0	0.0	1.2
	1.4		0.0	1.2
	1.4		0.0	1.2
	1.4		0.0	1.2
	1.7		0.0	1.3
	1.6		0.0	1.3
	1.5		0.0	1.3
	1.5		0.0	1.3
	1.4		0.0	1.2
	1.4		0.0	1.2
	1.4		0.0	1.2

Coniferous plantation

Land class group				
A-D	E-F	G-H	I-J	AONB
0.0	0.0	0.6	0.0	0.1
0.1	0.0	0.3	0.0	0.1
0.0	0.0	0.2	0.0	0.1
0.0	0.0	0.2	16.8	5.6
0.0	0.0	0.1	13.4	4.5
0.0	0.0	7.6	11.2	5.4
0.0	0.0	6.5	22.0	8.7
0.0	11.6	5.7	19.3	11.5
0.0	10.7	5.1	17.1	10.3
0.0	9.7	4.6	15.4	9.3
0.0	8.8	4.1	14.0	8.5
	8.5	3.8	12.9	7.9
	7.9	3.5	11.9	7.3
	7.3	3.3	11.0	6.8
	6.9	3.1	10.3	6.3
	6.4	2.9	9.6	6.0
	6.1	3.1	9.1	5.7
	5.8	2.9	8.6	5.4
	5.6	3.6	8.2	5.3
	5.4	3.4	7.8	5.1
	5.1		9.3	5.5
	5.3		8.9	5.4
	5.3		8.5	5.3
	5.2		8.2	5.2
	5.0		7.8	5.0
	4.8		7.5	4.8
	4.7		7.3	4.7
	4.5		8.8	5.1
	4.4		8.5	5.0
	4.2		8.2	4.8
	4.1		7.9	4.7
	4.0		7.7	4.6

Species-rich wet grassland

A-D	E-F	G-H	I-J	AONB
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.2	0.0	0.0
0.0	0.0	0.1	0.0	0.0
0.6	2.4	0.1	0.0	0.9
0.5	2.0	0.1	0.0	0.7
1.6	1.6	0.1	0.0	0.7
1.4	1.4	0.1	0.0	0.7
1.2	1.2	0.1	0.0	0.6
1.1	1.3	0.3	0.0	0.6
1.1	1.3	0.2	0.0	0.6
1.0	1.2	1.2	0.0	0.8
	1.7	1.1	0.0	0.9
	1.6	1.0	0.0	0.9
	1.5	1.0	0.0	0.8
	1.4	0.9	0.0	0.8
	1.4	0.9	0.0	0.8
	1.4	1.1	0.0	0.8
	1.3	1.0	0.0	0.8
	1.3	1.1	0.0	0.8
	1.2	1.0	0.0	0.7
	1.2	1.0	0.0	0.7
	1.6		0.0	0.9
	1.5		0.0	0.8
	1.5		0.0	0.8
	1.4		0.0	0.8
	1.4		0.0	0.8
	1.3		0.0	0.8
	1.3		0.0	0.8
	1.2		0.0	0.7
	1.2		0.0	0.7
	1.2		0.0	0.7
	1.1		0.0	0.7

Wet heath

A-D	E-F	G-H	I-J	AONB
0.0	0.0	97.7	61.7	41.8
0.0	0.0	48.8	30.9	20.9
0.0	0.0	32.6	26.0	15.7
0.0	0.0	24.4	19.5	11.8
0.0	0.0	20.6	17.2	10.2
0.0	2.9	17.3	21.7	11.9
0.1	2.5	17.9	18.6	10.9
0.1	3.1	15.6	23.8	12.3
0.1	2.8	13.9	29.5	13.7
0.1	2.5	12.5	26.6	12.4
0.1	2.3	11.5	24.2	11.3
	2.1	14.9	22.1	11.3
	2.1	18.9	28.1	14.1
	2.0	18.6	26.1	13.4
	1.8	20.3	29.2	14.7
	1.7	19.0	27.7	13.9
	1.6	17.9	26.1	13.1
	1.5	17.8	24.6	12.5
	1.9	17.2	23.3	12.1
	2.0	16.4	22.2	11.6
	2.3	16.2	21.1	11.3
	2.2		21.3	11.3
	2.1		20.4	11.0
	5.9		19.5	12.0
	5.6		18.7	11.6
	5.5		18.0	11.3
	5.3		20.7	12.2
	5.4		21.7	12.5
	5.2		21.7	12.5
	5.1		22.9	12.8
	5.0		22.9	12.8
	4.8		22.2	12.6

Wet bog

Land class group				
A-D	E-F	G-H	I-J	AONB
0.0	0.0	0.8	1.2	0.5
0.0	0.0	0.4	50.6	16.8
0.0	0.0	12.6	37.3	15.1
0.0	0.0	9.4	36.7	14.2
0.0	0.0	14.4	29.4	12.9
0.0	7.9	12.0	24.5	13.4
13.4	18.9	10.3	21.4	17.2
11.8	16.6	9.0	19.6	15.3
10.4	17.5	8.0	20.2	15.4
9.7	15.7	7.2	21.9	15.1
8.8	14.3	6.6	25.0	15.4
	14.5	6.2	22.9	14.7
	13.4	6.4	21.1	13.8
	12.4	6.0	19.6	12.9
	11.6	8.0	18.5	12.7
	10.9	7.5	17.3	12.0
	10.2	7.1	16.3	11.3
	9.6	6.7	15.4	10.8
	9.1	8.3	14.6	10.7
	9.3	7.9	13.9	10.4
	9.0	7.5	13.2	10.0
	8.6		12.6	9.7
	8.2		12.1	9.4
	7.9		11.6	9.1
	7.6		11.1	8.8
	7.3		10.7	8.6
	7.0		10.3	8.4
	6.9		9.9	8.2
	6.6		10.6	8.4
	6.4		10.2	8.2
	6.8		9.9	8.2
	6.6		9.6	8.1

Other grassland

A-D	E-F	G-H	I-J	AONB
36.0	10.8	0.0	0.0	7.7
19.9	10.9	2.6	0.0	6.5
17.7	10.5	1.8	0.0	5.9
14.3	16.1	2.8	0.0	7.6
16.2	19.2	5.0	0.0	9.3
15.8	16.0	4.9	0.0	8.2
13.7	13.7	8.2	0.0	7.9
12.1	12.0	7.7	0.0	7.1
12.4	12.5	12.5	0.0	8.4
12.3	13.5	15.0	0.0	9.2
14.4	12.3	13.8	0.0	8.8
	12.6	12.6	0.0	8.6
	12.9	11.7	0.0	8.5
	15.9	10.8	0.0	9.3
	19.2	10.1	0.0	10.3
	19.3	9.7	0.0	10.2
	20.5	10.3	0.1	10.7
	21.9	10.1	0.0	11.2
	21.8	9.6	0.1	11.0
	20.9	10.3	0.1	10.9
	20.2	11.4	0.1	10.9
	20.3		0.1	10.9
	20.9		0.1	11.1
	20.0		0.1	10.8
	19.3		0.0	10.6
	20.0		0.0	10.6
	20.1		0.0	10.9
	20.4		0.0	10.9
	20.2		0.0	10.9
	19.7		0.0	10.7
	19.5		0.0	10.7

Perennial ryegrass

Land class group				
A-D	E-F	G-H	I-J	AONB
45.0	76.4	14.6	0.0	33.8
50.3	70.0	16.5	0.0	32.7
47.9	50.3	11.0	0.0	24.7
49.2	47.2	8.3	0.0	23.2
45.2	43.6	6.6	0.0	21.2
48.7	36.4	7.9	0.0	19.4
41.9	31.2	6.7	0.0	16.7
47.5	27.3	6.9	0.0	16.1
45.6	26.4	7.8	0.0	15.8
44.4	29.0	9.3	0.0	16.8
44.0	26.4	14.3	0.0	17.0
	26.0	14.2	0.0	16.8
	25.3	13.4	0.0	16.4
	25.0	12.5	0.0	16.1
	23.9	11.6	0.0	15.6
	24.8	14.7	0.0	16.5
	25.6	15.5	0.0	17.0
	24.8	14.8	0.0	16.5
	25.4	14.0	0.7	16.8
	25.7	15.1	0.7	17.1
	24.4	14.4	0.7	16.6
	23.7		0.6	16.3
	23.4		0.6	16.2
	22.5		0.6	15.9
	23.6		0.5	16.2
	24.7		0.5	16.6
	23.8		0.5	16.3
	24.4		0.5	16.5
	25.6		0.5	16.9
	26.7		0.5	17.3
	26.0		0.4	17.0
	27.0		0.4	17.3

Arable/ fallow

A-D	E-F	G-H	I-J	AONB
0.0	8.8	0.0	0.0	2.9
7.1	4.7	0.0	0.0	2.4
12.4	3.1	0.0	0.0	2.5
9.3	2.4	0.0	0.0	1.9
7.5	1.9	0.0	0.0	1.5
6.3	1.6	0.0	0.0	1.2
5.4	1.3	0.0	0.0	1.1
5.5	1.2	0.3	0.0	1.1
8.7	1.0	0.2	0.0	1.4
8.3	1.4	0.2	0.0	1.5
7.5	1.3	0.9	0.0	1.5
	1.2	0.8	0.0	1.4
	1.1	0.8	0.0	1.4
	1.4	0.7	0.0	1.5
	1.5	0.7	0.0	1.5
	1.4	0.8	0.0	1.5
	1.3	0.7	0.0	1.4
	1.2	0.7	0.0	1.4
	1.2	0.6	0.0	1.4
	1.3	0.6	0.0	1.4
	1.2		0.0	1.4
	1.1		0.0	1.4
	2.2		0.0	1.7
	2.1		0.0	1.7
	2.1		0.0	1.7
	2.0		0.0	1.7
	2.0		0.0	1.7
	2.6		0.0	1.9
	2.6		0.0	1.9
	2.6		0.0	1.9

Table 54 Running means of lengths (km) per square kilometre with increase in sample size, for selected field boundary types in combined land class groups of the Sperrins AONB.

Hedgebank with scattered or overgrown shrubs(all conditions)

Land class group				
A-D	E-F	G-H	I-J	AONB
1.3	1.2	0.0	0.0	0.5
3.4	2.7	1.5	0.0	1.6
4.0	2.2	1.0	0.0	1.4
4.6	3.2	1.0	0.0	1.8
4.1	2.8	0.8	0.0	1.6
4.5	2.4	1.0	0.0	1.5
3.8	2.0	1.1	0.0	1.4
3.9	1.8	1.0	0.0	1.3
3.7	1.7	1.1	0.0	1.2
3.5	1.8	1.0	0.0	1.2
3.4	1.6	1.0	0.0	1.2
	1.5	0.9	0.0	1.1
	1.5	0.9	0.0	1.1
	1.5	0.8	0.0	1.1
	1.5	0.7	0.0	1.1
	1.6	0.7	0.0	1.1
	1.5	0.8	0.0	1.1
	1.5	0.8	0.0	1.0
	1.4	0.7	0.0	1.0
	1.4	0.7	0.0	1.0
	1.4	0.7	0.0	1.0
	1.4		0.0	1.0
	1.7		0.0	1.1
	1.6		0.0	1.1
	1.6		0.0	1.1
	1.6		0.0	1.1
	1.6		0.0	1.1
	1.8		0.0	1.2
	1.8		0.0	1.2
	1.8		0.0	1.2
	2.0		0.0	1.2

Earth/wall bank

Land class group				
A-D	E-F	G-H	I-J	AONB
20.0	19.1	4.2	0.0	9.6
11.6	12.3	11.0	0.0	7.9
8.7	15.1	7.4	0.6	7.8
7.0	15.1	8.2	0.5	7.8
10.2	12.3	8.7	0.4	7.3
9.7	10.4	8.9	0.4	6.7
8.6	8.9	10.7	0.4	6.4
7.7	7.8	10.2	0.3	5.8
7.1	7.1	10.0	0.3	5.5
6.7	8.3	10.9	0.3	6.0
7.3	7.6	11.5	0.2	5.9
	7.5	10.6	0.2	5.7
	7.5	9.8	0.2	5.5
	7.9	9.2	0.2	5.5
	8.5	8.7	0.2	5.6
	8.7	9.1	0.2	5.8
	9.4	9.3	0.2	6.1
	9.4	9.2	0.2	6.0
	9.6	9.0	0.5	6.1
	9.4	9.4	0.5	6.2
	9.2	9.9	0.6	6.3
	9.2		0.5	6.2
	9.2		0.5	6.2
	8.8		0.5	6.1
	8.6		0.5	6.0
	8.9		0.5	6.1
	9.4		0.4	6.3
	9.3		0.4	6.2
	9.5		0.4	6.3
	9.6		0.4	6.3
	9.5		0.4	6.3
	9.5		0.4	6.3

Wood post & wire and other fence

A-D	E-F	G-H	I-J	AONB
0.7	1.3	2.2	2.0	1.6
2.9	4.8	2.3	1.4	2.9
2.4	3.7	2.2	2.9	2.9
2.9	3.7	2.8	2.8	3.1
2.7	3.5	2.9	2.3	2.8
2.3	2.9	3.2	1.9	2.6
2.1	2.5	3.1	1.9	2.4
2.0	2.2	3.2	1.8	2.3
2.2	2.9	3.7	1.6	2.6
3.2	2.7	3.5	1.5	2.5
3.1	2.5	3.5	1.5	2.4
	3.3	3.4	1.4	2.7
	3.3	3.6	1.3	2.7
	3.5	3.6	1.2	2.7
	3.6	3.6	1.3	2.8
	3.8	3.6	1.6	2.9
	4.0	3.6	1.5	3.0
	4.1	3.6	1.6	3.0
	4.0	3.5	1.7	3.0
	4.1	3.4	1.7	3.0
	4.1	3.4	1.9	3.1
	4.4		2.0	3.2
	4.6		1.9	3.3
	4.6		1.9	3.2
	4.5		1.8	3.2
	4.5		1.7	3.2
	4.3		1.7	3.1
	4.2		1.7	3.1
	4.2		1.7	3.1
	4.2		1.7	3.0
	4.2		1.7	3.0
	4.2		1.8	3.1

Table 55 Running means of (a) percentage area for selected landscape resources with increase in sample size and (b) lengths (km) per square kilometre with increase in sample size for selected field boundary types, in the North Derry AONB.

Seminatural broadleaf woodland

Landscape unit		
1AC	1B	AONB
0.0	2.6	1.4
0.0	1.3	0.7
0.5	0.9	0.7
0.4	0.7	0.5
0.3	0.5	0.4
0.3	0.7	0.5
0.2	0.6	0.4
0.2	0.5	0.4
0.2	0.5	0.3
0.3	0.4	0.4

Reedbeds, fen and swamp

1AC	1B	AONB
2.1	1.0	1.5
1.3	0.5	0.9
5.5	0.3	2.7
4.2	0.3	2.1
3.9	0.2	1.9
3.0	0.3	1.5
2.6	0.2	1.3
2.2	0.2	1.1
1.9	0.2	1.0
1.7	0.2	0.9

Other grassland

1AC	1B	AONB
12.5	16.8	14.9
37.7	16.8	26.4
25.0	11.2	17.5
19.2	8.4	13.4
17.8	6.7	11.8
24.0	12.1	17.5
25.1	10.3	17.1
21.3	9.1	14.7
18.5	8.0	12.8
17.2	8.9	12.7

Earth/ wall bank

1AC	1B	AONB
0.0	2.1	1.1
0.0	1.4	0.7
0.8	1.0	0.9
0.6	0.7	0.7
0.6	0.6	0.6
0.4	1.1	0.8
0.8	2.2	1.5
0.6	1.9	1.3
0.6	1.7	1.2
0.5	1.7	1.1

Coniferous plantation

Landscape unit		
1AC	1B	AONB
0.0	0.0	0.0
0.0	0.9	0.5
0.0	0.6	0.3
0.0	0.4	0.2
0.0	8.8	4.7
0.0	7.3	4.0
0.0	6.9	3.7
0.0	6.0	3.3
0.0	12.8	6.9
0.0	19.4	10.5

Wet bog

1AC	1B	AONB
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0
0.0	6.6	3.6
0.0	5.3	2.9
0.0	4.4	2.4
0.0	6.4	3.5
0.0	17.8	9.6
0.0	19.0	10.3
0.0	17.1	9.2

Hedgebank with scattered or overgrown shrubs (all conditions).

1AC	1B	AONB
0.0	16.8	9.1
0.0	9.8	5.3
1.5	7.2	4.6
1.2	5.4	3.5
1.1	4.3	2.8
0.8	6.5	3.9
0.7	5.6	3.3
0.7	4.9	3.0
0.6	4.3	2.6
0.5	4.0	2.4

Wood post & wire and other fence

1AC	1B	AONB
11.4	7.4	9.2
7.9	5.7	6.7
6.1	5.1	5.5
5.1	4.4	4.7
4.7	3.9	4.3
5.5	4.2	4.8
6.8	3.9	5.2
8.1	3.7	5.7
8.1	3.3	5.5
9.0	3.3	5.9

Table 56 Percentage mean area of seminatural vegetation and land use (A) and mean length (km) per square kilometre of field boundary types (L) in combined land class groups of the Sperrins AONB. The significance of differences between means is shown (p = 0.001/*** : p = 0.01/** : p = 0.05/* : n.s. = not significant).

		Land class group				Significance
		A-D	E-F	G-H	I-J	
Seminatural broadleaf woodland	A	4.6	1.4	1.0	-	***
Coniferous plantation	A	<0.1	4.0	3.2	7.7	**
Species-rich wet grassland	A	1.0	1.1	1.0	-	n.s.
Wet heath	A	0.1	4.8	16.2	22.2	***
Wet bog	A	8.8	6.6	7.5	9.6	n.s.
Perennial ryegrass	A	44.0	27.0	14.3	0.4	***
Arable/fallow	A	7.5	2.6	0.6	-	***
Hedgebank, with scattered or overgrown shrubs (all conditions)	L	3.4	2.0	0.7	<0.1	***
Post and wire & other fence	L	3.1	4.2	3.4	1.8	**
Earth or wall bank	L	7.4	9.4	9.8	0.4	***

Appendix 11. Validation of resource estimates.

1. Coniferous forest

Validation of the estimates of coniferous plantation predicted from the sampling programme has been carried out against independent full cover survey data sets. Information on the extent of coniferous plantation (DANI) and broadleaf woodland in the Sperrins AONB was collected from 1:50,000 and 1:63,360 scale Ordnance Survey maps. Forest Service (DANI) maps were not consulted since there is little new forestry in the area. For the North Derry AONB, where there is extensive new plantation, information from Forest Service maps were transposed onto 1:50,000 Ordnance Survey maps.

The predicted and actual percentage mean areas of plantation in the study area are reasonably close and there is a good correlation between the amounts present in the land class groups and the landscape units (Tables 57 and 58). This is despite the fact that coniferous forest is mostly restricted to a small number of large plantations and that the total area of plantation is quite small. These distribution parameters can easily introduce large errors into estimates.

2. Peatlands

Validation of the estimates of peatland from the sampling programme has also been carried out against the Northern Ireland Peatland Survey (Smyth, Cruickshank & Tomlinson 1987-88 and Cruickshank & Tomlinson 1987-88).

The total amount of peatland estimated in the Sperrins, using bog and heath categories from the AONB survey, was 47,523 ha compared to 46,800ha from the NI Peatland Survey. For the North Derry area the figures are 1,410ha and 1,390ha

respectively. Estimates from both surveys are within 1.5% of each other in both areas.

The different types of peatland estimated by the two surveys are shown in Table 59. Detailed comparison is not appropriate due to differences in recording procedure. The NI Peatland Survey uses a non-hierarchical classification that combines vegetation and management attributes to produce generalised maps.

The estimated amounts of hand-cut peat in North Derry are remarkably similar (Table 59). The larger estimate from the NI Peatland Survey for the Sperrins, is probably because uncut peat remains within the mapped cut-over areas.

Most of the drained peat in North Derry recorded by the NI Peatland Survey is now coniferous forest plantation. The underestimate of drained peat in the Sperrins, given by the NI Peatland Survey indicates the extent to which peatland drainage has proceeded since 1964 when the aerial photographs used for the work, were taken.

The estimated amounts of eroded peat in the Sperrins are very close. In North Derry, the process of generalisation close to the escarpment and the incorporation of revegetated areas, has probably led to a greater estimate of eroded peat in the Northern Ireland Peatland Survey.

Table 57 Comparison of predicted and actual percentage mean area of coniferous plantation in combined land class groups of the Sperrins AONB.

	Land class group				AONB
	A - D	E - F	G - H	I - J	
Predicted	<0.1	4.0	3.2	7.7	4.6
Actual	0.7	4.6	4.3	9.5	5.8

Table 58 Comparison of predicted and actual percentage mean area of coniferous plantation in the landscape units of the Sperrins AONB and North Derry AONB.

	Landscape unit								
	N. Derry			Sperrins					
	1AC	1B	AONB	2	345	678	9	10	AONB
Predicted	<0.1	19.4	10.5	11.9	8.3	3.3	<0.1	1.2	4.6
Actual	0.6	24.6	12.6	13.1	8.1	5.4	0.3	2.0	5.8

Table 59 The percentage area of selected peatland categories in the North Derry AONB and Sperrins AONB, derived from the present study and the Northern Ireland Peatland Survey.

	North Derry AONB		Sperrins AONB	
	AONB survey	NI peatland survey	AONB survey	NI peatland survey
Peat cutting by hand	35	34	31	48
Drained peat	0	12	33	11
Eroded peat	4	12	20	19