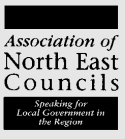
PREPARED BY NICK BRODIN

A BIODIVERSITY AUDIT OF THE NORTH EAST

The North East Biodiversity Forum is a partnership of the following organisations:

Durham
Northumberland
Tees Valley



Northumberland Biodiversity Action Plan Steering Group
Newcastle Biodiversity Action Plan Steering Group
Tees Valley Biodiversity Action Plan Steering Group
Durham Biodiversity Partnership
North Tyneside Council Biodiversity Action Plan
Farming and Wildlife Advisory Group
National Farmers Union

PREPARED BY NICK BRODIN OCTOBER 2001

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on behalf of the North East Biodiversity Forum

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The style and content of this document owes much to *A Biodiversity Audit of Yorkshire and the Humber* produced by the RSPB on behalf of the Regional Biodiversity Forum for Yorkshire and the Humber. Special thanks are due to Richard Selman for his initial advice and to Kevin Bayes for allowing the introductory sections of the Yorkshire Audit to be adapted for use in the production of this document.

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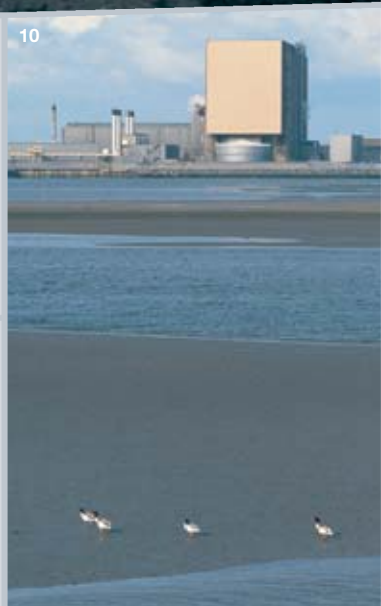
Ancient woodland at Castle Eden Dene National Nature Reserve, County Durham

1 *roseate terns*
2 *sand dunes Northumberland coast*
3 *arctic tern*
4 *bloody crane's bill*
5 *grey seals*
6 *basking shark*



7 *Lindisfarne - intertidal mudflats and sandflats*
8 *sea caves*
9 *sea anemone*
10 *shelduck at Seal Sands, Teesmouth NNR*
11 *wolf fish*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1 *Upper Teesdale*
2 *hen harrier*
3 *spring gentian*
4 *upland heathland*
5 *golden plover*
6 *black grouse*
7 *Cauldron Snout*
8 *yellow marsh saxifrage*

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1 *hay meadows in the North Pennine Dales*
2 *brown hare*
3 *lowland calcareous grassland, Thrislington Plantation SSSI, County Durham*
4 *small pearl-bordered fritillary*
5 *grey partridge*
6 *great yellow bumblebee*
7 *perennial flax*
8 *lapwing*

FOREWORD

I am especially pleased to see the publication of a regional biodiversity audit embracing, as it does, my own constituency of Sedgefield. The North East Region enjoys a diverse variety of wildlife habitats from the North Sea and its coastline to England's last wilderness, the high Pennine moors.

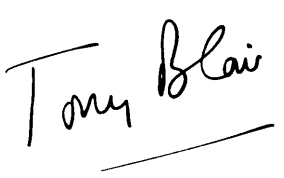
Rt. Hon. Tony Blair MP

The protection and careful management of natural resources is essential to the quality of life of the people of North East England. Over the last century the interaction between humans and the natural world has been so pronounced that much of what we see today is only a small fragment of our past. We cannot ignore the impact of humans on the habitats and species around us. It is our responsibility to bequeath our wildlife heritage to our grandchildren in a condition that will be sustainable for generations to come.

Conserving biodiversity can no longer be seen as an add-on but is central to sustainable development. An attractive natural environment encourages inward investment, helps regenerate our towns and cities and is important for the economical wellbeing of our rural areas.

The Biodiversity Audit of the North East is the first comprehensive review of wildlife and habitats in the Region. It draws on a wide range of sources and expertise and sets out baseline information on nationally important species and habitats. It will aid and inform the work of planners, policy and decision makers throughout the North East including Local Agenda 21 activity. In particular it will help guide the implementation of the Region's Local Biodiversity Action Plans, which have a vital role in meeting the UK Biodiversity Action Plan objectives.

The partnership formed by the North East Biodiversity Forum has produced this biodiversity audit. The Forum's cohesion and co-operative working methods very much reflect the constructive approach that has been a feature of national work in biodiversity. I congratulate the Forum on producing such an informative and comprehensive document and I commend the audit to you.



Tony Blair

Crag Lough, Roman Wall SSSI, Northumberland

PREFACE

The North East is a large area covering some 8,500 square kilometres and contains a wide variety of habitats and landscapes that go to make up the remarkable diversity of plants and animals found in the Region. Whilst some, such as the Northumberland coastline and the Pennine moorlands of Upper Teesdale are recognised as being of national and even international importance (over 13% of the Region's area is designated as Sites of Special Scientific Interest -SSSI), there are other locally significant and characteristic landscapes as well. English Nature recognises eight different 'Natural Areas' for the Region which together best describe this natural variety and combination of natural, geological and human influences on biodiversity.

The Region contains 29 UK priority habitats of national or international importance for nature conservation. Some habitats are particularly important in the Region because of their extensive nature or rarity. For example the Region holds 40% of England's upland hay meadows and 19% of England's upland heathland. Within the lowland calcareous grasslands habitat type, over 70% of the UK's resource of Magnesian Limestone grassland is found in the North East. The Region contains England's largest juniper wood and over 90% of England's black grouse. The Region contains a wealth of species, with a total of 68 priority species recorded.

Conservation of biodiversity, and the natural resources on which we all depend, is a key element of sustainable development. The UK government has produced a national framework - The UK Biodiversity Action Plan - but the delivery of its actions can only be achieved at a local scale. The Durham, Northumberland and Tees Valley Biodiversity Action Plans (BAPs) are key parts of this process, as are initiatives from others, such as the BAPs produced by the Northumberland National Park, Newcastle City Council and Northumbrian Water.

All such BAPs rely on a baseline of information, describing the current state of play, and providing the means by which we can measure progress. The North East Biodiversity Audit provides this baseline, building on such earlier work as the Durham Wildlife Audit (1995) and the Northumberland Red Data Book (1998). The North East Biodiversity Audit though goes further in two important areas; firstly, it is based around the Natural Areas concept and, secondly, it links closely to the development of Sustainability Indicators, both regionally and nationally.

Delivery of biodiversity action will rely on partnerships. It is no accident that the membership of the North East Biodiversity Forum includes not only the statutory and voluntary conservation bodies, but representatives of the Association of North East Councils, the Regional Assembly, Government Office for the North East, the Regional Development Agency (One North East), agriculture and industry amongst others.

Dr. Chris J Spray MBE
Environment Director
Northumbrian Water

INTRODUCTION

Who should read this Report?

Anyone with an interest in the biodiversity of the North East will find this report useful. It is designed to be of most value to those organisations or individuals involved in strategic planning who should be taking account of biodiversity in their plans, policies or programmes or who wish to make a specific contribution to biodiversity action in the Region. Whilst this is a technical document, it is aimed at a non-specialist audience so specialised terms are explained within the text or in the glossary. A summary broadsheet is also available from member organisations of the North East Biodiversity Forum.

The Regional Biodiversity Audit

In order to plan carefully the conservation of biodiversity (see the definition below) a sound knowledge of the existing resource is essential. This audit provides information on those species and habitats which occur within the North East Region that are regionally, nationally or internationally important.

This report relates national criteria and UK biodiversity work to the North East. It indicates the importance of the region's contribution to the total national resources of the UK's priority habitats and species and provides information on their distributions, relating to both the boundaries of the local planning authority areas (Map 1) and English Nature's Natural Areas (Map 2). It also identifies species and habitats that are not national priorities but which play a vital role in maintaining the biodiversity resource of the Region.

This document is not a plan. It contains no actions. Though there is merit in some actions and targets being conceived at the regional level, the majority of action on the ground will take place at a local level. Such actions will be detailed within the local Biodiversity Action Plans, of which there are six currently either being drafted or implemented around the Region. This report in no way seeks to duplicate or provide an alternative to that work. It will complement such work by placing it in a regional perspective and by placing the Region in a national context.

This audit aims to:

- determine the contribution the North East makes to the nation's threatened biodiversity;
- form an intermediate step between national and local biodiversity plans, identifying those UK priorities relevant to the Region;
- identify species and habitats that are not national priorities but which are considered to be important at the regional level;
- help organisations acting at the regional level, such as the statutory agencies like the Government Office for the North East and the Regional Assembly, to take account of biodiversity in their own planning and, where appropriate, to plan biodiversity work and its support/funding effectively;
- raise awareness of biodiversity and promote its incorporation into regional planning;

- promote co-operation between groups taking action to assist biodiversity by placing local Biodiversity Action Plans in a regional context whereby they can be used to complement each other;
- inform the Regional Planning Guidance on biodiversity issues;
- provide background information for the production of regional biodiversity targets.

What is biodiversity and why should we be interested in it?

Biodiversity simply means the variety of life. It is an all-encompassing term that includes plants, animals and fungi, from the smallest microbe to the largest mammal. It is vital to conserve biodiversity, even the most humble of species, because it is these that produce the oxygen we breathe, recycle our rubbish, clean our water, provide food and clothing and produce life-saving drugs. In addition to these basic life support functions, wildlife provides spiritual support in the form of a beautiful, intricate environment and provides us with one of the most stimulating and important educational resources we have.

Biodiversity is also a source of economic benefits and employment. In some areas, such as mid-Wales and the Shetland Islands, wildlife tourism is worth millions of pounds. In a less direct way, biodiversity already contributes to the landscape character that attracts large numbers of tourists into this region. Perhaps more important in economic terms is that beautiful environments attract inward investment.

Environmental concerns are high on the public agenda. In recent polls 87% of interviewees were concerned about the decline in British wildlife. Over two-thirds said that it was ‘essential’ or ‘very important’ for the government to give environmental issues and protection of the environment a high priority (RBA 1997, in *A Modern Planning System for Wildlife and the Countryside*, Wildlife and Countryside Link). There is now a great awareness that in so many ways biodiversity enhances our quality of life.

Sustainable development and biodiversity

There is increasing action to move towards greater sustainability within our lifestyles and to achieve more sustainable development. The UK government has shown its commitment to sustainability with shifts in policy and public consultation on the best way forward. But what exactly is sustainability? It has been defined by IUCN (International Union for the Conservation of Nature) as improving the quality of human life while living within the carrying capacity of the supporting ecosystem. Another definition stresses the need to provide development that meets the needs of the present without compromising the ability of future generations to meet their needs. Central to this idea is the protection and careful use of the world’s finite resources. Biodiversity forms part of those limited resources. Once lost, species can never be replaced. Consequently the conservation of biodiversity is a key test of sustainability.

Biodiversity planning

The need to conserve biodiversity in a global context was agreed by the signatories of the International Convention on Biological Diversity at the Earth Summit in Rio de Janeiro in 1992. Since that time the UK Government has been committed to a national programme of planning and implementation of action to conserve biodiversity. A national strategy, called the UK Biodiversity Action Plan (UK BAP), has been published which contains individual species and habitat action plans. These set out the most important species and habitats in the UK context and consider what actions are required to conserve them. It is recognised, however, that most action will be taken at a local level and this work is being co-ordinated by local Biodiversity Action Plans. A key difference between current biodiversity work and previous conservation strategies is that objective targets are being set to guide action and realistic time-scales and costings are identified. There is increasing recognition of the need to bridge the gap between national planning and local action. Consideration of biodiversity issues at a regional level has many advantages.

A regional approach can:

- establish clear links between national and local Biodiversity Action Plans;
- help to ensure a consistent level of biodiversity action across the Region;
- assist organisations which operate at a regional level;
- bring in the advantages of economies of scale when dealing with biodiversity issues.

Biodiversity has recently gained some statutory underpinning in the Countryside and Rights of Way Act (2000). This puts a duty on Ministers and Government Departments to have regard in the exercise of their functions to the purpose of conserving biological diversity. The Local Government Act (2000) requires local authorities to produce community strategies for their area. There is scope for this to contain a commitment to conserving biodiversity. The Rural White Paper also gives support to biodiversity. Paragraph 10.3.2 states ‘we will expect all local authorities to incorporate planning for local action on biodiversity in the integrated community strategies which they are required to prepare under the Local Government Act (2000)’.

Local Biodiversity Action Plans (LBAPs)

Within the Region, six local Biodiversity Action Plans are either currently being produced or have already been published. These cover Northumberland, the Northumberland National Park, County Durham (including South Tyneside, Gateshead, Darlington and the City of Sunderland), Tees Valley, North Tyneside and the City of Newcastle. In addition, some local businesses, such as Northumbrian Water, have produced action plans for their own land holdings.

Local Biodiversity Action Plans ensure that the actions and the objectives of the national plans for species and habitats are translated into effective local action. They also set out actions for those species and habitats that are of local importance but which are not covered by the UK BAP. It is hoped that this audit will support the work of local BAPs by placing their work in a regional and national context.

Biodiversity and EU Directives

Council Directive 92/43/EEC (the 'Habitats Directive') came into legal force in June 1994. The main aim of the directive is stated as being 'to promote the maintenance of biodiversity' and it endeavours to do this by the protection of habitats and species which are considered to be of community interest (Article 2). The 'Habitats Directive' lists 75 habitat types and 40 non-avian species which require protection through the creation of a series of designated sites called Special Areas of Conservation (SACs). Those habitats and species which are considered to be at particular risk of disappearance are given 'priority' status.

A second piece of EU legislation, Council Directive 79/409/EEC (the 'Birds Directive') prioritises action for certain vulnerable and all migratory bird species. This is complementary to the 'Habitats Directive' and requires the classification of internationally important bird sites as Special Protection Areas (SPAs). Collectively, SPAs and SACs form the 'Natura 2000' series of sites. Once designated, the UK is required to maintain or restore the condition of these sites.

The large majority of habitats and species listed under EU legislation are also targeted for action under BAP. However, the UK BAP does not just target wildlife that is of international importance, but also that which is declining in the UK. In many ways the UK BAP and the two EU Directives provide a complementary approach to nature conservation. The targets contained in specific action plans help to spur action towards achieving favourable conservation status for some of the most threatened species and habitats. The measures promoted under EU legislation provide valuable statutory tools that contribute towards the delivery of BAP targets.

ABOUT THIS AUDIT

Regional boundaries

For the purposes of this audit the boundary is that used by the Government Office for the North East. This is being increasingly used by organisations and agencies as regionalisation progresses. It includes Northumberland, County Durham and the Unitary Authorities of what were once the counties of Tyne & Wear and Cleveland. It also includes all of the Northumberland National Park and a small section of the North York Moors National Park (Map 1). Where local planning authority and National Park boundaries overlap, the National Parks are the planning authority. Only marine habitats within 12 miles of the coast are considered in the report, though some marine species records from further out are presented. Local planning authority jurisdiction on the coast only extends to land above the low tide mark. Consequently no marine habitats can be ascribed to local planning authority boundaries.

Natural Areas

English Nature has developed a map of England divided into 120 Natural Areas characterised by their particular wildlife and natural features. This correlates with the Countryside Agency's Landscape Character Areas (which form sub-divisions of the Natural Areas). They do not follow administrative boundaries but delineate areas with a common history of land use and ecological issues in order to promote more effective action on a regional scale by encouraging co-operation between local authorities. For this reason the boundaries of several Natural Areas extend outside of the North East Region.

Information in this audit only relates to those parts of the Natural Areas within the Region. Profiles have been written for each Natural Area and are available from English Nature. A map of the areas in this Region is given (Map 2) and reference will be made to these areas in the audit.

Habitat data

The first half of the habitat audit covers those habitats which have been identified as national priorities within the UK BAP. These are listed in Table 1 and are compared to broad habitat types and to the specialist habitats identified in the EU 'Habitats Directive'. Information on these habitats has been gathered from a wide range of sources including published and unpublished material.

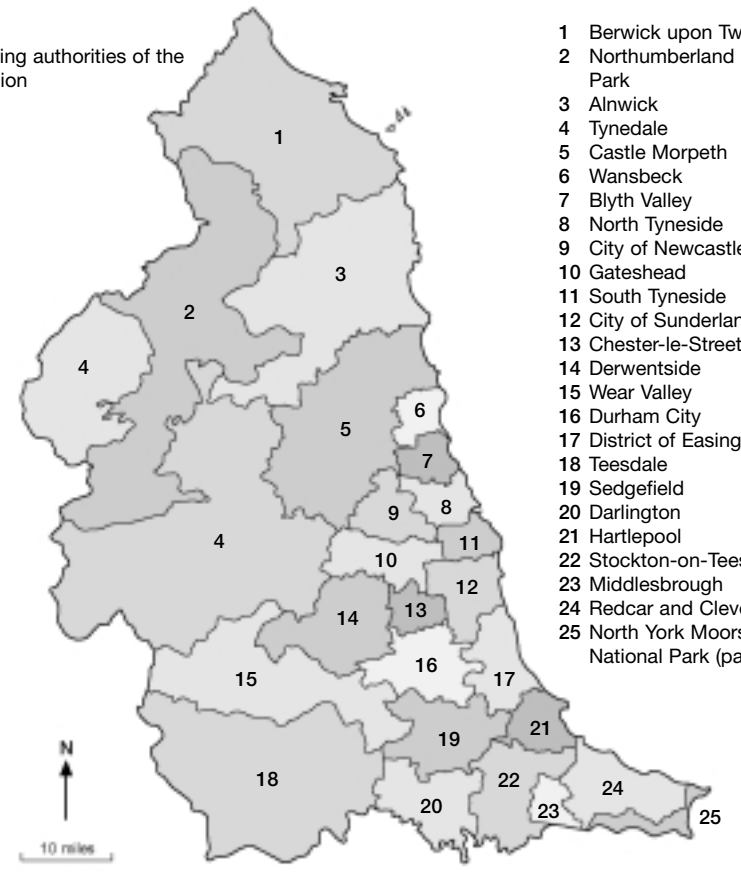
For each habitat an attempt has been made to provide information on:

- the total UK resource, in terms of both quantity and distribution;
- the regional resource, where possible quantified and presented as amounts within each local planning authority boundary and Natural Area;

Where appropriate this information is presented in map form, indicating presence of a particular habitat within a 5 x 5 km Ordnance Survey grid square.

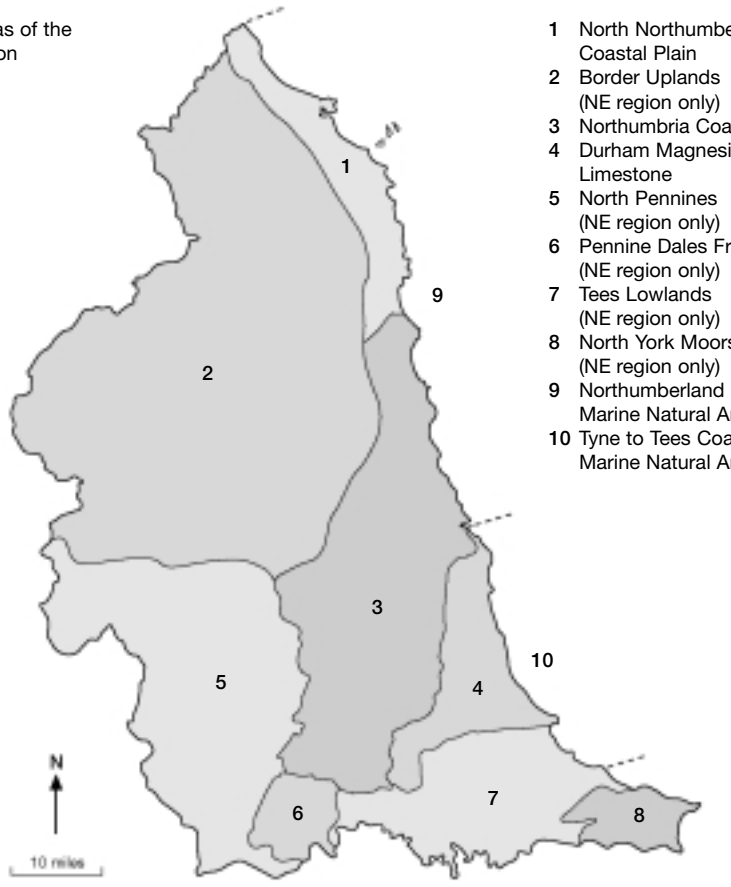
Information is also provided in the text on each habitat, providing a description which mentions important associated species; then under the heading 'status', the conservation value, quantity and quality of the habitat are given. Under 'threats' the

Map 1
The local planning authorities of the North East Region



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 2
The Natural Areas of the North East Region



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

known or potential threats are listed. The threats are not all proven causes of habitat decline, but they do indicate important issues for the conservation of a particular ecosystem. The section headed ‘opportunities for protection and enhancement’ briefly outlines some of the actions which could further the conservation of the habitat within the Region. It gives examples both of activities which are currently taking place, and of potential actions that would help a particular habitat. References are given at the end of these habitat summaries and the data sources are provided with the tabled information. Habitats and the species which they support are inescapably linked. Each habitat summary is cross-referenced with a list of some of the important species which the particular habitat may support. Those species which are described in the Species Audit are shown with their names in bold.

Species data

The first section of the species audit deals with species identified as national priorities under the UK BAP. Data is presented in two main tables showing the known presence of each species in the individual districts and in the Natural Areas. The audit has gathered historic as well as current information and these are presented under the following categories:

R recent (from 1990 onwards)
O old (from 1960 to 1989 inclusive)
H historic (1900 - 1959 inclusive)

Interpretation of this information will vary from species to species. For example, some plants have seeds which can remain in the soil for many years before germinating. Consequently, a lack of recent records may not necessarily mean that the species has been lost from the Region. Those species considered extinct are noted as such in the summaries. The tabulated information should be used together with the text in the species summaries, where additional unconfirmed records may be included.

How accurate and comprehensive is the information in this Audit?

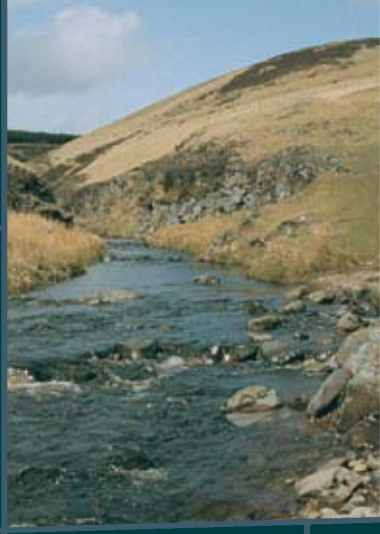
As mentioned earlier, this audit represents a comprehensive gathering of known existing information on the most important species and habitats in the Region. However, in common with all other audits of its type there are gaps in the information. Not all areas of the Region have been comprehensively surveyed for all species and habitats. This is particularly the case in Northumberland, where the broad habitat types present across much of the county have yet to be mapped and quantified (a process known as Phase 1 survey). The Phase 1 survey of the county is continuing at a slow pace and new information will be added as it becomes available. The available information is also variable in age. Some habitat data presented may be 10 years old and more. Whereas this gives a valuable insight into the resource, care should be taken in its interpretation, as land-use change can be considerable over 10 years. It is highly likely that a proportion of most of the habitats presented here will have been lost in that time. However the information presented is the best available and will be a vital planning tool.

What happens now?

The first phase of the biodiversity audit for the Region is complete. However, this should be seen as the start of a process rather than the end. Conservation of biodiversity should involve all. Action is constantly evolving amongst the key organisations in the Region. Some of the important tasks have already been outlined in the Regional Biodiversity Audit sections above but there are a number of other activities which need to be undertaken. These include the following:

- enhance biodiversity through the protection and sensitive management of all important sites and species and the creation of habitats appropriate to the natural character of the local area, ensuring all development is properly assessed to cause no environmental damage to biodiversity;
- all local authorities and statutory agencies should develop strategies which identify their role in biodiversity conservation and enact policies and programmes to take these forward in partnership with the conservation agencies;
- support partnerships to foster education and awareness of sustainable development and joint actions for biodiversity;
- support initiatives for the improved acquisition, handling of and access to biodiversity information;
- fill gaps in our knowledge of important habitats and species in the Region, for example by completing the Phase 1 survey of Northumberland;
- encourage the use of European, national and regional funding for biodiversity purposes;
- fully integrate biodiversity planning with economic and social planning under the banner of sustainability within the Region at a high level;
- monitor progress of biodiversity action through the Region's sustainable development indicators, and at a more detailed level by periodic reviews against the baseline of this audit;
- ensure that biodiversity action is incorporated within the activities of Local Agenda 21 Groups;
- ensure the increasing involvement of the private sector in making a greater contribution to biodiversity action;
- promote the growth of the environmental sector to provide new jobs and new economic opportunities;
- provide means by which people who live or work in the Region can participate in the conservation of biodiversity.

A BIODIVERSITY AUDIT OF THE NORTH EAST



HABITATS

overleaf
northern dart
blanket bog with blocked ditch
Upper Teesdale
maritime cliffs with shag
standing water with black-necked grebe
The Cheviot with blanket bog
upland stream with dipper
Seal Sands, Teesmouth

Part 1: UK Biodiversity Action Plan Priority Habitats

The first section of this habitat audit is a review of all the UK priority habitats found in the North East Region. A full list of priority habitats and their relationship to UK BAP broad habitat types and to those habitats listed in the EU 'Habitats' Directive is presented in Table 1. A comparison of the areas of each habitat (where known) within the Region and within the country or the UK as a whole is given in Table 2. The regional distributions of each habitat are provided in tabular form. Table 3 shows the distribution by local planning authority boundaries and Table 4 by Natural Area boundaries. The figures provided show habitat coverage by area (where possible). Individual habitat summaries follow. Each summary begins with a brief description of its physical or biological characteristics and associated species. Species described later in the Audit are shown with their names in bold. The status of the habitat is then reviewed, giving where possible the extent of the national resource, the regional resource and notes on historical trends in extent or distribution. A dot map shows the distribution of the habitat against local planning authority boundaries. A second map shows the same distribution against Natural Area boundaries. These maps are indicative only and show where a habitat is present within a particular 5 x 5 km OS Grid Square. The location of dots does not neccessarily represent the exact location of a particular habitat. Tables provide site lists or more detailed information on habitat coverage. A reference list gives the data sources used in compiling the information provided.

Data tables are provided with each habitat summary, with references attached. This is in addition to the summary of data in the table at the front of the habitat audit. Within the tables the following symbols are used:

✔ habitat is present but there is no information on coverage;

≥ 'greater than or equal to', ie there is at least this amount of habitat in an area (this is not an estimate of the total but a minimum, gained from survey information available);

~ 'approximately'.

Part 2: Other Regionally Important Habitats

The second section of the audit is concerned with those habitats that are not identified as national priorities within the UK BAP but which in the opinion of the North East Biodiversity Forum make an important contribution to the wildlife resource of the Region. The coverage given to each habitat is less detailed than for Part 1. A brief description of each habitat is given. This includes details of its contribution to the biodiversity of the North East, its distribution within the Region, and associated species. Those species which are described later in the Audit are shown with their names in bold. No attempt has been made to quantify the extent of these habitats, either by local planning authority or Natural Area.

Table 1: UK BAP priority habitats found in the Region and their relationship with the UK broad habitat types and habitats identified for protection within the EU 'Habitats Directive'

Broad habitat type*	Priority habitats within Region	EU 'Habitats Directive' - Annex 1 habitats present in Region
Broadleaved, mixed and yew woodland	Upland oak woodland	Old oak woods with *Ilex* and *Blechnum* in the British Isles
	Upland mixed ash woods	*Taxus baccata* woods
	Wet woodland	Residual alluvial forests (*Alnion glutinoso-incanae*)
	Lowland wood pasture and parkland*	
Boundary and linear feature	Ancient and/or species-rich hedgerows	
Arable and horticulture	Cereal field margins	
Improved grassland	Coastal and floodplain grazing marsh*	
Neutral grassland	Lowland meadows	
	Upland hay meadows	Mountain hay meadows (British type with *Geranium sylvaticum*)
Calcareous grassland	Lowland calcareous grassland Upland calcareous grassland	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)
Acid grassland	Lowland dry acid grassland	
Dwarf shrub heath	Lowland heathland Upland heathland	Dry heaths (all types)
Fen, marsh and swamp	Purple moor-grass and rush pasture	Molinia meadows on chalk and clay (*Eu-Molinion*)
	Fens	Alkaline fens Petrifying springs with tufa formations (*Cratoneurion*)
	Reedbeds	
Bogs	Lowland raised bog	Active raised bogs† Degraded raised bogs (still capable of natural regeneration)
	Blanket bog	Blanket bogs (†active only)
Standing open water and canals	Mesotrophic lakes	
	Eutrophic standing waters	Natural eutrophic lakes with *Magno-potamion* or *Hydrocharition*-type vegetation
Supra littoral rock	Marine cliffs and slopes	Vegetated sea cliffs of the Atlantic and Baltic coasts
Supra littoral sediments	Coastal sand dunes	Embryonic shifting dunes Shifting dunes along shoreline with *Ammophila arenaria* (white dunes)† Fixed dunes with hebaceous vegetation (grey dunes)† Dunes with *Salix arenaria* Humid dune slacks
Littoral sediment	Coastal saltmarsh	*Salicornia* and other annuals colonising mud and sand
	Mudflats	Mudflats and sandflats not covered by sea water at low tide Estuaries
	Sea-grass beds (*Zostera noltii*)	
Inshore sublittoral sediment	Saline lagoons	Lagoons
	Sea-grass beds (*Zostera marina*)	
	Sublittoral sands and gravels	

References/data sources

* The UK broad habitat types form a framework within which any habitat can be placed. These were published by the UK Steering Group[1] and the terrestrial and freshwater types revised in the UK Biodiversity Group Tranche 2 Action Plans[2]. The priority habitats are those for which Habitat Action Plans have been written. These form part 1 of the habitat section of this audit. The EU habitat types are those listed in Annex 1 of the EU 'Habitats Directive' - EU Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC) and listed in Planning Policy Guidance 9.[3]

* Priority habitats which are habitat complexes, distinguished by their land use, and containing elements from other broad habitat types.

† Listed as priority EU habitats in Directive.

1. UK Biodiversity Steering Group (1995) *Biodiversity: the UK Steering Group Report. Vol 2: Action Plans*. HMSO, London.
2. UK Biodiversity Steering Group (1998) *UK Biodiversity Steering Group Tranche 2 Action Plans. Vol 2 - Terrestrial and Freshwater Habitats*. English Nature, Peterborough.
3. Department of the Environment (1994) *Planning Policy Guidance 9: Nature Conservation*. HMSO, London.

Table 2: Habitat areas in the North East Region

Habitats	UK/GB/English area[1]	North East Region	% of UK/GB/ English area
Upland oak woodland	70 000 - 100 000 UK	not known	
Upland ash woods	67 500 UK	not known	
Wet woodland	50 000 - 70 000 UK	not known	
Lowland wood pasture and parkland	10 000 - 20 000 UK	not known	
Ancient and/or species-rich hedgerows	329 000 km English	not known	
Cereal field margins	4821 km English	645 km	13.4 English
Lowland meadows	5000 - 10 000 England & Wales	≥ 325	3.2 English & Welsh
Upland hay meadows	> 1000 England	~ 404.8 (SSSI)	~ 40.5 English
Lowland calcareous grassland	33 000 - 41 000 UK	≥ 322.5	0.8 UK
Upland calcareous grassland	22 000 - 25 000 UK 10 000 English	440.6	1.8 UK 4.4 English
Lowland dry acid grassland	< 30 000 UK (unimproved) 15 000 - 22 000 English	≥ 2260.6 (all types) ~ 146.2 (unimproved)	~ 0.5 UK unimproved ~ 0.7 English unimproved
Lowland heathland	31 694 English	≥ 429.9	1.3 English
Upland heathland	~ 269 000 English	≥ 51 162.4	19.0 English
Blanket bog	~ 1 500 000 UK 215 000 English	≥ 39 229.6	2.6 UK 18.2 English
Lowland raised bog	6000 active UK	123 (some degraded)	
Purple moor-grass and rush pasture	56 000 UK 5400 English	2.06	0.003 UK 0.04 English
Fens	not known	5047.7	
Reedbeds	5000 UK	≥ 61.2	1.2 UK
Mesotrophic lakes	not known	not known	
Eutrophic standing waters	~ 17 850 km^2 UK	not known	
Coastal and floodplain grazing marsh	10 000 UK 5000 UK	not known	
Maritime cliffs and slopes	4059 km UK 1165 km English	52 km	1.28 UK 4.5 English
Coastal saltmarsh	45 370 GB 31 533 England	365.9	0.81 GB 1.16 English
Coastal sand dunes	55 998 GB 11 897 England	1829.9	3.3 GB 15.4 English
Mudflats	270 000 intertidal flats UK	3542	1.3 UK
Sea-grass beds	not known		
Saline lagoons	1293 GB	18.4	1.4 GB
Sublittoral sands and gravels	common on UK coast	common on NE coast	

References/data sources
1. Units are in hectares unless otherwise stated.
> means greater than
≥ means greater than or equal to
< means less than
~ means approximately

Table 3: Habitat presence (✔) or coverage in each local planning authority

	Alnwick	Berwick upon Tweed	Blyth Valley	Castle Morpeth	Chester-le-Street	Darlington	Derwentside	Durham City	Easington	Gateshead	Hartlepool	Middlesbrough	Newcastle upon Tyne
Upland oak woodland	✔			✔			✔						
Upland ashwoods*	✔			✔			✔		✔				
Wet woodlands	✔	✔		✔	✔		✔	✔		✔			✔
Lowland meadows		✔	35.1	13.9		5.1	2.5	7.1	19	51.6	0.9	3.5	27.3
Upland hay meadows							2.2						
Lowland calcareous grassland	✔	✔		✔		0.6		70.1	107.8		1		
Upland calcareous grassland													
Lowland dry acid grassland	✔	✔			4.5	1	31.8	78.2	2.9	19			44
Lowland heathland	✔		1.9	17	79.8		15	7.6	1	9.4			1.8
Upland heathland	✔	1306.6					3040.1						
Blanket bog	375.9	67					191.8						
Lowland raised mire		~93											30
Fens	✔	3.6			2.7	1	63.9	5.8	2.7		1.79		14.4
Reedbeds	1.5	4.4		3.6		0.5		1.4	0.5	6.3	2.6	2	7
Purple moor-grass and rush pastures						0.55			1.01				
Coastal and floodplain grazing marsh	✔	✔		✔							✔		
Maritime cliffs and slopes	✔	✔	✔	✔					✔		✔		
Coastal saltmarsh	40.6	277.8	3.3							0.04	15		0.5
Coastal sand dunes	273	823	32.4	154					11.2		157.5		
Mudflats	117	2781	45							29.1	105.5	1	13
Saline lagoons	2			8.2							8.2		

*Table only shows known examples of this habitat. In practice, upland ashwoods are likely to be found across the Region (see main text for details).

NB: Because of the difficulties in identifying ancient and/or species-rich hedgerows, cereal field margins, mesotrophic lakes and eutrophic standing waters, these habitats have not been shown in the above table.

North Tyneside	Northumberland National Park	North York Moors National Park	Redcar and Cleveland	Sedgefield	South Tyneside	Stockton-on-Tees	Sunderland	Teesdale	Tynedale	Wansbeck	Wear Valley	
	✔	✔						✔	✔		✔	Upland oak woodland
	✔	✔						✔	✔		✔	Upland ashwoods
	✔	✔		✔				✔	✔		✔	Wet woodlands
10			43	11.7	11.3	26.2	13.1		3.1	40.6		Lowland meadows
	87							463	114.8		60.3	Upland hay meadows
0.2			7	47	35.1	7	46.7		✔			Lowland calcareous grassland
	2							422.6	2		14	Upland calcareous grassland
3.8	✔			8.5			4.5		2062.4			Lowland dry acid grassland
			287.5	✔			1.2	0.1	6.1	✔	1.5	Lowland heathland
	19913	1690						8000.9	9123.7		8088.1	Upland heathland
	4559	1.3						15955.8	11695.5		6383.3	Blanket bog
												Lowland raised mire
	504	30	3.5	11.9				1484.5	1416.5		1501.4	Fens
	12.5		3.1	1.1	0.7	12.9	1.1		✔			Reedbeds
								~0.5				Purple moor-grass and rush pastures
						✔						Coastal and floodplain grazing marsh
✔		✔	✔		✔		✔			✔		Maritime cliffs and slopes
1.9					9.6	11.5	3.4			2.3		Coastal saltmarsh
9.9			325.5		15	7.5				21		Coastal sand dunes
1			68.4		8	182.5	53.7			82		Mudflats
												Saline lagoons

Table 4: Habitat presence (✔) or coverage in each Natural Area*

	Border Uplands	Durham Magnesian Limestone	North Pennines	North Pennine Dales Fringe	North Northumberland Coastal Plain	Northumbria Coal Measures	North York Moors and Hills	Tees Lowlands
Upland oak woodland	✔		✔	✔			✔	
Upland ashwoods**	✔	✔	✔	✔			✔	
Wet woodlands	✔	✔	✔	✔	✔	✔	✔	
Lowland meadows	12.4	168.6	3.1			168.6		78.7
Upland hay meadows	87		640.3					
Lowland calcareous grassland	✔	307.3			✔	0.2		15
Upland calcareous grassland	2		430.4	8.2				
Lowland dry acid grassland	2062.4	94.1			✔	103.1		1
Lowland heathland	23.1	2.2	1.6			115.5	287.5	
Upland heathland			26620.8				1690	
Blanket bog	9390.4		29837.9				1.3	
Lowland raised mire	43					30		
Fens	507.1	10.5	4466.3		0.5	22.8	30.0	10.5
Reedbeds	13.5	1.6	✔		5.9	18		22.2
Purple moor-grass and rush pastures		1.01	0.5					0.55
Coastal and floodplain grazing marsh				✔	✔		✔	
Maritime cliffs and slopes								
Coastal saltmarsh		3.4			318.4	17.6		26.5
Coastal sand dunes		26.2			1071	242.3		490.5
Mudflats		23			2868	214		437
Saline lagoons					2	8.2		8.2

*Figures are only for land within the North East Region.

**Table only shows known examples of this habitat. In practice, upland ashwoods are likely to be found across the Region (see main text for details).

NB: Because of the difficulties in identifying ancient and/or species-rich hedgerows, cereal field margins, mesotrophic lakes and eutrophic standing waters, these habitats have not been shown in the above table.

A BIODIVERSITY AUDIT OF THE NORTH EAST

HABITATS PART 1

UK Biodiversity Action Plan Priority Habitats

1. WOODLANDS

Woodlands include all vegetation types dominated by trees forming a distinct, although sometimes open, canopy. They may have developed naturally or occur as a result of planting. The woodlands that are of greatest conservation significance are those which have had continuous wooded cover for at least 400 years. Such sites, called ancient woodlands, are often extremely rich in plants and animals and may contain species with specialised habitat requirements. In a number of ancient woodlands the original tree cover has been felled and replanted (often with conifers). These often retain remnants of the original woodland flora and fauna. The North East supports approximately 3.5% of England's ancient semi-natural woodland and 3.2% of England's ancient replanted woodland.

The information available about woodlands in the region is patchy. Phase 1 survey data exist for much of the North East but habitat data has still to be collected for large areas of Northumberland. There have been few systematic studies of woodland composition and so it has not been possible to reliably quantify the extent of UK BAP priority habitat types within the Region. The Forestry Commission is currently producing an inventory of all of Britain's woodlands but this information is unlikely to be available for some time. The information currently available about woodland cover in the Region is shown in Table 5.

The UK BAP identifies six priority woodland habitats, of which four - upland oak woodland, upland mixed ashwoods, wet woodlands and lowland wood pasture and parkland - occur within the North East Region.

Table 5: Broadleaved and mixed woodland cover in the North East Region

County/former county	Local planning authority	Semi-natural broadleaved and mixed woodland (ha)	Broadleaved and mixed plantation (ha)	Ancient semi-natural woodland (ha)[12]	Ancient replanted woodland (ha)[12]
County Durham	Chester-le-Street[1]	164.8	428.5	2906	1209
	Darlington[1]	173.0	338.6		
	Derwentside[1]	701.7	514.2		
	Durham City[1]	355.7	518.5		
	Easington[1]	340.1	485.3		
	Sedgefield[1]	171.1	592.0		
	Teesdale[1]	922.3	1026.1		
	Wear Valley[1]	470.1	320.5		
Tees Valley	Hartlepool[2]	28.5	102.5	886	539
	Middlesbrough[2]	16.0	56.5		
	North York Moors National Park[3]	177.0	146.9		
	Redcar and Cleveland[2]	688.5	498.0		
	Stockton-on-Tees[2]	177.0	223		
Tyne & Wear	Gateshead[4]	521.2	658.9	328	755
	Newcastle upon Tyne[5]	52.0	360		
	North Tyneside[6]	12.6	168.1		
	South Tyneside[7]	2.9	45.4		
	Sunderland[8]	156.5	834.2		
Northumberland	Alnwick	not known	not known	2738	2108
	Berwick upon Tweed	not known	not known		
	Blyth Valley[9]	141.8	not known		
	Castle Morpeth[9]	(≥369.2)*	not known		
	Northumberland National Park[10]	807.0	610		
	Tynedale[11]	(≥229.7)**	(≥191.3)**		
	Wansbeck[9]	115.0	not known		

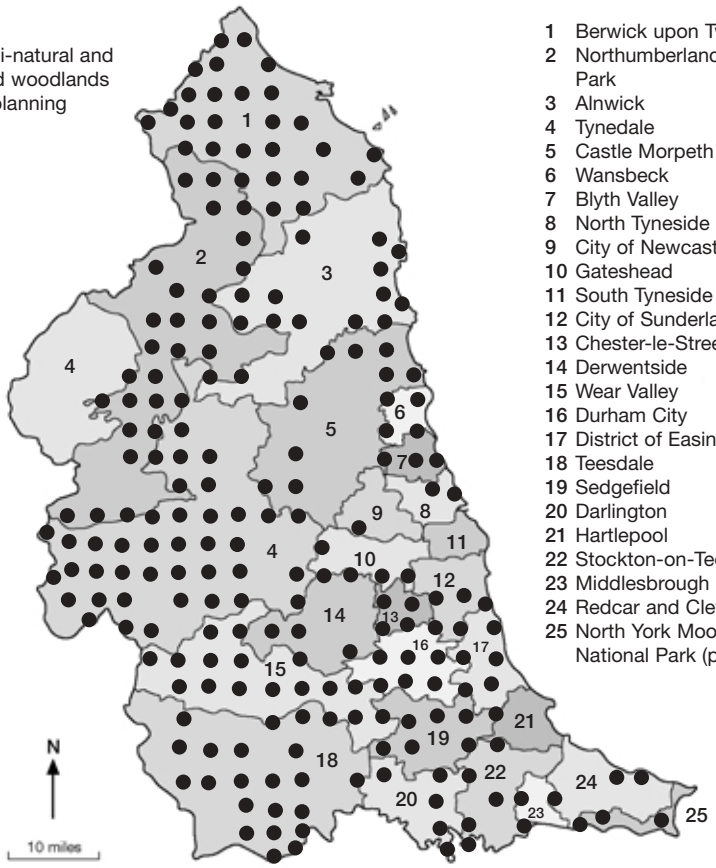
*Only a small area of Castle Morpeth is covered by Phase 1 survey. The true figure for woodland cover in the district will be significantly higher.

**Information is for North Pennines only. The true extent of woodland cover in Tynedale will be significantly higher.

References/data sources

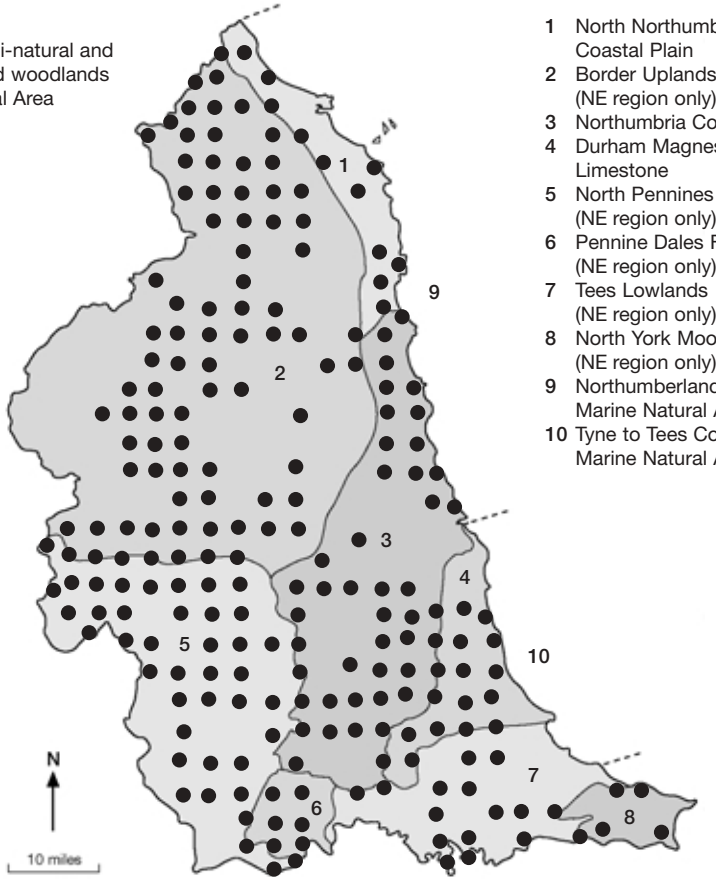
1. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council.
2. Weir, A & Allison, N (1986) *Wildlife Habitats in Cleveland*. Cleveland County Council.
3. North York Moors National Park Phase 1 survey (1990).
4. Data from Gateshead MBC Phase 1 survey (1998).
5. Data from City of Newcastle Phase 1 survey (2000).
6. Data from North Tyneside Phase 1 survey (1995).
7. South Tyneside MBC (1988) *Wildlife Audit of the Borough of South Tyneside*. South Tyneside MBC.
8. Data from Sunderland Phase 1 survey (1999).
9. South East Northumberland Phase 1 survey (2000).
10. Data from Northumberland National Park Phase 1 survey (1992). Information on plantation woodlands relates to plantings of new native woodlands. Figure provided by Elaine Rigg, Northumberland National Park.
11. English Nature (1997) *Natural Area Profile: The North Pennines*. English Nature, Newcastle upon Tyne.
12. Information taken from English Nature's Ancient Woodland database.

Map 3
Presence of semi-natural and ancient replanted woodlands shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 4
Presence of semi-natural and ancient replanted woodlands shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

1.1 UPLAND OAK WOODLAND

Upland oak woodlands are characterised by a predominance of oak *Quercus* spp. and birch *Betula* spp. in the canopy, with varying amounts of holly *Ilex aquifolium*, rowan *Sorbus aucuparia* and hazel *Corylus avellana* as the main understorey species. Such woods are often rich in mosses, liverworts, lichens and ferns and often hold a distinctive assemblage of breeding birds which includes redstart, wood warbler and pied flycatcher. The upland oak woodlands of Britain and Ireland are considered to be of international importance because of their extent and distinctive plant and animal communities.

Other nationally or regionally important species sometimes associated with upland oakwoods include:
red squirrel
dormouse
black grouse
spotted flycatcher
bats

Current status

There are no precise figures for the total extent of this woodland type, but it is believed to be between 70 000 and 100 000 ha in the UK, with major concentrations in south west Scotland, Cumbria, Gwynedd, Devon and Cornwall.

Within the Region, upland oak woodlands are mainly found within the North Pennines and the Northumberland National Park. Typically they occur as fragments of woodland surviving on steep sided valleys, with few blocks exceeding five ha in size. No reliable figures exist for the extent of the habitat but rough estimates have been made of 550 - 600 ha for Northumberland and 925 ha in County Durham. Table 6 summarises the known distribution of upland oak woodland in the Region.

Threats

- Overgrazing by domestic stock, deer and rabbits, leading to a loss of ground flora, difficulties in regeneration of tree species and changes to the woodland structure.
- Upland semi-natural woods have declined by around 30 - 40% in area over the last 60 years as a result of replanting, development and conversion to grazing. Recent policy changes (eg by the Forestry Commission) have greatly reduced the amount of inappropriate planting that takes place in woods.
- Invasion by species such as *Rhododendron* spp. which shades out the ground layers and eliminates much of the conservation interest.
- Development pressures, such as new roads and quarries.
- Air pollution may affect lichen and bryophyte communities within woodlands.
- Grazing by the introduced Muntjac deer can be particularly destructive of woodland ground flora, and the expansion of the species within the region is a potential threat.

Opportunities for protection and enhancement

- Enhancement through fencing to eliminate/reduce grazing; supplementary planting, bracken spraying, gap creation, scarification and other practices to encourage natural regeneration of tree species; creation of links between existing woodlands and boundary features.

- The Forestry Commission's Woodland Grant Scheme gives grants for the planting of new woodlands. The Annual Management Grant and Woodland Improvement Grant make payments for the management of existing woodlands. The New Native Woodlands in National Parks Challenge scheme and the Jigsaw Challenge within the North Pennines are targeted at creating new native woodlands, extending and linking existing semi-natural ancient woodlands.
- The Northumberland National Park enters into woodland management agreements with landowners to secure the management of existing woodlands.
- A number of upland oak woodland sites are managed as nature reserves, for example Holystone North Wood is a Northumberland Wildlife Trust reserve.
- Forest Enterprise are carrying out restoration of native broadleaved woodland on some sites as part of their forest design plan process.

Table 6: Known distribution of upland oak woodland in the North East Region by local planning authority

Local planning authority	Upland oak woodland thought to be present	Examples of sites supporting upland oak woodland
Alnwick	Yes	River Coquet and Coquet Valley Woodlands SSSI
Berwick upon Tweed	Not known	
Blyth Valley	No	
Castle Morpeth	Yes	River Coquet and Coquet Valley Woodlands SSSI
Chester-le-Street	No	
Darlington	No	
Derwentside	Yes	Derwent Gorge and Horsleyhope Ravine SSSI
Durham City	No	
Easington	No	
Gateshead	No	
Hartlepool	No	
Middlesbrough	No	
Newcastle upon Tyne	No	
North Tyneside	No	
Northumberland National Park	Yes	Holystone Burn Woods SSSI Holystone North Wood SSSI
North York Moors National Park	Yes	Newton Wood
Redcar and Cleveland	No	
Sedgefield	No	
South Tyneside	No	
Stockton-on-Tees	No	
Sunderland	No	
Teesdale	Yes	Shipley and Great Woods SSSI
Tynedale	Yes	Derwent Gorge and Horsleyhope Ravine SSSI
Wansbeck	No	
Wear Valley	Yes	Backstone Bank and Baal Hill Woods SSSI

1.2 UPLAND MIXED ASHWOODS

Upland mixed ashwoods comprise a broad range of woodland types on free-draining base-rich soils. Ash *Fraxinus excelsior* is usually a major species, but oak *Quercus* spp., elm *Ulmus* spp., and birch *Betula* spp., may also be locally abundant. Yew *Taxus baccata* may also form stands in an intimate mosaic with the other major tree species and alder *Alnus glutinosa* may occur where there are transitions to wet woodland. Many of these woods are ancient, but ash is a vigorous colonist of open ground and secondary upland mixed ash woodland can form rapidly. The name upland mixed ashwoods reflects the abundance of this type of woodland in upland Britain rather than the altitude at which sites may occur. Many sites may be found just above sea level, for example Castle Eden Dene in County Durham. Upland mixed ashwoods are generally taken to equate to three particular communities of the National Vegetation Classification (NVC): W8 ash *Fraxinus excelsior* - field maple *Acer campestre* - dog's mercury *Mercurialis perennis* woodland; W9 ash *Fraxinus excelsior* - rowan *Sorbus aucuparia* - dog's mercury *Mercurialis perennis* woodland; and W13 yew *Taxus baccata* woodland.

Other nationally or regionally important species sometimes associated with upland mixed ash woodland include:
red squirrel
dormouse
black grouse
spotted flycatcher
bats

Mixed ashwoods are amongst the richest habitats for wildlife in the uplands, notable for flowers such as bluebell *Hyacinthoides non-scripta*, primrose *Primula vulgaris*, wood crane's-bill *Geranium sylvaticum* and wild garlic *Allium ursinum*. Many rare woodland plants and trees occur only in ash woodlands and the habitat may be particularly rich in lichens and invertebrates.

Current status

There is no precise data on the total extent of upland ash woodlands in the UK, but in the late 1980s the Nature Conservancy Council estimated that the total extent of ancient semi-natural woodland of this type was 40 000 to 50 000 ha. Over the last fifty years it has declined in area through clearance, overgrazing and replanting with non-native species. A crude estimate places the total area of upland ashwood at 67 500 ha.

Within the North East, examples of W8 or W9 type woodlands are thought to be found in all districts[1]. It is therefore likely that examples of upland mixed ashwoods are found within each local planning authority area in the Region, with overlap with other types of lowland mixed deciduous woodland. Particularly important examples of upland ash woodlands are found in the upland valleys and ravines of the North Pennines and Border Uplands/Northumberland National Park, and within coastal denes on the Magnesian Limestone of east Durham. Many of these sites are designated as SSSIs and one site, Castle Eden Dene, is a Candidate Special Area of Conservation (cSAC).

Threats

- Overgrazing by domestic stock, deer and rabbits, leading to a loss of ground flora, difficulties in regeneration of tree species and changes to the woodland structure.
- Invasion by tree species which are not native to ashwoods, such as sycamore *Acer pseudoplatanus*. Invasion by bracken *Pteridium aquilinum* reduces or prevents the regeneration of tree species.

References/data sources
1. Keith Kirby (EN) pers comm.

- Dutch elm disease has changed the structure and composition of many woods since the early 1970s.
- Nationally, quarrying threatens some sites.
- Intensive farming methods have led to a simplification of the landscape and removal of field boundaries which caused greater ecological isolation of woodlands.
- Semi-natural woodlands have declined in many areas over the last 60 years as a result of replanting, development and conversion to grazing. Recent changes in policy (eg by the Forestry Commission) have greatly reduced the amount of inappropriate planting that takes place in woods.

Opportunities for protection and enhancement

- Enhancement through fencing to eliminate/reduce grazing; supplementary planting, bracken spraying, gap creation, scarification etc to encourage natural regeneration of tree species; creation of links between existing woodlands and boundary features to reduce the effects of habitat fragmentation.
- The Forestry Commission's Woodland Grant Scheme gives grants for the planting of new woodlands. The Annual Management Grant and Woodland Improvement Grant make payments for the management of existing woodlands. The New Native Woodlands in National Parks Challenge scheme and the Jigsaw Challenge within the North Pennines are targeted at creating new native woodlands, extending and linking existing semi-natural ancient woodlands.
- The Northumberland National Park enters into woodland management agreements with landowners to secure the management of existing woodlands.
- Castle Eden Dene is managed as a National Nature Reserve (NNR) by English Nature.
- A number of other woodland sites, such as Hawthorn Dene on the Durham Coast, are managed as nature reserves by conservation bodies.
- New areas of native woodland are being created by the Great North Forest and the Tees Forest.

1.3 WET WOODLAND

Wet woodlands occur on poorly drained or seasonally waterlogged soils and are usually dominated by alder *Alnus glutinosa*, birch *Betula* spp., and willow *Salix* spp. They are found on floodplains, as successional habitats on fens and bogs, along streams and flushes, and in peaty hollows. Wet woodlands frequently occur as mosaics with other woodland habitat types (such as oak woods) and wetland habitats.

Other nationally or regionally important species sometimes associated with wet woodland include:
European otter
reed bunting
spotted flycatcher
bats
small pearl-bordered fritillary

Current status

There is no precise data available about the total extent of wet woodland in the UK although a crude estimate has been given as 50 000 - 70 000 ha. Wet woodland is found throughout the North East but in many cases are only of small size. The extent of this habitat within the region has yet to be fully quantified. Table 7 lists areas where the habitat is known to occur.

Threats

- Overgrazing by domestic stock, deer and rabbits, leading to a loss of ground flora, difficulties in regeneration of tree species and changes to the woodland structure.
- Clearance and conversion to other land-uses.
- Succession to drier woodland types.
- Flood prevention measures and river control leading to changes in river dynamics which prevent development of new wooded areas.
- Invasion by non-native species, such as Indian balsam *Impatiens glandulifera*, which can change vegetation composition and lower the conservation value of sites.
- Lowering of water tables through water abstraction or drainage, leading to drying of wooded areas.
- Pollution and poor water quality leading to changes in the composition of ground flora and invertebrate communities.

Opportunities for protection and enhancement

- Enhancement through fencing to eliminate/reduce grazing; supplementary planting, bracken spraying, gap creation, scarification etc to encourage natural regeneration of tree species; creation of links between existing woodlands and boundary features to reduce the effects of habitat fragmentation.
- The Forestry Commission's Woodland Grant Scheme gives grants for the planting of new woodlands. The Annual Management Grant and Woodland Improvement Grant make payments for the management of existing woodlands. The New Native Woodland Challenge in National Parks scheme within the Northumberland National Park and the Jigsaw Challenge within the North Pennines are targeted at creating new native woodlands, extending and linking existing semi-natural ancient woodlands.

- The Northumberland National Park enters into woodland management agreements with landowners to secure the management of existing woodlands.
- Management of flood defence or of the local water table may provide opportunities for the creation of new areas of wet woodland.

Table 7: Known distribution of wet woodland in the North East Region by local planning authority

Local planning authority	Wet woodland thought to be present	Examples of sites supporting wet woodland
Alnwick	Yes	River Coquet and Coquet Valley Woodlands SSSI
Berwick upon Tweed	Yes	Newham Fen SSSI
Blyth Valley	Not known	
Castle Morpeth	Yes	River Coquet and Coquet Valley Woodlands SSSI
Chester-le-Street	Yes	Waldridge Fell SSSI
Darlington	Not known	
Derwentside	Yes	Derwent Gorge and Horsleyhope Ravine SSSI Causey Bank Mires SSSI
Durham City	Yes	Butterby Oxbow SSSI
Easington	Not known	
Gateshead	Yes	Ridley Gill SSSI Strother Hills SSSI
Hartlepool	Not known	
Middlesbrough	No	
Newcastle upon Tyne	Yes	Gosforth Park
North Tyneside	Not known	
Northumberland National Park	Yes	Grasslees Burn Wood
North York Moors National Park	Yes	Woodhill Gill
Redcar and Cleveland	Not known	
Sedgefield	Yes	Hardwick Hall
South Tyneside	No	
Stockton-on-Tees	Not known	
Sunderland	Not known	
Teesdale	Yes	Park End Wood SSSI
Tynedale	Yes	Derwent Gorge and Horsleyhope Ravine SSSI
Wansbeck	Not known	
Wear Valley	Yes	Backstone Bank and Baal Hill Woods SSSI Witton-le-Wear

1.4 LOWLAND WOOD PASTURE AND PARKLAND

Wood pasture and parkland generally consist of areas of grassland or heath with an open cover of mature trees. It is these mature trees (known as veteran trees) that form much of the interest of the habitat, although the associated areas of grassland and heath may also be of nature conservation value. Included within this habitat are medieval forests, wooded pastures and Victorian parks that contain older trees derived from an earlier landscape. It also includes undermanaged wood pastures containing veteran trees within a matrix of scrub and secondary woodland, and parkland that has been converted to other land uses but which still contains veteran trees of nature conservation interest. Parklands not supporting veteran trees are not included here.

Other nationally or regionally important species sometimes associated with lowland wood pasture and parkland include:
orange-fruited elm-lichen
Bacidia incompata

Veteran trees may support populations of uncommon saproxylic (wood eating) invertebrates, lichens and fungi. They may also provide roost sites for **bats** and nest sites for birds.

Current status

There are no reliable estimates on the extent of this habitat within the UK, nor on its rate of loss or degradation. Wood pasture and parkland are most common in southern England but scattered examples occur throughout the country. The extent of this habitat within the North East is not known. A number of lowland parks occur within the Region which may contain veteran trees but these have not been surveyed and their value for nature conservation is unknown. For this reason no further information is provided.

Threats

- Lack of a younger generation of trees is producing a skewed age structure, leading to breaks in continuity of dead wood and a loss of the specialised species that utilise the habitat.
- Neglect, and loss of expertise in traditional tree management techniques (eg pollarding) leading to trees collapsing or being felled for safety reasons.
- Loss of veteran trees through disease, physiological stress, and competition for resources with surrounding younger trees.
- Removal of veteran trees and dead wood for safety reasons and for tidiness where sites have a high amenity value.
- Changes to ground water levels leading to water stress and tree death.
- Isolation and fragmentation of the remaining parklands and wood pasture sites.
- Damage to trees and roots from soil compaction and soil erosion caused by trampling by livestock and people.
- Pasture loss through conversion to arable and other land uses.
- Pasture improvements through reseeding, deep ploughing, fertilizer and other chemical treatments, leading to root damage, damage to soil and loss of epiphytes.
- Inappropriate grazing levels.
- Pollution, eg air pollution affecting lichen communities.

Opportunities for protection and enhancement

- Payments are available under the Countryside Stewardship Scheme for the restoration of historic parks.
- The development of an inventory of parklands/wood pastures of nature conservation value would allow sites to receive proper protection and benefit from the targeting of management actions.

2. ANCIENT AND/OR SPECIES-RICH HEDGEROWS

Ancient hedgerows are defined as those which were in existence before the Enclosure Acts of 1720 to 1840. Post-enclosure hedges dominated by hawthorn *Crataegus monogyna*, beech *Fagus sylvatica*, privet *Ligustrum spp*., yew *Taxus baccata* or exotic species are not included. Species-rich hedges are defined as those that contain four or more native woody species, on average, along a 30 m length. They also include hedges with fewer woody species but possessing a rich flora along the hedge bottom. This definition includes recently planted species-rich hedgerows.

Other nationally or regionally important species sometimes associated with hedgerows include:
corn bunting
linnet
reed bunting

Hedges are a vital habitat for a wide range of wildlife. More than 600 plants, 1500 insects, 65 birds and 20 mammal species are known to live or feed in hedgerows. Within the intensively farmed lowlands they are a very significant habitat, often being the only refuge for many farmland and woodland species which rely on them for food, shelter and dispersal. Among the species that rely strongly on hedgerows are **brown hare**, **pipistrelle bat**, **tree sparrow**, **grey partridge** and **song thrush**, all of which are priority species in the UK Biodiversity Action Plan. Hedges may also act as wildlife corridors, linking up areas of semi-natural habitats and allowing the movement of plants and animals throughout the countryside.

Current status

Since 1945 there has been a dramatic loss in hedgerows in the UK through neglect and removal. The current UK resource of hedgerows has been calculated to be around 450 000 km, of which some 190 000 km is estimated to be ancient and/or species-rich. It has been estimated that only about 10% of hedgerows are currently under favourable conservation management.

Many of the North East's hedgerows date from the Enclosure Acts. A proportion date from before this period and can therefore be classed as ancient under the definition given in the UK Biodiversity Action Plan. In only a few cases does antiquity have any additional consequence for the biodiversity of the Region's hedges, as hedges which are both ancient and species-rich are rare. However, some species-rich hedges of great antiquity do survive. In Tynedale, for example, some hedges bordering drove roads have been estimated to be up to 1000 years old based on the number of species they contain.

No comprehensive survey of the Region's hedgerows has been undertaken so information on the presence and extent of ancient and/or species-rich hedgerows is patchy. Table 8 summarises the information that is currently available.

Threats

- Neglect of hedgerows (lack of cutting or laying) leads to the development of gaps and often effectively turns a hedge into a row of trees. Gappy hedges make poorer wildlife corridors than intact hedges.
- Unsympathetic cutting practices, such as over-frequent or badly timed cutting or the cutting of hedgerow trees, can reduce the suitability of hedgerows for plants and animals and lead to a loss in biological diversity.

References/data sources
1. Richards, A J (1979). Tynedales Hedges. Roebuck: Journal of the Northumberland Wildlife Trust, No 27, 6-8.

- Hedges may be removed to create larger fields, better suited to modern farm machinery, or may be destroyed during development.
- The use of herbicides, pesticides and fertilizers right up to the base of hedges can cause damage to hedgerow vegetation and can cause nutrient enrichment which leads to a reduction in habitat suitability and species diversity.
- Hedgerow trees may be lost through senescence, plough damage to roots and felling and are not replaced.
- High livestock densities in fields can damage hedgerows and lead to a need to fence boundaries, which in turn reduces the need to maintain existing hedgerows.

Opportunities for protection and enhancement

- Payments for the restoration and planting of hedges are made under the Countryside Stewardship Scheme administered by DEFRA.
- A Field Boundary Restoration Grant scheme is administered by Durham County Council. This is available for works on hedgerows and dry stone walls in County Durham.
- The 1997 Hedgerow Regulations offer protection to some ancient and/or species-rich hedgerows against removal. However, in practice all but a tiny proportion of the North East's hedges are too species-poor to be considered important in terms of the Regulations.

Table 8: Known distribution of ancient and/or species-rich hedgerows in the North East Region by local planning authority

Local planning authority	Ancient and/or species-rich hedgerows thought to be present
Alnwick	Information not available
Berwick upon Tweed	Yes
Blyth Valley	No
Castle Morpeth	Yes
Chester-le-Street	Information not available
Darlington	Information not available
Derwentside	Information not available
Durham City	Information not available
Easington	Information not available
Gateshead	Yes
Hartlepool	Information not available
Middlesbrough	Yes
Newcastle	No

Local planning authority	Ancient and/or species-rich hedgerows thought to be present
North Tyneside	No
Northumberland National Park	Yes
North York Moors National Park	Information not available
Redcar and Cleveland	Information not available
Sedgefield	Information not available
South Tyneside	No
Stockton	Information not available
Sunderland	Information not available
Teesdale	Information not available
Tynedale	Yes
Wansbeck	No
Wear Valley	Information not available

3. CEREAL FIELD MARGINS

Cereal field margins refer to strips of land lying between cereal crops and field boundaries, which are managed to create conditions of benefit to key farmland species. These can take many forms including uncropped 'wildlife strips'; 'conservation headlands' which are managed with reduced inputs of pesticides; and game crops, stubble or grassland fallows left between crops and field boundaries.

Other nationally or regionally important species sometimes associated with cereal field margins include:
lapwing
linnet

Research has shown that the retention of field margins is of benefit to many plant and animal species. They provide a valuable refuge and source of prey items for species that were formerly widespread in Britain but which have suffered heavy declines in recent years. These include **grey partridge**, **skylark**, **corn bunting**, **tree sparrow** and **brown hare**, all of which are identified as priorities for action in the UK Biodiversity Action Plan.

Many annual plants that were associated with traditional agricultural cropping systems, such as **shepherd's needle** *Scandix pecten-veneris*, broadleaved spurge *Euphorbia platyphyllos* and **cornflower** *Centaurea cyanus*, have also suffered a massive national decline in recent years due to changes in farming practices and are now largely restricted to the edges of fields.

Cereal field margins may also provide valuable buffer zones for watercourses and wetlands against diffuse pollution.

Current status

Cereals account for 51% of the arable land in Great Britain. Estimating the average national field size to be 12 ha suggests that there are 400 000 km of cereal field edges in the UK. If all such boundaries included a 6 m managed margin, some 200 000 ha of land would be brought into sensitive management.

Within the North East cereal production accounts for an area of 131 673 ha, which represents 80% of the arable land in the region. The presence and extent of cereal field margins vary from year to year depending on choices made by individual farmers.

The Countryside Stewardship Scheme run by DEFRA makes payments for the management of field boundaries. Among the options for cereal field margins available under the scheme are an uncropped 6m arable margin, and an uncropped 2m arable margin which can be sown along field boundaries and streams and rivers to buffer them from agricultural operations. Data from DEFRA shows that within the Region 645 km of arable margins are managed through Countryside Stewardship. This is shown in Table 9.

The area of cereal field margins which are of value to wildlife but exist outside of Countryside Stewardship is not known. However, it is likely to be minor in comparison.

Threats

The main factors that have reduced the wildlife value of cereal fields are:

- Intensification of cereal production, including the use of herbicides to ensure a weed free monoculture, and summer use of insecticides.

- The shift to winter cropping and the associated loss of winter stubble.
- The reduction in rotation of cereal crops with other land covers (including grass leys and fallows).
- The reduction in the undersown area associated with the shift to winter cropping.

Opportunities for protection and enhancement

- The Countryside Stewardship Scheme offers payments for the retention and management of arable field margins.
- Farmers can meet their set-aside requirements by setting aside field margins of at least 20 m width. The scheme literature advises farmers on how best to manage the margins for wildlife.
- The introduction of an arable option for Countryside Stewardship in the North East Region would assist towards meeting the objectives of the cereal field margin Habitat Action Plan.
- Identifying the location of rare arable plants and birds within the region would allow action to be targeted effectively.

Table 9: Uptake of arable margins options of Countryside Stewardship in the North East Region (March 1999)

Source: MAFF Rural Development Plan[1]

Option	Northumberland	Tyne & Wear	Durham	Tees Valley	Total (km)
2m arable margin	393 635 m	1345 m	99 246 m	36 191 m	530
6m arable margin	61 781 m	741 m	32 382 m	20 145 m	115
Totals	**45 5416 m**	**2086 m**	**13 1628 m**	**56 336 m**	**645**

References/data sources
1. Ministry of Agriculture, Fisheries and Food (2000) *England Rural Development Plan - North East Region*. MAFF, Newcastle upon Tyne.

4. COASTAL AND FLOOD PLAIN GRAZING MARSH

Grazing marshes are periodically inundated grasslands found in low-lying coastal areas or within the flood plains of rivers. They usually have high water levels which are maintained by ditches containing standing brackish or fresh water. Almost all sites are grazed and some are cut for hay or silage. Sites may contain seasonal water-filled hollows and permanent ponds with emergent swamp communities, but not extensive areas of tall fen species such as reed.

The ditches which typically criss-cross grazing marshes may be particularly rich in plants and invertebrates. The habitat is also particularly important for breeding, passage and wintering birds including species such as **lapwing**, **snipe** and teal.

Other nationally or regionally important species sometimes associated with coastal and flood plain grazing marsh include:
golden plover
redshank
wigeon

Current status

There is thought to be 200 000 ha of grazing marsh in England, of which only 5000 ha is semi-natural and supports a high diversity of native plant species. There have been significant losses of the habitat in the last 60 years and most sites are very sensitive to changes in grazing, cutting, and flooding regime.

Within the North East, grazing marsh is concentrated along the lower-lying areas of the north Northumberland coast and the Tees Estuary. Table 10 lists those grazing marsh sites which have been identified in the Region. These include some ungrazed coastal grasslands. The list may be added to in future as new sites are identified.

There are areas of grazing marsh adjacent to five coastal SSSIs in Northumberland. They do not form part of the notified interest features of the sites but contribute to the valuable mix of coastal habitats present. Cowpen Marsh SSSI on the Tees Estuary includes significant areas of grazing marsh and forms part of the Teesmouth and Cleveland Coast SPA, designated in recognition of its importance for passage and wintering birds. Two other SSSIs on the Tees Estuary contain examples of the habitat.

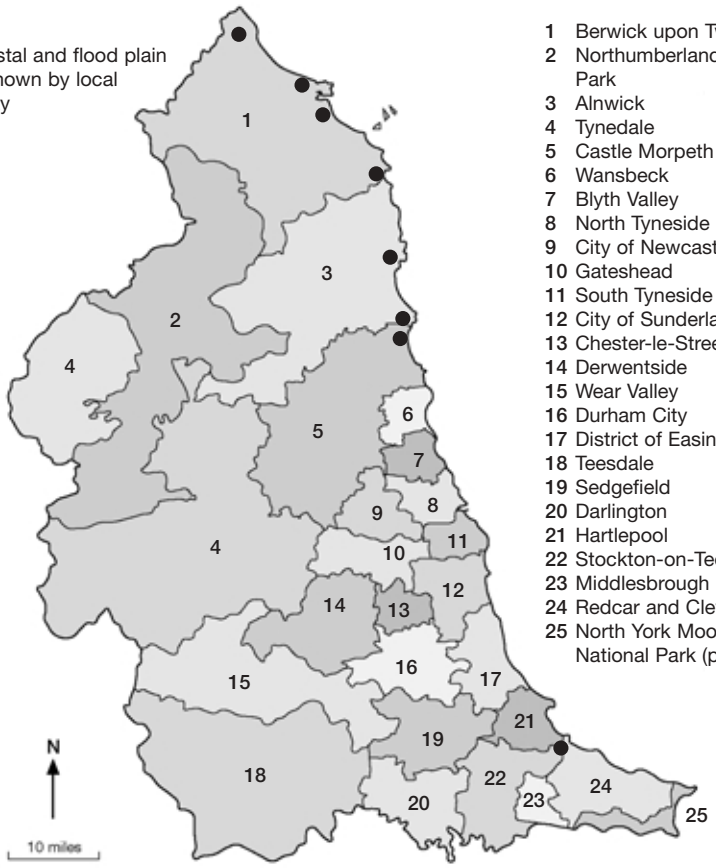
Threats

- Neglect of sites, including a decline in traditional management techniques such as maintenance of water levels.
- Agricultural intensification, including the loss of sites due to drainage and fertilizer applications.
- Nutrient enrichment and other forms of water pollution.
- In the past, creation of flood defences has been part of a process of agricultural improvement which has resulted in the loss of significant areas of grazing marsh.
- Overgrazing leading to the loss of tall vegetation required by some breeding bird species or cessation of grazing leading to a loss of structural diversity.
- Disturbance of bird species caused by human activities.

Opportunities for protection and enhancement

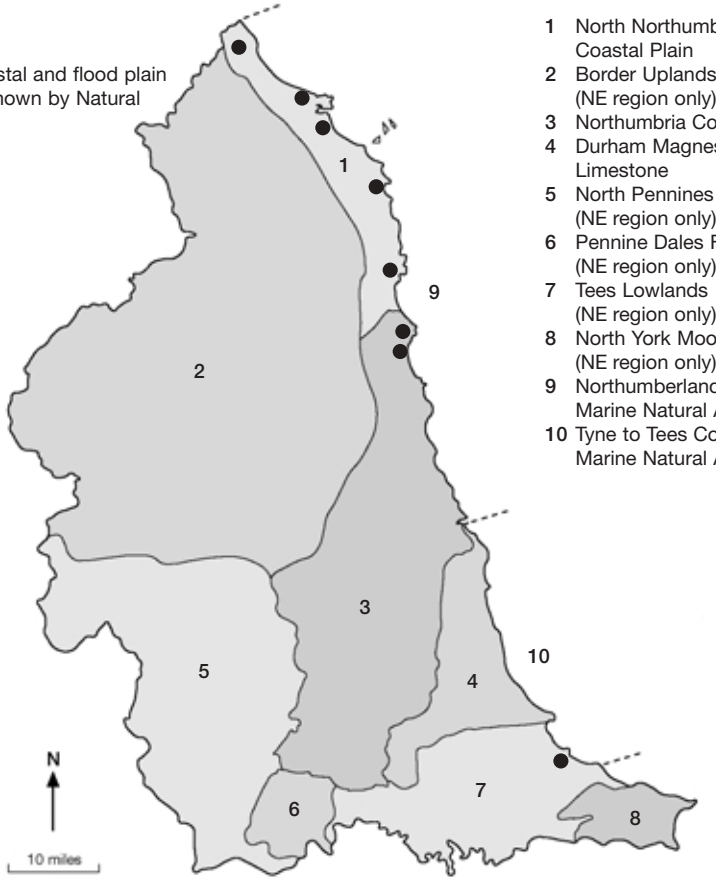
- The creation of flood storage/washland areas for flood defence purposes offers the opportunity to create new areas of grazing marsh.

Map 5
Presence of coastal and flood plain grazing marsh shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 6
Presence of coastal and flood plain grazing marsh shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Table 10: Grazing marsh sites identified in the North East Region

Site	Local planning authority	Natural area	Grid reference	Status of grazing marsh
River Tweed	Berwick upon Tweed	North Northumberland Coastal Plain	NT975523	Adjacent to Tweed Estuary SSSI
Lindisfarne	Berwick upon Tweed	North Northumberland Coastal Plain	NU070437 NU082415 NU121377 NU135360	Adjacent to SSSI and National Nature Reserve
Newton Links	Berwick upon Tweed/ Alnwick	North Northumberland Coastal Plain	NU225270	Both within and adjacent to Newton Links SSSI
River Aln	Alnwick	North Northumberland Coastal Plain	NU245115	Adjacent to Alnmouth Saltmarsh & Dunes SSSI
Coquet Estuary	Alnwick	Northumbria Coal Measures	NU256049	Adjacent to River Coquet SSSI
Druridge Pools	Castle Morpeth	Northumbria Coal Measures	NZ2733965	Northumberland Wildlife Trust Nature Reserve
Tees Estuary	Stockton-on-Tees	Tees Lowlands	NZ500250 NZ513230[1] NZ505225[1] NZ506258[1]	SSSI
Seaton Dunes[1] and Common	Hartlepool	Tees Lowlands	NZ530280	SSSI

Data adapted from Barnes *et al* (1995)[2].

References/data sources
1. Mike Leakey (English Nature) pers comm.
2. Barnes *et al* (1995) *Coast and Seas of the United Kingdom, Region 5 North East England: Berwick upon Tweed to Filey Bay*, JNCC, Peterborough.

5.0. MEADOWS

5.1. LOWLAND MEADOWS

Other nationally or regionally important species sometimes associated with lowland meadows include:
brown hare
grey partridge
lapwing
linnet
reed bunting
song thrush
tree sparrow
great yellow bumblebee
shrill carder bee

The definition of lowland meadows given in the UK Biodiversity Action Plan (UK BAP) includes both hay-meadows and unimproved pastures found in the lowlands on neutral soils. It also encompasses species-rich grassland found in non-agricultural settings such as churchyards and roadside verges. It does not include upland hay meadows, maritime grasslands or purple moor-grass and rush pastures. Lowland meadows are made up of the following communities of the National Vegetation Classification (NVC): MG5 crested dog's-tail *Cynosurus cristatus* - knapweed *Centaurea nigra* grassland; MG4 meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* grassland; and MG8 crested dog's-tail *Cynosurus cristatus* - marsh marigold *Caltha palustris* grassland. The lowland meadows of the Region are almost exclusively examples of MG5 grassland.

Unimproved species-rich grassland is a scarce and declining resource both nationally and internationally. The traditional management of lowland meadows has produced a habitat particularly rich in flowering plants. These include a number of uncommon and declining species such as greater butterfly orchid *Platanthera chlorantha*, dyer's greenweed *Genista tinctoria* and pepper saxifrage *Silaum silaus*. They are also an important habitat for a range of birds, such as **skylark**, and insects, such as the meadow brown butterfly.

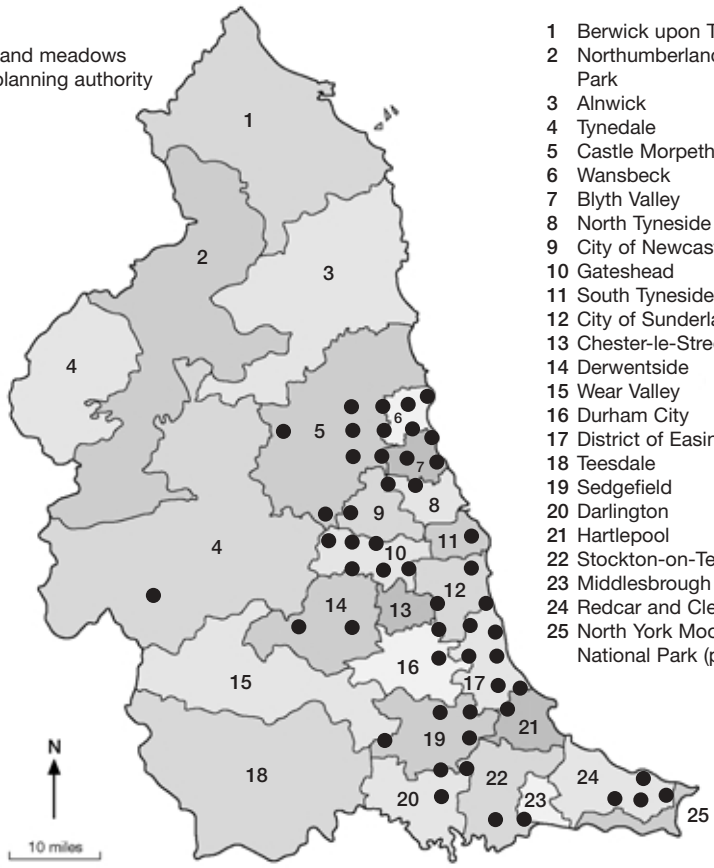
Current status

It has been estimated that by 1984 in lowland England and Wales, semi-natural neutral grasslands had declined by 97% over the previous 50 years to approximately 0.2 million hectares. Losses have continued during the 1980s and 1990s, and have been recorded at 2 - 10% per annum in some parts of England. In 1994 the area of species-rich neutral grassland in the UK was estimated at 15 000 ha. This includes both lowland meadows/pastures and upland hay meadows.

Species-rich, traditionally managed neutral meadows and pastures are a scarce resource in the Region. The majority of remaining species-rich lowland grasslands are found within the coal fields of Tyne & Wear, Durham, and south east Northumberland. Many of these are in decline due to lack of management or agricultural intensification. The majority of grassland sites are either managed as pastures or receive no active management at all. Sites managed as hay meadows are comparatively rare.

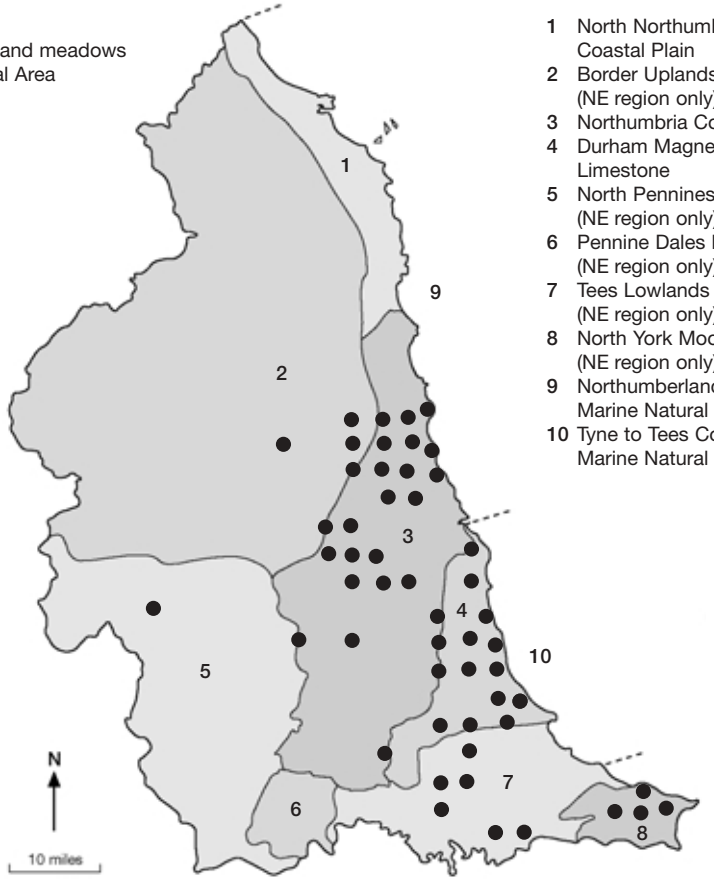
Tables 11 and 12 attempt to quantify the extent of lowland species-rich neutral grasslands in the North East. These have been compiled from information on sites of known nature conservation interest. There is thought to be a high rate of change and loss in grasslands and so some of the sites used in the calculation of these figures may have lost their interest. Alternatively, other high quality grasslands may have been overlooked. The figures should therefore only be considered as an initial estimate of the resource of lowland species-rich neutral grassland in the Region. Species-rich examples of MG5 grassland that occur in upland situations have also been included here as lowland meadows.

Map 7
Presence of lowland meadows shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 8
Presence of lowland meadows shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Threats

- Agricultural improvements through ploughing, drainage, re-seeding, and the application of inorganic fertilizers and slurry.
- The shift from hay-making to silage production, with more frequent and earlier cutting, reduces the opportunities for plants to seed and disrupts nesting birds and other animals.
- Abandonment and lack of management of grasslands leads to a reversion to rank grassland, and eventually to the development of scrub or secondary woodland.
- Changes from mowing to spring and summer grazing can result in the loss of plants and animals that are intolerant of summer grazing and that have adapted to traditional hay cutting management.
- Increased grazing intensity and duration, particularly in spring, can lead to a decrease in botanical diversity.
- Increased supplementary stock feeding associated with higher grazing levels leads to increased nutrient loadings and localised ground damage (poaching).
- Some sites are still under threat from development.
- Inappropriate management regimes (such as excessive mowing) may be damaging grassland sites on roadside verges.

Opportunities for protection and enhancement

- Payments for the sympathetic management and enhancement of lowland meadows and pastures are available through the Countryside Stewardship Scheme.
- English Nature makes payments through its Wildlife Enhancement Scheme (WES) for the management of a number of lowland neutral grassland SSSIs.
- The identification of roadside verges of nature conservation interest by local authorities would aid the protection of important sites and the targeting of suitable management works.

Table 11: Presence (✔) or estimated area of species-rich lowland neutral grassland by local planning authority

Local planning authority	Estimated area (ha)
Berwick upon Tweed[1]	✔
Blyth Valley[2]	35.1
Castle Morpeth[3]	≥13.9
Darlington[4]	≥5.1
Derwentside[5]	≥2.5
Durham City[6]	≥7.1
Easington[7]	≥19
Gateshead[8]	≥51.6
Hartlepool[9]	0.9
Middlesbrough[10]	≥3.5
Newcastle upon Tyne[11]	≥27.3
North Tyneside[12]	≥10
Redcar and Cleveland[13]	≥43
Sedgefield[14]	≥11.7
South Tyneside[15]	≥11.3
Stockton-on-Tees[16]	≥26.2
Sunderland[17]	≥13.1
Tynedale[18]	≥3.1
Wansbeck[2]	40.6

Table 12: Estimated area of species-rich neutral grassland by Natural Area

Natural Area	Estimated area (ha)
Border Uplands*	≥12.4
Durham Magnesian Limestone	≥62.2
North Pennines*	≥3.1
Northumbria Coal Measures	≥168.6
Tees Lowlands*	≥78.7

*Figures for land within the North East Region only

References/data sources

1. SNCI schedule for Northumberland
2. Data from South East Northumberland Phase 1 survey (2000)
3. Calculated from South East Northumberland Phase 1 survey (2000), EN data for Darras Hall Grassland SSSI and data for Wallington and Little Harle Site of Nature Conservation Importance.
4. Calculated from EN data on Newton Ketton Meadow SSSI, and from selected Phase 1 habitat information.
5. Calculated from Durham County Council's schedule of County Wildlife Sites and Phase 1 habitat information for the following County Wildlife Sites: Leapmill Burn Meadow, Geenwell Ford Meadow, Horselyhope Mill Meadow, and Horsleyhope Haugh. Additional information provided by EN data for Derwent Gorge and Muggleswick Woods National Nature Reserve.
6. Calculated from Durham County Council's schedule of County Wildlife Sites and Phase 1 habitat information for the following County Wildlife Sites: Sherburn Hospital and Ludworth Peat Heap.
7. Calculated from Durham County Council's schedule of County Wildlife Sites and Phase 1 habitat information for the following County Wildlife Sites: Murton Grassland, Cold Hesledon Meadow, Byron's Dene, Warren House Gill Grassland, and Edderacres. Additional information came from EN information for Hesledon Moor East SSSI, and the Durham Coast SSSI.
8. Weston, T J (ed) *Sites of Nature Conservation Importance in Gateshead*. Gateshead MBC.
Figure derived from the SNCI citations for the following sites: Hag Hill Pasture, Black Burn Meadow, Clover Hill, Crook Hill Pasture, Hedgefield Quarry, Image Hill, Path Head Meadow, Swalwell Meadow, Shedan's Hill, Shibdon Meadows, Ryton Piggeries and Ryton Peth Lane. Additional information taken from EN information for Shibdon Pond SSSI and Lower Derwent Meadows SSSI.
9. EN held data on Pawton Hill p SSSI.
10. Allison, N & Weir, A (1987) *Inventory of Sites of Biological Interest in Cleveland*. Cleveland County Council. Derived from information on Plumbtree Pasture SNCI and Maltby Beck SNCI.
11. English Nature (1994) *Grassland Inventory*. EN, Peterborough.
Figure estimated from information given on relevant neutral grassland sites.
12. Dave Mitchell (EN) *pers comm*.
13. Allison, N & Weir, A (1987) *Inventory of Sites of Biological Interest in Cleveland*. Cleveland County Council. Derived from information for the following sites: Howlbeck Mill Farm, Hobdale Terrace, Longacre Pit, Saltburn Grange/Valley Gardens, Little Dale, Merry's Wood Grassland, Lumpsey Mine Grassland, Low Farm Gerrick, Cow Close Lane, Elms Head, Holygill Well, Waytail Beck, Handale Abbey, Handale Pasture, and Onehams Pasture.
14. Estimated from EN information for the Charity Land SSSI and from Phase 1 habitat information for Ferryhill Stell and Grassland County Wildlife Site.
15. Estimate from EN information on Boldon Pastures SSSI and West Farm Meadow SSSI. Supplemented with information provided on Boldon Lake SNCI, Mount Pleasant Marsh SNCI, Station Burn SNCI and Cotman Gardens pSNCI by Matthew Hawking, South Tyneside MBC.
16. Derived from the areas for the following SNCIs given in *Inventory of Sites of Biological Interest in Cleveland*: Whitton Bridge Pasture, Brierly Wood Grassland, Saltergill, Aislaby, Ingleby Hill, Castle Hill, Briarcroft.
17. City of Sunderland (1996) *Nature Conservation Site Register*. City of Sunderland, Sunderland. Information taken from the SNCI citation for Penshaw Pallion railway. Supplemented by EN information for South Hylton Pasture SSSI and Moorsley Banks SSSI,
18. EN information for Peckriding Top Lot SSSI.

5.2. UPLAND HAY MEADOWS

Other nationally or regionally important species sometimes associated with upland meadows include:
brown hare
curlew
grey partridge
Alchemilla acutiloba
Alchemilla monticola
Alchemilla subcrenata

Upland hay meadows comprise the single NVC community MG3, sweet vernal-grass *Anthoxanthum odoratum* - wood crane's-bill *Geranium sylvaticum* grassland. These are characterised by a dense growth of grasses and herbaceous dicotyledons, up to 80 cm in height. Species found include pignut *Conopodium majus*, great burnet *Sanguisorba major* and lady's mantle *Alchemilla* spp.

Upland hay meadows have been formed as a result of traditional hay making practices taking place in a sub-montane climate typified by high rainfall, low temperatures and a short growing season. As a result of this they have developed a mix of plant species that is more closely related to that found in the mountains of the Alps and Scandinavia than of lowland Britain.

Upland hay meadows support a rich variety of plant species and are also important nesting sites for breeding birds such as **lapwing** and **yellow wagtail**. Historically, upland hay meadows were also used by the globally threatened **corncrake**, and the loss of meadows is thought to be one of the reasons for the decline in this species, which is thought to be extinct as a breeding bird in the Region.

Current status

Within the UK, upland hay meadows are found almost exclusively in the north of England. Their main concentration is in the North Pennine Dales. There is no past data for the occurrence of upland hay meadows, but it is thought likely that they have been much reduced during the 20th century by agricultural intensification. Recent estimates indicate that there are less than 1000 ha in northern England.

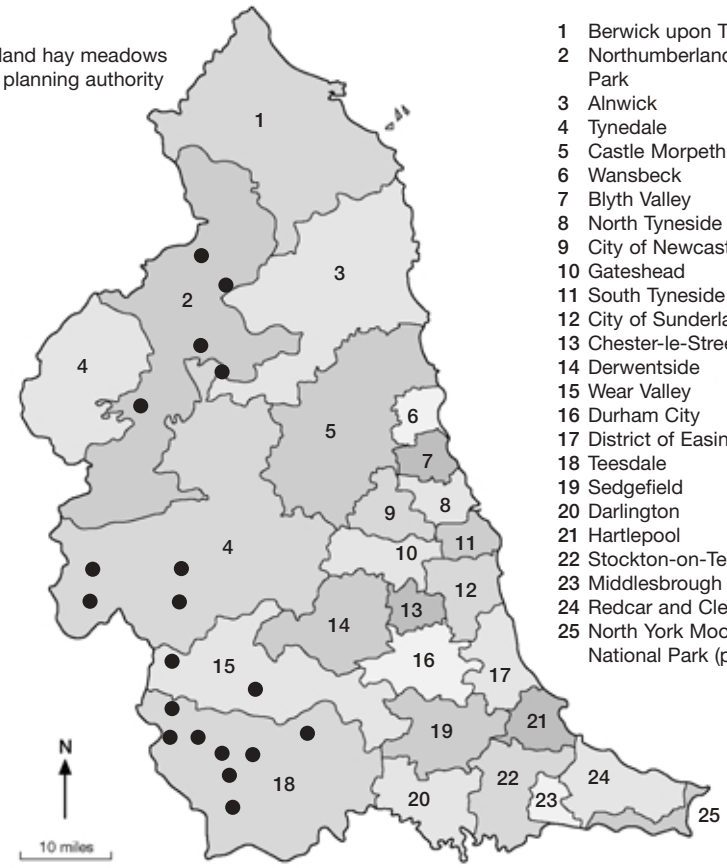
Most examples of this type of grassland occur within enclosed farmland but fragments do exist on roadside verges and river banks. The existing sites are generally small, each less than 2 ha in area. Teesdale and Weardale (together with some of the Yorkshire Dales) are widely acknowledged to possess the finest concentration of upland hay meadows anywhere in Britain.

Tables 13 and 14 attempt to quantify the extent of upland hay meadows in the region. Most of the figures are drawn from the English Nature Grassland Inventory (1994). This lists sites which are considered to be of high botanical interest and for which post 1980 survey data exists. Entries have been checked against existing Phase 1 habitat information to identify sites listed in the Inventory which have now been lost to agricultural improvements. However, there is thought to be a high rate of change and loss in grasslands and so it has not been possible to assess the current quality of the remaining sites. The figures in Tables 13 and 14 should be considered as an initial estimate of the upland hay meadow resource of the region and may be subject to revision. For comparison, figures are also given for the area of upland grassland in the region notified as SSSI, and therefore of known quality.

Threats

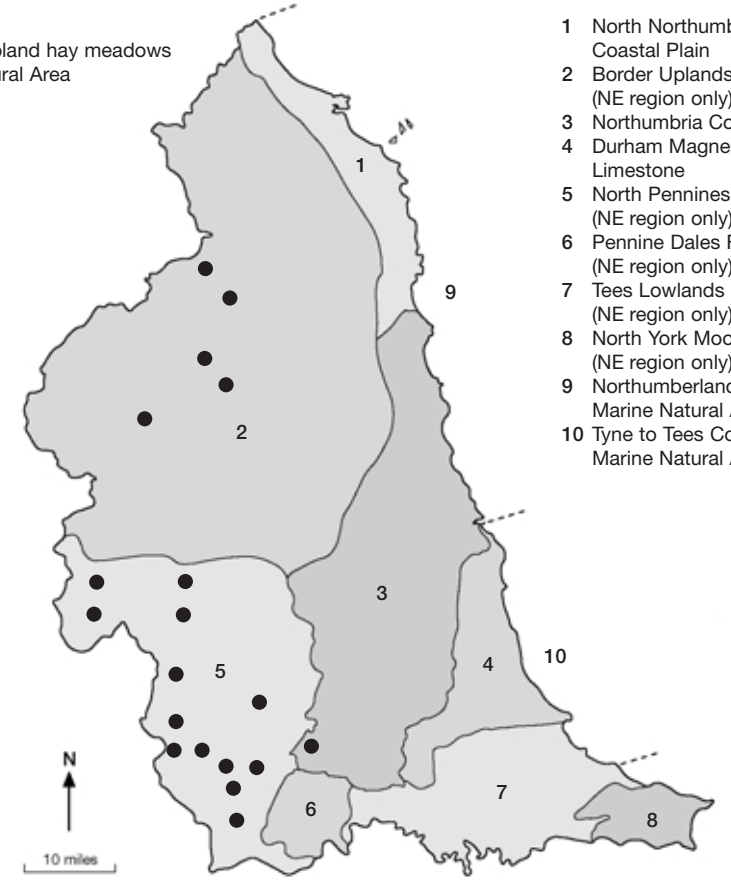
- Agricultural improvements through ploughing, drainage, re-seeding, and the application of inorganic fertilizers and slurry.

Map 9
Presence of upland hay meadows shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 10
Presence of upland hay meadows shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

- The shift from hay-making to silage production, with more frequent and earlier cutting, reduces the opportunities for plants to set seed and damages nesting birds and other animals.
- Changes from mowing to spring and summer grazing can result in the loss of plants and animals intolerant of summer grazing and adapted to traditional hay cutting management.
- Lack of farmyard manure for use as fertilizer as fewer cattle are being kept on upland farms.
- Increases in grazing intensity and duration, particularly in spring, can lead to a decrease in botanical diversity.
- Increased supplementary stock feeding associated with higher grazing levels leads to increased nutrient loadings and localised ground damage.
- Abandonment and lack of management of grasslands leads to reversion to rank grassland, and eventually to the development of scrub or secondary woodland.
- Inappropriate management (such as too regular cutting or complete lack of management) can damage the conservation interest of grasslands on roadside verges.

Opportunities for protection and enhancement

- Payments for the traditional management of hay meadows are available under the Countryside Stewardship Scheme and the Environmentally Sensitive Area (ESA) Scheme. English Nature makes payments through its Wildlife Enhancement Scheme for the management of a number of upland hay meadow SSSIs. The Northumberland National Park has management agreements on a number of traditional hay meadows.

Table 13: Estimated area of upland hay meadow by local planning authority

Local planning authority	Approximate area of upland hay meadow (ha)	Approximate area of hay meadow designated as SSSI (ha)
Derwentside[2]	2.2	0
Northumberland National Park[3]	87	18.6
Teesdale[4,5]	~463	~318
Tynedale[6]	114.8	34.5
Wear Valley[4]	60.3	33.7

Table 14: Estimated area of upland hay meadows by Natural Area

Natural Area	Approximate area of upland hay meadow (ha)	Approximate area of hay meadow designated as SSSI (ha)
Border Uplands	87	18.6
North Pennines	640.3	~386.2

*Figures for land within the North East Region only.

References/data sources
1. UK Biodiversity Steering Group (1998) *UK biodiversity Steering Group Tranche 2 Action Plans - Terrestrial and Freshwater Habitats*, English Nature, Peterborough.
2. Estimated from Durham County Council's Country Wildlife Site schedule for Derwentside District.
3. Northumberland National Park (2000) *Biodiversity Action Plan for Northumberland National Park*. NNP, Hexham.
4. English Nature (1994) *Grassland Inventory*. EN, Peterborough.
5. Approximate area of upland hay meadow in Upper Teesdale SSSI provided by Stuart Hedley, English Nature
6. English Nature (1994) *Grassland Inventory*. EN, Peterborough. Supplemented with EN information for Derwent Gorge and Horsleyhope Ravine SSSI and for Phase 1 habitat information for the Hindley Hill Wood SNCI.

6.0. CALCAREOUS GRASSLAND

6.1. LOWLAND CALCAREOUS GRASSLAND

Lowland calcareous grasslands are found on thin base-rich soils derived from underlying limestone rocks at altitudes below 250 m. They are characterized by a variety of lime-loving plant species such as thyme *Thymus praecox*, quaking grass *Briza media*, salad burnet *Sanguisorba minor* and hoary plantain *Plantago media*.

Calcareous grasslands support an exceptionally rich diversity of plants, including some rare species that are restricted entirely to lime-rich soils. The habitat is also important for many birds and for invertebrates, such as the **northern brown argus** butterfly *Aricia artaxerxes*.

Other nationally or regionally important species sometimes associated with lowland calcareous grassland include:
brown hare
grey partridge
song thrush
skylark
chalk carpet moth
lady's slipper orchid

Current status

The total amount of lowland calcareous grassland within the UK has been estimated at 33 000 - 41 000 ha. The majority of this is chalk grassland, found predominantly in the lowlands of southern England. Lowland calcareous grassland suffered significant losses during the last century. For example, there was a 20% loss in English chalk grassland sites between 1966 and 1980.

Within the Region, calcareous grasslands are mainly found on the Carboniferous limestone which runs north-east from the North Pennines towards the Northumberland coast, on the Magnesian Limestone of County Durham, and in association with the Whin Sill where they often form a mosaic with areas of acid grasslands.

The Magnesian Limestone grasslands found in the lowlands of County Durham and Tyne and Wear are of particular national interest. Magnesian Limestone grassland is unique to Britain. It is one of the UK's scarcest and most restricted habitat types, of which the North East Region is the stronghold; only 279 ha are represented in the national SSSI series and two thirds of this lies within County Durham and Tyne and Wear. These grasslands are characterised by the presence of blue moor-grass *Seslaria albicans* and small scabious *Scabiosa columbaria*.

Lowland calcareous grasslands in the Region (Tables 15 and 16) have a highly fragmented distribution, due to variation in overlying drift deposits and past losses to agricultural improvement. The most important sites are designated as SSSIs.

Threats

- Neglect and absence of grazing can lead to scrub encroachment or bracken invasion and a loss of grassland areas.
- Overgrazing can cause soil erosion and lead to a loss of species-richness and structural diversity within the grassland.
- Agricultural intensification in the form of fertilizer use, herbicide application, ploughing and re-seeding has historically been a major source of losses of grassland sites and may still potentially be damaging and destroying some grasslands.
- The in-filling of abandoned limestone quarries (eg, by use as landfill sites) where calcareous grasslands have become established is a threat in some localities.

- Quarrying may still be a threat in some areas.
- Acidification and nitrogen enrichment caused by atmospheric deposition may have a deleterious effect on calcareous grasslands, but potential impacts have not been fully assessed.

Opportunities for protection and enhancement

- Payments for the sympathetic management of lowland calcareous grasslands are available under the Countryside Stewardship Scheme. English Nature makes payments through its Wildlife Enhancement Scheme for the management of the majority of Magnesian Limestone grassland SSSIs in the Region.
- The Magnesian Limestone grasslands of Thrislington and Cassop Vale are managed as NNRs by English Nature. A number of other lowland calcareous grassland sites are managed as nature reserves by other conservation bodies, eg Bishop Middleham Quarry is a Durham Wildlife Trust reserve.
- Within County Durham, restoration of quarry sites is being used as an opportunity to create new areas of Magnesian Limestone grassland in several locations.

Table 15: Presence (✔) or area of unimproved (UI) and semi-improved (SI) lowland calcareous grasslands within the Region by local planning authority

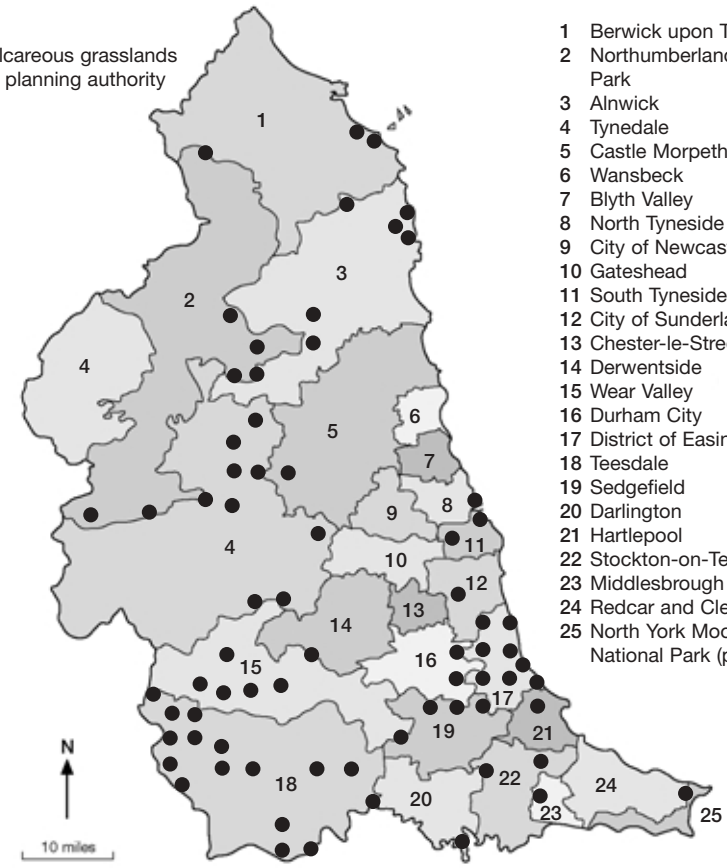
Local planning authority	Estimated area (ha)	
Alnwick[1]	✔	
Berwick upon Tweed[1]	✔	
Castle Morpeth[1]	✔	
Darlington[2]	0.6 (SI)	
Durham City[2]	52.4 (UI)	17.7 (SI)
Easington[2]	96.6 (UI)	11.2 (SI)
Hartlepool[3]	1 (UI +SI)	
North Tyneside[4]	0.2 (SI)	
Redcar and Cleveland[3]	7 (UI+SI)	
Sedgefield[1]	36.6 (UI)	10.4 (SI)
South Tyneside[5]	35.1 (UI)	
Stockton-on-Tees[3]	7 (UI+SI)	
Sunderland[6]	21.7 (UI)	25 (SI)
Tynedale	✔	

Table 16: Presence (✔) or areas of unimproved (UI) and semi-improved (SI) lowland calcareous grassland by Natural Area

Natural Area	Estimated area (ha)	
Border Uplands	✔	
Durham Magnesian Limestone	242.4 (UI)	64.9 (SI)
North Northumberland Coastal Plain	✔	
Northumbria Coal Measures	0.2 (SI)	
Tees Lowlands	15 (UI +SI)	

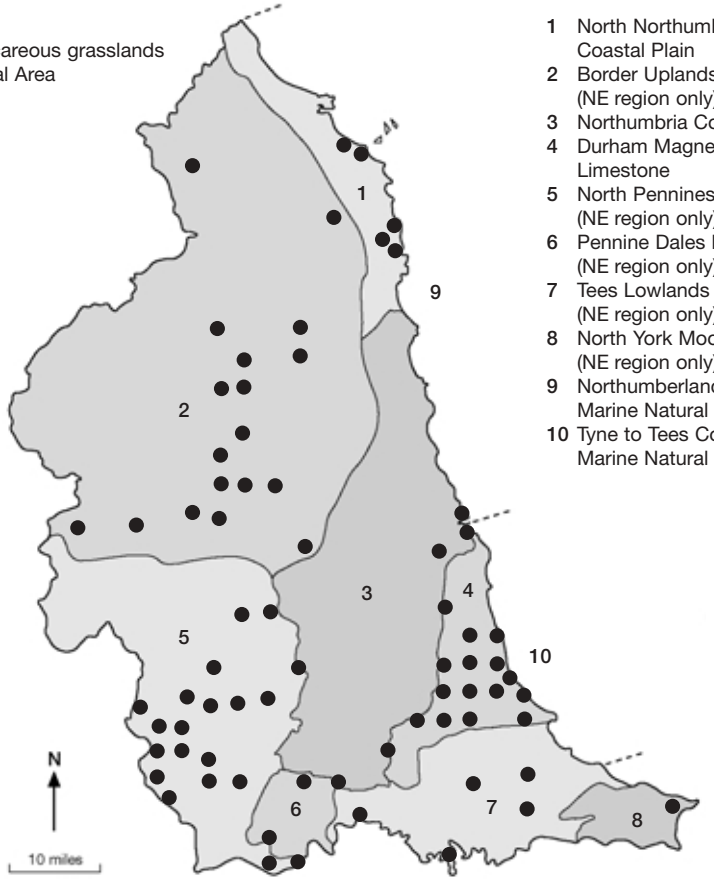
References/data source
1. Hutt, D (1996) *A Grassland Survey of the Great Limestone Between the Tyne and the Coquet*. Northumberland Wildlife Trust, Newcastle upon Tyne.
2. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council.
3. Weir, A & Allison, N (1986) *Wildlife Habitats in Cleveland*. Cleveland County Council.
4. Data from North Tyneside Phase 1 survey (1995).
5. South Tyneside MBC (1988) *Wildlife Audit of the Borough of South Tyneside*. South Tyneside MBC.
6. Data from Sunderland Phase 1 survey (1999).

Map 11
Presence of calcareous grasslands shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 12
Presence of calcareous grasslands shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

6.2. UPLAND CALCAREOUS GRASSLAND

Other nationally or regionally important species sometimes associated with upland calcareous grassland include:
skylark
alpine bartsia
alpine forget-me-not
hoary rock-rose
juniper
spring sandwort

Upland calcareous grasslands are found on thin base-rich soils derived from underlying limestone rocks. Most examples occur at altitudes of 250 - 300 m, but the habitat is also found on unenclosed moorland at lower elevations. They are subject to a harsher climate than their lowland counterparts and so their vegetation has developed a slightly different character. While many of their characteristic species, such as thyme *Thymus praecox* and quaking grass *Briza media*, are shared with lowland grasslands, plants associated with acid grasslands, such as tormentil *Potentilla erecta*, flea sedge *Carex pulicaris* and mat grass *Nardus stricta*, can also be found. Upland calcareous grasslands typically occur as part of a habitat mosaic managed as rough grazing.

Upland calcareous grasslands are a relatively rare upland vegetation type which supports a particularly wide range of plants, including some very rare or specialised species such as **spring gentian** *Gentiana verna* and **Teesdale violet** *Viola rupestris*. The habitat is used by a number of breeding birds including **skylark** and **lapwing**, and is important for several invertebrate species.

Current status

There is estimated to be 10 000 ha of upland calcareous grassland in England. Little data is available on how the extent or quality of the habitat has changed in recent years. Within the UK the North Pennines, Cumbria and Breadalbane in Scotland are regarded as being particularly important areas for upland calcareous grassland.

Upper Teesdale is the stronghold for upland calcareous grassland within the North East Region and supports a flora that is particularly rich in rarities, for example hair sedge *Carex capillaris*. Elsewhere, smaller areas of calcareous grassland are found on the Carboniferous Limestone and in association with outcrops of the Whin Sill.

The majority of upland limestone grasslands within the Region have been designated as SSSI. The important calcareous grasslands of Teesdale are within the Moor House - Upper Teesdale candidate Special Area of Conservation (cSAC), and form part of the Upper Teesdale NNR.

Threats

- Overgrazing can cause soil erosion and lead to a loss of species-richness and structural diversity within the grassland.
- Neglect and absence of grazing can lead to scrub encroachment or bracken invasion and loss of grassland areas.
- Agricultural intensification in the form of fertilizer use, herbicide application, ploughing and re-seeding has historically been a major source of losses of grassland sites and may still potentially be damaging and destroying some grasslands.
- The in-filling of abandoned limestone quarries (eg, by use as land-fill sites) where calcareous grasslands have become established is a threat in some localities.

- Acidification and nitrogen enrichment caused by atmospheric deposition may have a deleterious effect on calcareous grasslands, but potential impacts have not been fully assessed.

Opportunities for protection and enhancement

- Upland calcareous grassland is the principal target of the Tier 2B pasture option of the Pennine Dales ESA. The Countryside Stewardship Scheme has an option which makes payments for the appropriate management of upland calcareous grasslands.

Table 17: Estimated areas of unimproved (UI) and semi-improved (SI) upland calcareous grassland within the Region by local planning authority

Local planning authority	Estimated area (ha)	
Northumberland National Park[1]	2 (UI)	
Teesdale[3]	335.9 (UI)	86.7 (SI)
Tynedale[4]	2 (UI)	
Wear Valley[3]	6.7 (UI)	7.3 (SI)

Table 18: Estimated areas of unimproved (UI) and semi-improved (SI) upland calcareous grassland by Natural Area

Natural Area	Estimated area (ha)	
Border Uplands	2 (UI)	
North Pennine Fringe*	6.4 (UI)	1.8 (SI)
North Pennines[3]*	338.2 (UI)	92.2 (SI)

*Figures for land within the North East Region only.

References/data sources
1. Data from Northumberland National Park Phase 1 survey (1992).
2. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council.
3. English Nature (1997) *Natural Area Profile: The North Pennines*. English Nature, Newcastle upon Tyne.

7. LOWLAND DRY ACID GRASSLANDS

Other nationally or regionally important species sometimes associated with lowland dry acid grassland include:
brown hare
lapwing
skylark

Lowland acid grasslands typically occur on nutrient-poor, generally free draining soils with pH ranging from 4 to 5.5 overlying acid rocks or superficial deposits such as sands and gravels. They often occur as an integral part of lowland heath, in parklands and on coastal cliffs and shingle. This habitat is largely restricted to land below 300 m. Acid grassland is usually characterised by a range of plant species such as heath bedstraw *Galium saxatile*, common bent *Agrostis capillaris*, sheep's sorrel *Rumex acetosella* and tormentil *Potentilla erecta*. Acid grasslands can have a high cover of mosses and parched acid grasslands can be rich in lichens.

Like other lowland grasslands, lowland dry acid grassland has decreased to such an extent that it is now considered to be a highly threatened habitat. In a national context lowland acid grasslands are important for a range of rare and endangered bird, invertebrate and plant species, such as stone-curlew, **nightjar**, field cricket and Deptford pink *Dianthus armeria*. None of these nationally important species are actually found on the lowland acid grasslands of the North East but the habitat does support a number of plants that are regionally notable such as maiden pink *Dianthus deltoides*.

Current status

Lowland acid grassland underwent a substantial decline in the 20th century. There are currently thought to be 15 000 to 22 000 ha of lowland acid grassland in England, although comprehensive survey information is not available.

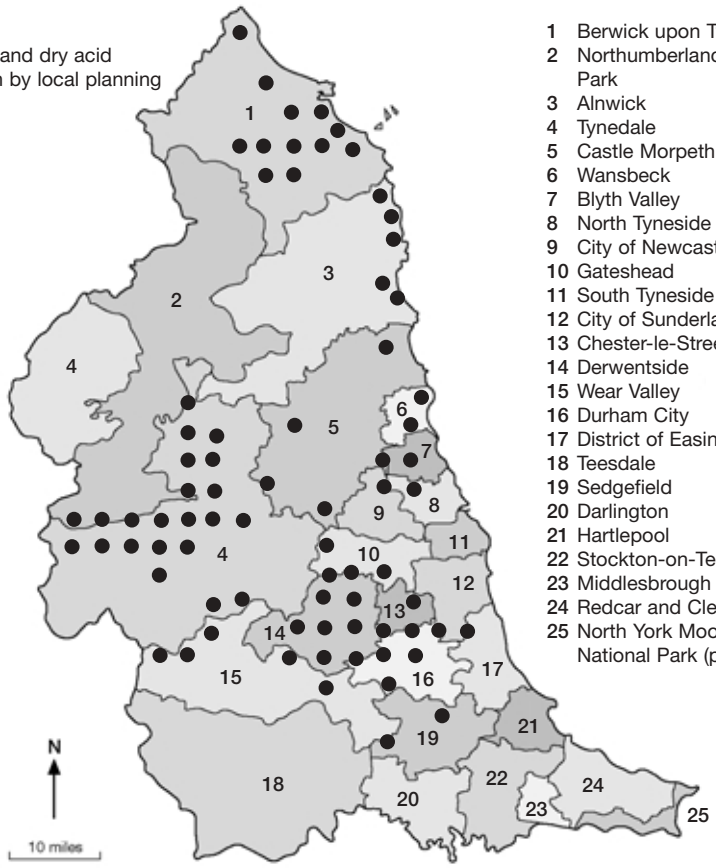
Information about the extent of lowland acid grasslands in the Region is summarised in Tables 19 and 20. In many locations there is little difference between the vegetation of lowland acid grasslands and the extensive acid grasslands of the uplands. This is particularly true of many of the grasslands which have received some agricultural improvement, such as those found in much of the Tyne Valley. The area of lowland acid grassland that is of particular nature conservation interest is therefore lower than suggested by these figures.

Lowland acid grassland occurs in a mosaic with lowland heath at several sites on the coal measures. A few patches also survive in association with Magnesian Limestone grassland. However, the most distinctive and floristically diverse lowland acid grasslands in the region are found in association with outcrops of the Whin Sill. This is a quartz-dolerite intrusion than runs through the region from Teesdale up to the Northumberland coast. At lowland sites within Northumberland the outcrops support parched grasslands that contain a number of interesting and regionally notable plant species including maiden pink *Dianthus deltoides* (a species of which the Region holds nationally important populations), purple milk-vetch *Astragalus danicus*, and chives *Allium schoenoprasum*. In many respects these can be considered as northern outposts of southern acid grassland communities. A number of the most important sites are notified as SSSIs.

Threats

- Agricultural intensification by use of fertilizers, herbicides and pesticides, liming or re-seeding can destroy the interest of lowland acid grassland.

Map 13
Presence of lowland dry acid grassland shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
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10 Gateshead
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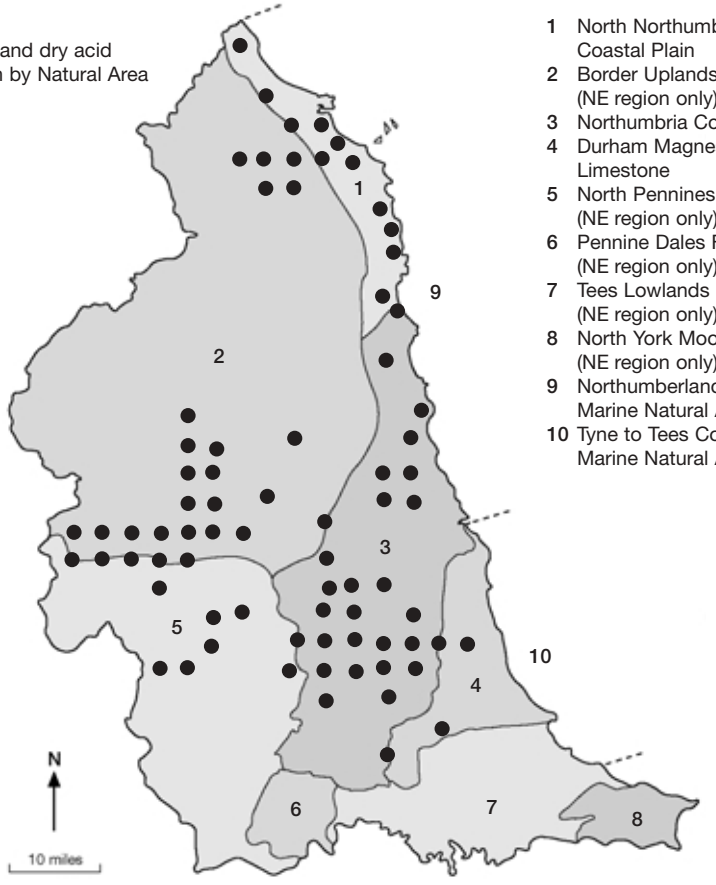
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 14
Presence of lowland dry acid grassland shown by Natural Area



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7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

- Lack of management leading to rank overgrowth, bracken invasion, and the encroachment of scrub can lead to the loss of habitat.
- Overgrazing, sometimes associated with supplementary feeding, can cause damage.
- Development activities such as mineral and rock extraction, road building, housing and landfill are still leading to the loss of sites.
- Atmospheric pollution and climate change may affect lowland acid grasslands but this has not yet been fully assessed.

Opportunities for protection and enhancement

- English Nature makes payments through its Wildlife Enhancement Scheme for the management of a number of Whin grassland sites within the Region.

Table 19: Presence (✔) or area of lowland unimproved (UI) and semi-improved (SI) acid grasslands within the Region by local planning authority

Local planning authority	Estimated area (ha)	
Alnwick	✔	
Berwick upon Tweed	✔	
Chester-le-Street[1]	4.5	
Darlington[1]	1.0	
Derwentside[2]	31.8 (UI + SI)	
Durham City[1]	65.1 (UI)	13.1 (SI)
Easington[1]	2.9 (UI)	
Gateshead[3]	18.1 (UI)	0.9 (SI)
Newcastle upon Tyne[4]	13 (UI)	31 (SI)
North Tyneside[5]	3.8 (SI)	
Northumberland National Park	✔	
Sedgefield[1]	8.5 (UI)	
Sunderland[6]	1.3 (UI)	3.2 (SI)
Tynedale[7]	2062.4 (SI)	

Table 20: Presence (✔) or estimated area of acid grasslands (unimproved and semi-improved) by Natural Area

Natural Area	Estimated area (ha)
Border Uplands*	2062.4
Durham Magnesian Limestone	2.9
North Northumberland Coastal Plain	✔
Northumbria Coal Measures	191.2
Tees Lowlands*	1.0

*Figure for land within North East Region only.

References/data sources
1. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council.
2. Figures estimated from County Durham Phase 1 data.
3. Data from Gateshead Phase 1 survey (1998).
4. Data from Newcastle upon Tyne Phase 1 survey (1997).
5. Data from North Tyneside Phase 1 survey (1995).
6. Data from Sunderland Phase 1 survey (1999).
7. Data from Tyne Valley Phase 1 survey (1996).

8.0. HEATHLAND

8.1. LOWLAND HEATHLAND

Lowland heathland is characterised by the presence of ericaceous dwarf-shrubs such as heather and is generally found below 300 m in altitude. It is often found in association with open water, bogs, scattered trees and scrub, bare ground and acid grasslands. Lowland heaths have a different complement of plants and birds to the more exposed and wetter upland heaths.

Other nationally or regionally important species sometimes associated with lowland heathland include:
nightjar
small pearl-bordered fritillary

Nationally, lowland heath is a priority for nature conservation because it is a rare and threatened habitat, with around 80% of the lowland heaths in England having been lost over the last 200 years. The varied suite of habitats that lowland heaths support encourages a wide diversity of plants, mosses, lichens, insects, reptiles and birds, including many rare and specialised species.

Current status

The UK has some 58 000 ha of lowland heath, which represents about 20% of the world total of this habitat. The largest areas of lowland heath nationally can be found in the south and south-west, Staffordshire, East Anglia and south and west Wales. 56% of the lowland heath present in the UK before 1940 has now been destroyed.

Within the North East, lowland heath is a scarce habitat and the examples present are generally small and highly fragmented. Many of these sites are declining in quality. Several of the Region's areas of heath lie at or above 250 m and have been classified by some as 'mid-altitude' heath because of their mixture of upland and lowland characteristics.

Tables 21 and 22 give an estimate of the area of lowland heath in the Region. Much of this information comes from English Nature's Lowland Heath Inventory and may be under-estimates of the true extent of lowland heath in the region as sites less than 0.5 ha in area were not included. The full list of sites given in the Lowland Heath Inventory is shown in Table 23.

All of the larger lowland heath sites within the Region have been notified as SSSIs. These include Waldridge Fell and Longhorsley Moor.

Threats

- Lack of management, such as light grazing and cutting, can lead to a loss of structural diversity and the encroachment of trees and scrub.
- Developments such as housing or road construction can lead to habitat loss, disturbance and fragmentation.
- Agricultural improvements can lead to a loss of lowland heath.
- Some sites suffer from recreational pressures which cause damage and disturbance to fragile habitats and create problems with fires.

Opportunities for protection and enhancement

- A number of local authorities have initiated heathland re-creation schemes on degraded or post-industrial sites.

- Derwentside District Council has set up a heathland nursery which can provide locally grown heather for restoration schemes.
- Payments for the management of lowland heath are available through the Countryside Stewardship Scheme. English Nature makes payments through its Wildlife Enhancement Scheme for the management of several lowland heath SSSIs in the Region.

Table 21: Presence (✔) or estimated extent of lowland heathland within the North East Region by local planning authority

Local planning authority	Estimated area (ha)
Alnwick[1]	✔
Blyth Valley[1]	≥1.9
Castle Morpeth[1]	≥17
Chester-le-Street[1]	≥79.8
Derwentside[1]	≥15
Durham City[2]	7.6
Easington[1]	≥1
Gateshead[3]	9.4
Newcastle upon Tyne[1]	1.8
Redcar and Cleveland[4]	287.5
Sedgefield[1]	✔
Sunderland[5]	1.2
Teesdale[1]	≥0.1
Tynedale[1]	≥6.1
Wansbeck[1]	✔
Wear Valley[1]	≥1.5

Table 22: Estimated area of lowland heathland by Natural Area

Natural Area	Estimated area (ha)
Border Uplands*	≥23.1
Durham Magnesian Limestone	≥2.2
North Pennines*	≥1.6
Northumbria Coal Measures	≥115.5
North York Moors and Hills*	≥287.5

*Figure for land within North East Region only.

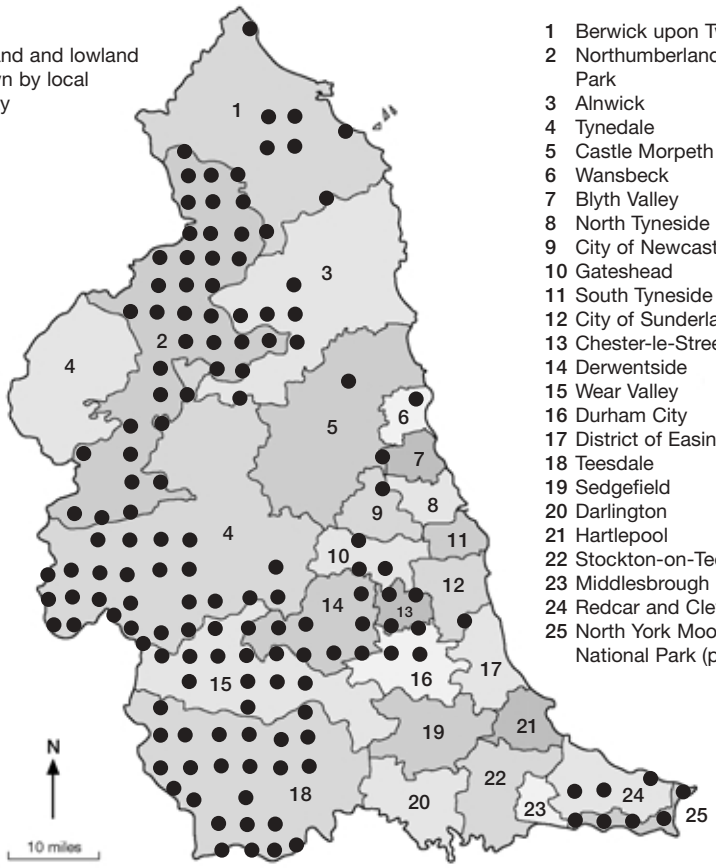
References/data sources
1. English Nature (1994), *Lowland Heath Inventory (Northern Counties)*. English Nature/RSPB.
2. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council. Figure taken for the areas for dry dwarf shrub heath and dry heath/acid grassland mosaic.
3. Figure taken from areas for dry dwarf shrub heath and dry heath/acid grassland mosaic found in Gateshead Phase 1 survey (1998).
4. Tees Valley Wildlife Trust (1999) *Tees Valley Biodiversity Action Plan*. TVWT, Redcar.
5. Figure taken from areas for dry dwarf shrub heath and dry heath/acid grassland mosaic found in Sunderland Phase 1 survey (1999).

Table 23: Sites listed in English Nature's Lowland Heathland Inventory by local planning authority

Local planning authority	Lowland heath sites listed in *'The Lowland Heath Inventory'*
Alnwick	Hulme Park
Blyth Valley	Arcot Hall Grasslands and Ponds SSSI
Castle Morpeth	Longhorsley Moor SSSI, Longhorsley Moor (west), Shaftoe Crags
Chester-le-Street	Waldridge Fell SSSI, Hett Hills, Grange Plantation, Newfield (south of), Whitehill Hall Wood
Derwentside	Greencroft and Langley Moor SSSI, Butsfield & Quick Burn, Stuartfield Moor and Whitehall Plantation, Loves Wood & Malton Nature Reserve, Ragpath Heath, Cockshots Hill, Haperley and Pea Woods, Simpson Hill Murrow Edge Heath, Bone Lane Disused Shaft Area, Dipton, Greencroft Disused Railway, Harelaw Cemetery (west of), Pontop Pike Fell, Pontop Pike Lane, South Moor Golf Course, Stoney Heap/Batling Lime Kilns, Twizzel Plantation,
Durham City	Deerness Valley, Brancepeth Castle & Golf Course, Brancepeth Disused Railway, Bear Park, Framwellgate Moor Carrs, Frankland & Kepier Woods, Newton Hall Junction, Rainton Park Wood, Shincliffe Pit Heap, Oxclose, Ludworth Mine Disused Railway
Easington	Hesledon Moor West SSSI
Gateshead	Gibside SSSI, Burdon Dene, Damhead Wood, Ouseborough Wood
Newcastle upon Tyne	Havannah
Redcar and Cleveland	Eston Moor
Sedgefield	Eldon Lane Heath, Ferryhill
Sunderland	Hetton Lyons, Eppleton Railway
Tynedale	Doors East Quarry, Doors West Quarry, Low Common, Stagshaw Common, West Dipton Wood
Teesdale	Frog Wood Bog SSSI
Wansbeck	Newbiggin Moor Golf Links
Wear Valley	Pow Hill Bog SSSI, Pow Hill Country Park, Pow Hill (north), Low Hospital Plantation, Houselop Beck Wood

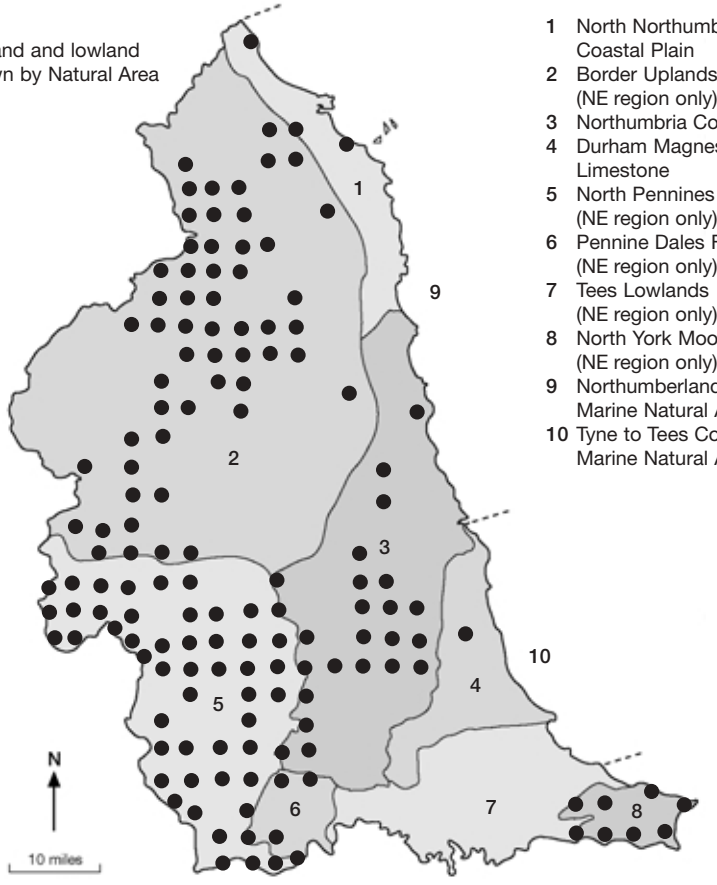
Note: the Lowland Heath Inventory (1994) only listed sites for which information was available at the time of publication and which were larger than 0.5 ha in area. It is not therefore an exhaustive list of sites within the Region.

Map 15
Presence of upland and lowland heathlands shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 16
Presence of upland and lowland heathlands shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

8.2. UPLAND HEATHLAND

Upland heathlands are generally found above the upper edge of enclosed agricultural land at around 300 - 400 m in altitude. Some sites below 300 m may also display upland characteristics and are regarded and managed as such. Upland heath is characterised by the presence of dwarf shrubs, such as heather *Calluna vulgaris* and bilberry *Vaccinium myrtillus*. They tend to develop on nutrient poor acid soils which receive over 100 cm of precipitation per annum. They often form a mosaic with acid grasslands.

Other nationally or regionally important species sometimes associated with upland heathland include:
dunlin
golden plover
sword grass moth

Dwarf shrub heath has a limited global distribution and is largely confined to the British Isles and the western seaboard of mainland Europe. Britain therefore holds a significant proportion of the world resource of this habitat.

Upland heathlands are also important for the populations of breeding birds which they support. These include species such as **curlew**, **snipe** and **redshank**, **black grouse**, ring ouzel and red grouse, as well as birds of prey such as **merlin** and **hen harrier**. Many upland sites contain nationally and internationally important populations of birds. Upland heathlands may also support a range of specialised invertebrates, such as the bumblebee *Bombus monticola*, a species which has suffered a dramatic decline in the region.

Current status

There is currently estimated to be between 2 and 3 million ha of upland heath in the UK, of which 270 000 ha is thought to be in England. The habitat has suffered considerable losses in recent times, with 27% of the heather moorland in England and Wales estimated to have been lost between 1947 and 1980. Much of this loss is attributed to agricultural land improvements, heavy grazing by sheep, and afforestation. It has been estimated that 440 000 ha of land in England and Wales is made up of grassland containing suppressed dwarf shrubs. There is likely to be further significant loss of heather moorland to acid grassland if current grazing levels and pressures continue.

The North East has extensive tracts of upland heath. There is at least 51 162 ha of upland heathland within the region (Tables 24 and 25), which represents around 19% of the English resource. Much of this can be found in the North Pennines, the Northumberland National Park, and in the Tees Valley portion of the North York Moors. The most important tracts of upland heath have been designated as SSSIs. Some sites are also considered to be of international importance for their heathland habitats and/or bird populations and have accordingly been designated as cSACs and Special Protection Areas (SPAs).

Threats

- Heavy grazing, especially by sheep, leads to the suppression of dwarf shrubs and ultimately to conversion to acid grassland. This can be exacerbated by a lack of shepherding which prevents stock utilizing the whole of the grazing land available to them. Inappropriate supplementary feeding practices can lead to localised over-grazing and nutrient enrichment.
- Lack of management can allow encroachment of scrub and trees and succession to woodland.

- Bracken invasion is a problem at several sites and can lead to a loss of dwarf shrubs.
- Difficulties in negotiating agreements with commoners are hampering take-up of agri-environment schemes on common land.
- Poorly managed heather burning can damage or eliminate lower plant communities and lead to a monoculture of heather at the expense of other plant species.
- Conversion to grassland through ploughing, reseeding, liming, and fertilization for agricultural purposes may take place, particularly at lower elevations on enclosed allotment land. Drainage and moorland gripping may reduce the interest of wet heaths. These factors have become less significant over the last ten years.
- Raptor populations are still subject to persecution.
- Quarries, windfarms, communication masts, access tracks and other planning developments can impact directly on the wildlife interest of upland heathlands.
- Localised damage and disturbance from other forms of land use in the uplands, such as recreation, may be a concern in some areas.
- Afforestation leads to the direct loss of dwarf-shrub habitat.
- The interaction of two or more of the factors listed above often greatly increase the impact on upland heathland vegetation. For example, poorly managed burning followed by heavy grazing will result in the loss of dwarf shrubs more rapidly than either factor in isolation.
- Areas of marginal land surrounding upland heath are an important habitat for many of the birds of open moorland and are under pressure from agricultural improvement.

Opportunities for protection and enhancement

- Agri-environment schemes such as Countryside Stewardship provide grants for the sympathetic management of upland heath and for the restoration of suppressed heather. On sites notified as SSSIs, English Nature's Wildlife Enhancement Scheme can make payments, eg, for off-wintering of sheep and for habitat enhancements of benefit to black grouse and other bird species.
- Recent progress has been made on several North Pennines sites in negotiating agreements by commoners to permit entry into agri-environment schemes.
- At national and international level policy change to reduce overgrazing in the uplands, such as reform of the Common Agricultural Policy (CAP), would be of great benefit to upland heathlands.
- Restructuring of conifer blocks offers the opportunity to recreate or restore areas of heath. For example, on Wooler Common 160 ha of conifers are being removed and restored to heather moorland.
- Grouse moor management acts as an economic driver for habitat management in the uplands and has provided funds for works aimed at increasing heather cover.

Table 24: Presence (✔) or estimated areas of upland heath and heathland/acid grassland mosaics in the North East Region by local planning authority

Local planning authority	Estimated area (ha)
Alnwick	✔
Berwick upon Tweed[1]	≥1306.6
Derwentside[2]	3040.1
Northumberland National Park[4]	19913
North York Moors National Park[3]	1690
Teesdale[5]	8000.9
Tynedale[6]	9123.7
Wear Valley[5]	8088.1

Table 25: Estimated area of upland heath and heathland/acid grassland mosaic by Natural Area

Natural Area	Estimated area (ha)
Border Uplands	≥22851.6
North Pennines[6]*	26620.8
North York Moors and Hills*	1690

*Figure for land within North East Region only.

References/data sources
1. Data from East Northumberland Phase 1 survey. Supplemented by information for Bewick Moor provided by D Fiege, NCC.
2. Calculated using Phase 1survey information for County Durham.
3. This figure is for land within the North East region only. Taken from Tees Valley Biodiversity Action Plan.
4. Data from Northumberland National Park Phase 1 survey (1992)
5. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council.
6. English Nature (1997) *Natural Area Profile: The North Pennine*s. English Nature, Newcastle upon Tyne. Supplemented with data from the Tyne Valley Phase 1 survey (1996) and EN data on the Kielderhead and Emblehope Moors SSSI.
7. English Nature (1997) *Natural Area Profile: The North Pennine*s. English Nature, Newcastle upon Tyne. Figure for land within the North East region only.

9.0. FEN, MARSH AND SWAMP

9.1. PURPLE MOOR-GRASS AND RUSH PASTURE

Other nationally or regionally important species sometimes associated with purple moor-grass and rush pasture include:
skylark
narrow-bordered bee hawkmoth

Purple moor-grass and rush pastures have a vegetation that is dominated by purple moor-grass *Molinia caerulea* and tall rushes *Juncus spp*. The habitat is made up of five particular communities of the National Vegetation Classification (NVC): M22, blunt-flowered rush *Juncus subnodulus* - marsh thistle *Cirsium palustre* fen meadow; M23 soft/sharp-flowered rush *Juncus effusus/acutiflorus* - marsh bedstraw *Galium palustre* fen meadow; M24 purple moor-grass *Molinia caerulea* - marsh plume thistle *Cirsium disectum* fen meadow; M25 purple moor-grass *Molinia caerulea* - tormentil *Potentilla erecta* mire; and M26 purple moor-grass *Molinia caerulea* - marsh hawk's-beard *Crepis paludosa* mire. Of these, examples of M22, M24 and M26 are considered to be particular priorities for conservation.

Purple moor-grass and rush pastures are generally found on peaty gleys and shallow peats at low altitude, but also extend on to mineral soils, and often occur in a complex mosaic with other types of vegetation. This definition of purple moor-grass and rush pastures is generally restricted to the lowlands, with the altitudinal limit being principally set by the limit of enclosure. Forms of *Juncus* (M23) and *Molinia* (M25) pastures in the uplands are therefore excluded. However, stands of *Molinia - Cirsium dissectum* fen meadow (M24) and *Molinia - Crepis paludosa* mire (M26) may occasionally be found somewhere above the enclosure limit and are included because they have a predominantly lowland character.

Purple moor-grass and rush pastures are a priority for nature conservation because they are highly susceptible to agricultural modification and reclamation throughout their range.

The habitat generally supports a rich mixture of plant species including, sharp-flowered rush *Juncus acutiflorus*, blunt-flowered rush *Juncus subnodulus*, devil's-bit scabious *Succisa pratensis*, marsh bedstraw *Galium palustre* and sedges *Carex spp*. The pastures can be important for wading birds such as **redshank**, **snipe** and **lapwing**, and in some parts of the country support the marsh fritillary butterfly.

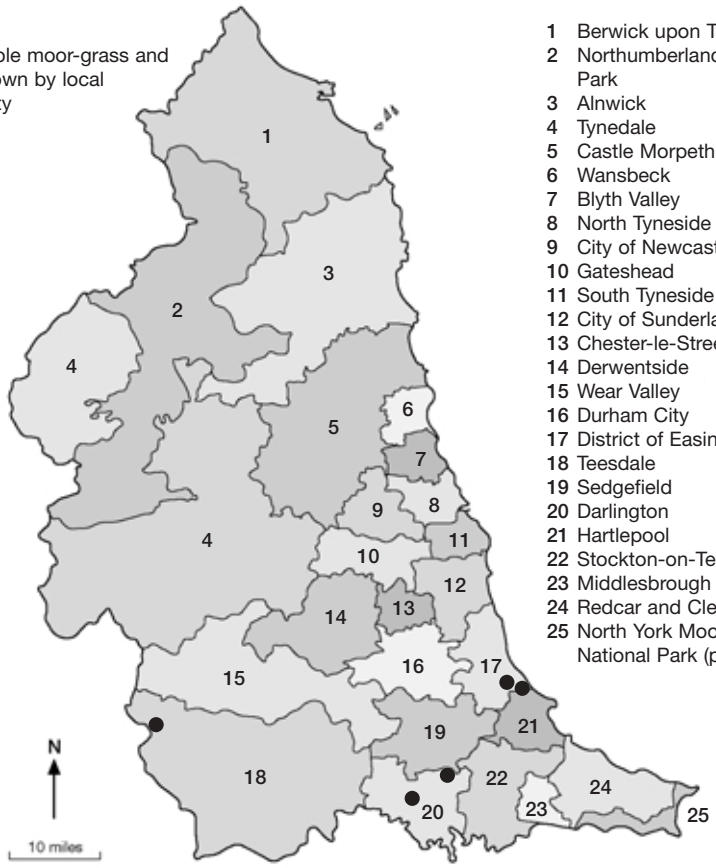
Current status

There are approximately 56 000 ha of purple moor-grass and rush pasture in the UK. This probably exceeds that in the rest of Europe, with the possible exception of Ireland. Devon and Cornwall are the English strongholds for this habitat, and have lost 62% of sites, and 48% of the total area, between 1981 and 1991.

Within the North East Region examples of the three most valuable types of purple moor-grass and rush pastures are virtually non-existent. Small areas (around 2 ha in total) have been recorded from five sites in the region. In each case the vegetation represents an impoverished example of the relevant NVC community. All of the known sites for purple moor-grass and rush pasture in the region are found on Sites of Special Scientific Interest (SSSIs). Details of these sites are given in Table 26. Some examples of the M23 *Juncus effusus/acutiflorus - Galium palustre* fen meadow also persist in the lowlands of the region. However, it has not been possible to quantify their extent.

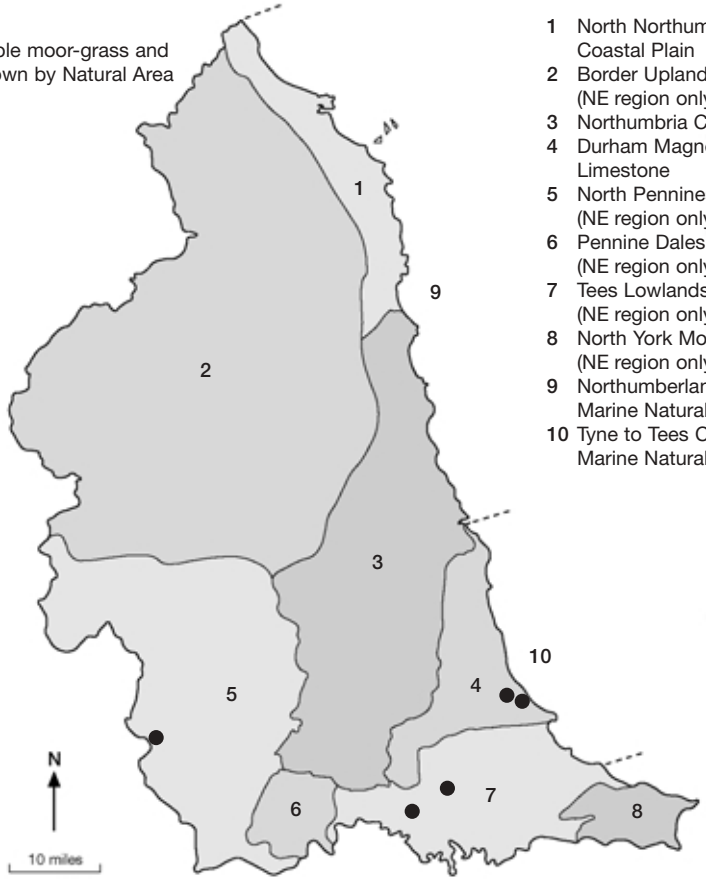
There is no information about the former extent of this habitat within the Region but it is probable that it would have been common in the once extensive wetland of Bradbury, Morden and Preston Carrs, which were drained early last century.

Map 17
Presence of purple moor-grass and rush pasture shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 18
Presence of purple moor-grass and rush pasture shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Threats

- Nutrient enrichment caused by agricultural run-off, leading to a loss of biodiversity through the growth of competitive species such as great horsetail *Equisetum telemateia* and hemp agrimony *Eupatorium cannabinum*. This is a particular problem on the Durham Coast.
- Climate change may reduce ground water availability for flushes on the Durham Coast.
- On the Durham Coast, coastal erosion could lead to direct losses in habitat.
- Agricultural improvement through drainage, cultivation and fertilizer applications.
- Inappropriate management, including inappropriate grazing management.
- Agricultural abandonment, leading to rankness and scrub encroachment through lack of grazing.
- Fragmentation and disturbance caused by developments such as housing and road construction.

Opportunities for protection and enhancement

- The rush pastures of the Durham Coast form part of the Durham Coast National Nature Reserve. Redcar Field is managed as a nature reserve by the Durham Wildlife Trust.

Table 26: Sites of purple moor-grass and rush pasture in the North East Region

Site name	Local planning authority	Natural Area	Estimated area (hectares)	NVC community present
Newton Ketton Meadows SSSI	Darlington	Tees Lowlands	~0.5	M23/M24
Redcar Field SSSI	Darlington	Tees Lowlands	<0.05	M22
Durham Coast SSSI	Easington	Durham Magnesian Limestone	~1	M22/M24
Hulam Fen SSSI	Easington	Durham Magnesian Limestone	<0.01	M23/M24/M25
Upper Teesdale SSSI	Teesdale	North Pennines	~0.5	M26

Table is based on SSSI information held on file by English Nature Northumbria Team.

9.2. FENS

Fens are peatlands which are fed by groundwater as well as by rainwater. In scientific terminology they are described as minerotrophic. This differentiates fens from true bogs whose water supply comes from rainwater only and which are described as ombrotrophic. In practice, the vegetation of some fens may be very similar to many true bogs and the two may be difficult to separate.

Other nationally or regionally important species sometimes associated with fens include:
lapwing
redshank
reed bunting
snipe
yellow wagtail
European otter
water vole
dark bordered beauty

Fens are often separated into two types: topogenous fens, in which water movement is generally vertical, and soligenous fens, where water movement is usually lateral. The former type includes basin mires and flood plain mires, while the latter includes valley mires and a range of acidic flush/mire systems in the uplands.

Fens can also be described as 'poor-fens' or 'rich-fens'. Poor-fens are found were the water is derived from base-poor rocks such as sandstones. They are characterised by short vegetation with a high proportion of bog-mosses *Sphagnum* spp. Rich-fens are fed by mineral enriched calcareous water and the vegetation usually contains patches of tall plants.

Fen habitats are an internationally threatened habitat which support a diversity of plant and animal communities. They are the habitat which supports more species listed in the UK BAP than any other. In some fens up to 550 species of higher plant have been recorded, and the habitat is known to be important for a wide range of invertebrates including dragonflies and water beetles.

Current status

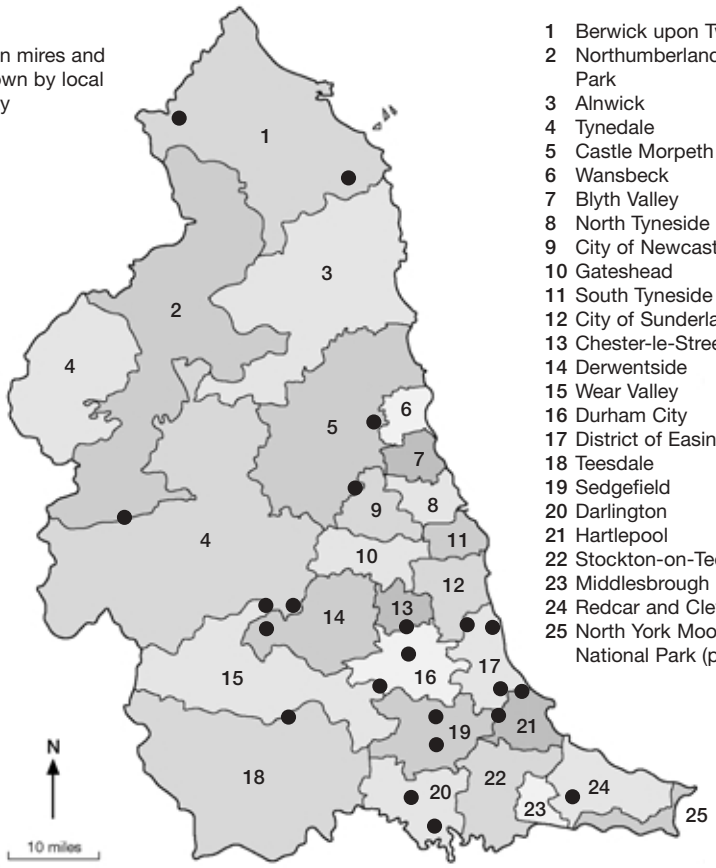
The total area of fen in the UK has not been calculated, however it is thought to be a significant proportion of the European fen resource.

Tables 27 and 28 attempt to quantify the extent of fens in the Region. This has been largely derived from existing Phase 1 data, supplemented with information about particular valley mires and basin mires. The classification of fens used in Phase 1 methodology is based on topography and landform rather than vegetation. This can lead to difficulties in accurately quantifying the extent of the habitat, particularly in the case of valley mires because of their similarity to marshy grasslands in the lowlands and because of their convergence with flush systems in the uplands. For completeness the range of flush/mire systems in the uplands is included within the figures given in Tables 27 and 28.

The majority of fen vegetation in the Region probably occurs as valley mire and is found mainly in the uplands. Basin mires are very localised in the North East. Most of the important areas of fen within the Region have been designated as SSSIs. Because of the widespread presence of flush/mire systems in the uplands, Maps 19 and 20 only show the locations of basin mires and lowland fens.

There is no information available about the likely recent decline in the extent of fens in the region. However, in County Durham much of Bradbury, Morden and Preston Carrs, which were drained early last century, would have consisted of fen.

Map 19
Presence of basin mires and lowland fens shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
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8 North Tyneside
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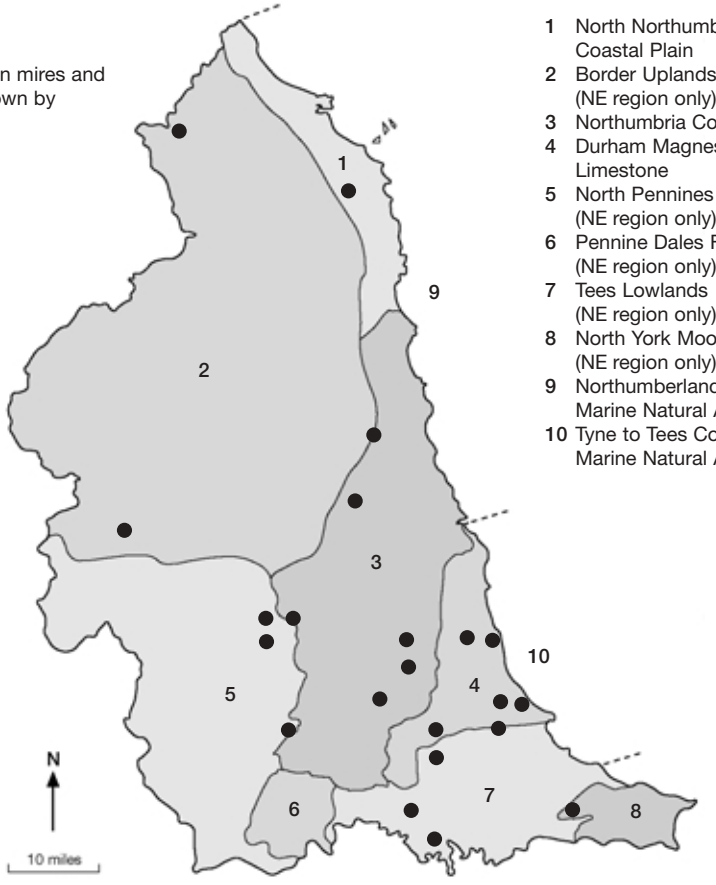
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 20
Presence of basin mires and lowland fens shown by Natural Area



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6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Threats

- Drainage of fens, or of the surrounding land, leads to drying out of peat and the development of woodland.
- Pollution, particularly nutrient enrichment, can cause adverse changes in the vegetation of fens.
- Valley mires are particularly susceptible to agricultural run-off and afforestation within their catchment.
- Overgrazing may be a problem on some sites.
- Inappropriate management can lead to drying, scrub encroachment and succession to woodland.
- Excessive water abstraction can lower water tables and alter the quality of both ground water and surface water.

Opportunities for protection and enhancement

- Newham Fen in Northumberland is managed as an NNR by English Nature. Areas of fen are also found within the Greenlee Lough National Nature Reserve which is managed by the Northumberland National Park.
- Payments are available under the Countryside Stewardship scheme for the management of fens.

Table 27: Presence (✔) or estimated area of fen in the North East Region by local planning authority

Local planning authority	Estimated area (ha)
Alnwick	✔
Berwick upon Tweed[1]	≥3.6
Chester-le-Street[2]	2.7
Darlington[2]	1.0
Derwentside[7]	63.9
Durham City[2]	5.8
Easington[2]	2.7
Hartlepool[2]	1.79
Newcastle upon Tyne[3]	14.4
Northumberland National Park[5]	504
North York Moors National Park[4]	30.0
Redcar & Cleveland[6]	~3.5
Sedgefield[2]	11.9
Teesdale[7]	1484.5
Tynedale[7]	1416.5
Wear Valley[7]	1501.4

References/data sources

1. Calculated from habitat information from English Nature for Newham Fen SSSI (area of open fen only), Barelees Pond SSSI, and Campfield Kettle Hole SSSI.
2. Stuart Hedley (English Nature) Unpublished data.
3. English Nature Phase 1 data for Prestwick Carr SSSI.
4. North York Moors National Park Phase 1 survey (1990).
5. Data taken from Northumberland National Park Phase 1 survey (1992)
6. Allison, N & Weir, A (1987) *Inventory of Sites of Biological Interest in Cleveland*. Cleveland County Council. Taken from areas for Easton Basin Mire SNCI.
7. English Nature (1997) *Natural Area Profile: The North Pennines*. English Nature, Newcastle upon Tyne.

Note: A proposal is currently before the UK BAP Steering Group to revise the Habitat Action Plan for fens to cover only lowland fens (both soligenous and topogenous types). The value of upland fens and flushes for nature conservation is recognised but they are not thought to be widely threatend. It has therefore been suggested that upland fens and flushes be re-categorised as a 'Habitat of Conservation Importance'. At the time of going to press, these proposals have not yet been agreed or approved by the UK Steering Group. The figures presented here include the significant areas of acid soligenous fen which occur in the uplands.

Table 28: Estimated area of fen by Natural Area

Natural Area	Estimated area (ha)
Border Uplands	≥507.1
Durham Magnesian Limestone	10.5
North Northumberland Coastal Plain	≥0.5
North Pennines*	4466.3
Northumbria Coal Measures	22.8
North York Moors & Hills*	30.0
Tees Lowlands	~10.49

*Figure is for land within the North East Region only.

9.3. REEDBEDS

Reedbeds are wetlands dominated by stands of common reed *Phragmites australis*. Other species may also occur but at significantly lower levels of abundance. In reedbeds the water table is at or above ground level for most of the year. They tend to incorporate areas of open water and ditches.

Other nationally or regionally important species sometimes associated with reedbeds include:
bats
great crested newt

Nationally, reedbeds are among the most important habitats for birds in the UK. They can support a distinctive assemblage of breeding birds, which includes rare and endangered species such as **bittern** and bearded tit. Reedbeds also provide roosting and feeding sites for migratory species, winter roost sites for birds of prey, and are associated with five GB red data book invertebrates.

The reedbeds in the North East Region are currently of insufficient size and quality to support breeding populations of bittern and bearded tit (although both may occur outside of the breeding season) but are locally important for a number of birds, including reed warbler, sedge warbler and **reed bunting**, and are associated with mammals such as **water vole** and **otter**. These latter three are priority species in the UK Biodiversity Action Plan.

Current status

There are estimated to be around 5000 ha of reedbed in the UK, however most sites are of small size. Extensive reedbeds are not common and nationally there are only around 50 sites which exceed 20 ha in area.

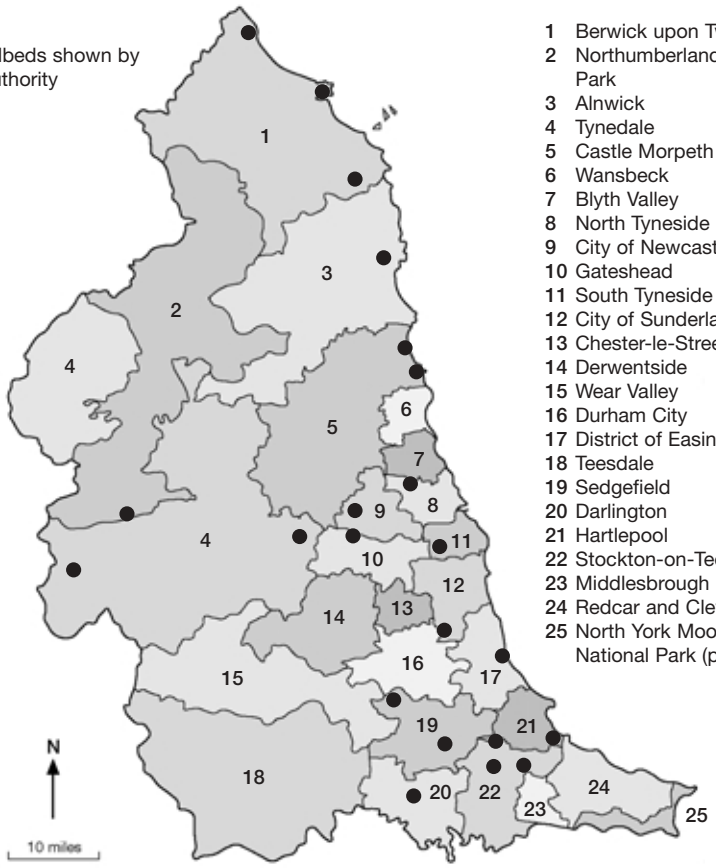
Reedbeds are widely distributed within the North East Region but are all of small size. They can generally be found around the edges of lakes and ponds. Tables 29 and 30 attempt to quantify the reedbed resource in the Region. Most of the information shown is taken from the RSPB's *An Inventory of British Reedbeds*[1]. This is not comprehensive and many smaller, or newly created, reedbeds may not have been included. The figures in Tables 29 and 30 should therefore only be taken as an initial estimation of the area of reedbed in the North East.

Reedbeds are found in several SSSIs within the region.

Threats

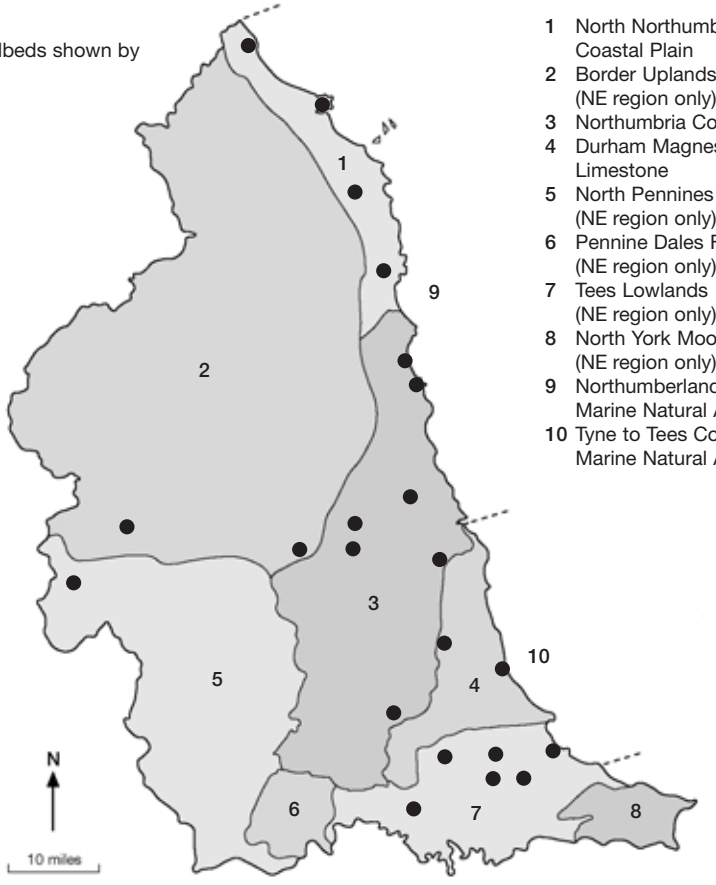
- Neglect or inappropriate management of reedbeds can lead to scrub encroachment, drying out and succession to woodland.
- Water pollution (including eutrophication) can kill off reeds and other wetland species.
- Sea-level rises may threaten some coastal reedbeds.
- Water abstraction can cause drying out of reedbeds.
- The small size of many reedbeds mean that they cannot support viable populations of some key species.
- Habitat may be lost as the result of development. In the past reedbeds have also been lost through drainage and conversion to agricultural land.

Map 21
Presence of reedbeds shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 22
Presence of reedbeds shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Opportunities for protection and enhancement

- There are plans for large scale reedbed creation at East Chevington on the Northumberland coast and at the Teesside International Nature Reserve.
- The RSPB/Environment Agency/English Nature Northern England Lowland Wetland Project identifies potential sites for reedbed/wetland creation.
- Creation of new areas of reedbed where management of flood defences or local water table provide suitable opportunities.
- The Countryside Stewardship Scheme provides payments to manage or re-create reedbed habitat.
- Some reedbeds have been created in order to assist water treatment on industrial sites, for example at Terra (formerly ICI) on Teesside.

Table 29: Presence (✔) or estimated area of reedbed in the North East Region by local planning authority

Information is taken mostly from *An inventory of British reedbeds*[1] but has been supplemented by other data sources.

Local planning authority	Estimated area (ha)	Site names (taken from RSPB reedbed inventory unless otherwise stated)
Alnwick	≥1.5	Alnmouth Saltmarsh & Dunes
Berwick upon Tweed	≥4.4	Lindisfarne, Newham Fen[2], Berwick Tapee Lake[3]
Castle Morpeth	≥3.6	Cresswell Ponds, East Chevington Burn, Hadston Links, Whittle Dene Reservoir[4]
Darlington	≥0.5	Redcar Field
Durham City	≥1.4	Butterby Oxbow
Easington	≥0.5	Durham Coast
Gateshead	≥6.3	Ryton Willows, Shibdon Pond
Hartlepool	≥2.6	
Middlesbrough	≥2	Berwick Hills reedbed[5]
Newcastle upon Tyne	≥7	Gosforth Park Lake
Northumberland National Park	≥12.5	Roman Wall Loughs
Redcar and Cleveland	≥3.1	South Gare & Coatham Sands
Sedgefield	≥1.1	Railway Stell West
South Tyneside	0.7	Primrose LNR reedbed[6]
Stockton-on-Tees	≥12.9	Cowpen Marsh, Haverton Hill Lakes[7]
Sunderland	≥1.1	Hetton Bogs, Wildfowl and Wetlands Trust, Washington[8]
Tynedale	✔	Coanwood Fen[9]

References/data sources
1. Painter M, Smith K & Gilbert G (1995) *An Inventory of British Reedbeds*, RSPB, Sandy.
2. Area of reed at Newham Fen not given in reedbed inventory. Calculated to be ~0.8 ha using EN data.
3. Northumberland Wildlife Trust (1983) *Sites of Nature Conservation Interest*, NWT, Newcastle upon Tyne.
Area of Berwick Tapee Lake given as 1 ha.
4. Area of reed at Whittle Dene Reservior not given in reedbed inventory. Calculated at ~1 ha using phase 1 information from Northumbrian Water.
5. Details of Berwick Hills reedbed supplied by Heather Tidball, Middlesbrough Council.
6. Details of Primrose LNR reedbed provided by Matthew Hawking, South Tyneside MBC.
7. Area of Haverton Hill Lakes not given in reedbed inventory. Estimate of area (6 ha) given by Mike Leakey, English Nature.
8. Keith Bowey, pers comm.
9. Northumberland Wildlife Trust (1983) *Sites of Nature Conservation Interest*, NWT, Newcastle upon Tyne.

Table 30: Presence (✔) or estimated area of reedbed by Natural Area

Natural Area	Estimated area (ha)
Border Uplands*	≥13.5
Durham Magnesian Limestone	≥1.6
North Northumberland Coastal Plain	≥5.9
North Pennines	✔
Northumbria Coal Measures	≥18.0
Tees Lowlands*	≥22.2

*Figure for land within North East Region only.

10.0. BOGS

10.1. LOWLAND RAISED BOG

Lowland raised bogs characteristically consist of a raised mound of peat above a water table which is fed only by rainfall (as opposed to ground water). As a result they develop a surface vegetation which is adapted to acid, nutrient-poor conditions.

Other nationally or regionally important species sometimes associated with lowland raised bogs include:
curlew
snipe

Lowland raised bogs are considered to be a priority for conservation because of their rare and threatened status. In a prime state, lowland raised bogs support a rich assemblage of various bog mosses *Sphagnum* spp. together with a number of other species which can include cotton-grass *Eriophorum* spp., sundew *Drosera rotundifolia*, and **bog rosemary** *Andromeda polifolia*. Nationally, raised bogs support a number of uncommon plant and animal species, such as **nightjar**, the **large heath** butterfly and the moss *Dicranum undulatum*.

Current status

Intact lowland raised bogs are one of Europe's rarest and most threatened habitats. The area of lowland raised bog in the UK retaining a largely undisturbed surface is estimated to have diminished by around 94% from an original c95 000 ha to c6000 ha in the present day. Historically, the greatest decline has occurred through agricultural intensification, afforestation and commercial peat extraction. Future decline is most likely to be the result of gradual desiccation of bogs damaged by a range of drainage activities and/or a general lowering of groundwater tables.

In the North East Region, relatively intact lowland raised bog is restricted to north of the Tyne (Table 31). The best examples, Holburn Moss, Ford Moss and Prestwick Carr, are all designated as SSSIs. All three sites have been greatly modified by the actions of man, through drainage and planting with trees. The international importance of Ford Moss has been recognised in its designation as a cSAC. Hart Bog SSSI in the Tees Valley has vegetation similar to that of a raised bog but is topographically a fen, and has been treated as such in this Audit.

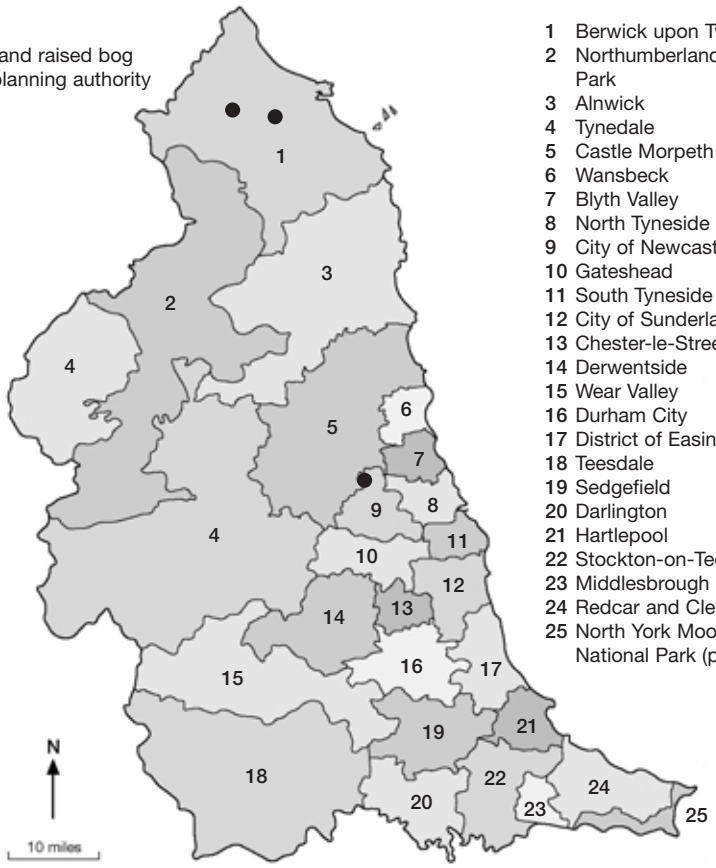
An Inventory of Lowland Raised Bogs in Great Britain (Scottish Natural Heritage, 1996) lists a further 11 sites in the Region, although these are thought to have lost their lowland mire interest. Eight of these sites have been claimed by agricultural use or development and are classed as 'archaic', one is being used for commercial peat extraction, and the remaining two support close-canopied woodland. These sites are listed in Table 32.

Threats

In the North East Region the main threat to lowland raised bogs comes from continued drying out and shrinkage of the peat body as a result of past drainage both of the bogs themselves and of adjacent agricultural land. This has been followed, and exacerbated, by scrub and tree encroachment. Peat extraction is currently being carried out on two sites in the Region, at Kemping Moss and at Greymare Farm (part of the same peat body as Holburn Moss). In other parts of the UK the following are also considered as threats to lowland raised bogs:

- Afforestation.

Map 23
Presence of lowland raised bog shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
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4 Tynedale
5 Castle Morpeth
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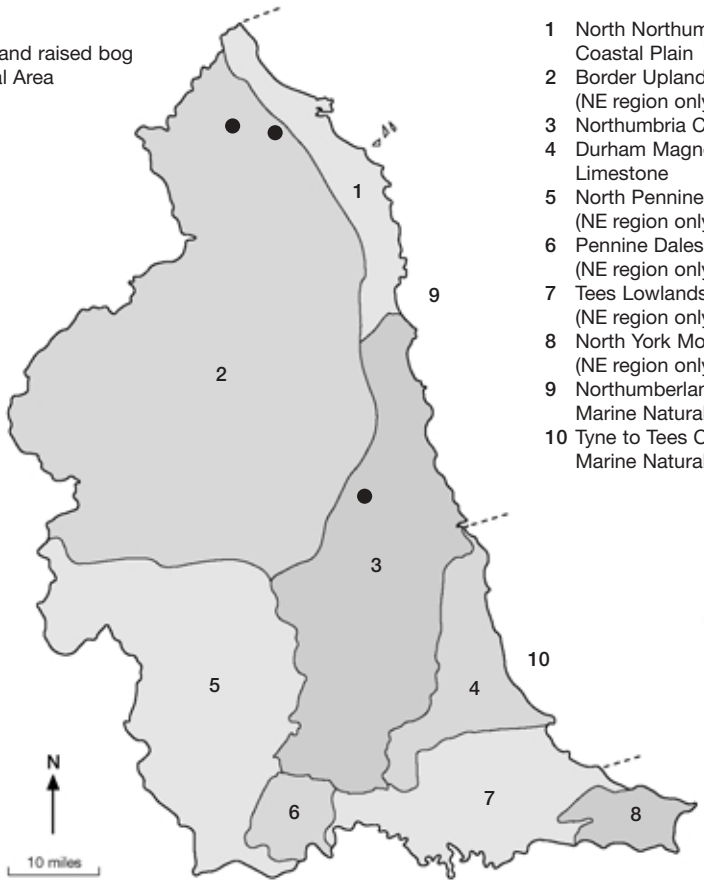
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 24
Presence of lowland raised bog shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

- Extant planning permissions for peat extraction and for mineral extraction of deposits underlying the peat.
- Development, including landfill.
- Nutrient enrichment from agricultural run-off from adjacent land.
- Decreasing rainfall associated with climate change.

Opportunities for enhancement and protection

- Holburn Moss and Ford Moss are Northumberland Wildlife Trust nature reserves. Management includes ditch blocking to raise the water table of both sites, and removal of trees.

Table 31: Estimated area of intact lowland raised bog SSSIs in the North East Region by local planning authority and Natural Area

Local planning authority/*Natural Area*	Site name	Estimated area of peat body (ha)[2]
Berwick upon Tweed/*Border Uplands Natural Area*	Ford Moss	~46
Berwick upon Tweed/*Border Uplands Natural Area*	Holburn Moss	~47
Newcastle uponTyne*/ *Northumbria Coal Measures Natural Area*	Prestwick Carr	~30

*A small part of Prestwick Carr is in Castle Morpeth district.

Table 32: Additional sites also listed in 'An inventory of lowland raised bogs in Great Britain' (1996)[1]

County	Site name	Grid reference	Status
Durham	-	NZ151203	Archaic
Northumberland	Kemping Moss	NT997376	Commercial peat workings
Northumberland	Moss Wood	NT997390	Close canopied woodland
Northumberland	Shoreswood Bog	NT936470	Archaic
Northumberland	-	NU144321	Archaic
Northumberland	-	NT923476	Archaic
Northumberland	-	NU143316	Archaic
Northumberland	-	NZ144705	Archaic
Northumberland	-	NU257010	Archaic
Northumberland	-	NU038455	Close-canopied woodland
Northumberland	-	NU170345	Archaic

References/data sources
1. Lindsay, RA & Immirizi, CP (1996) *An Inventory of lowland raised bogs in Great Britain*. Scottish Natural Heritage Research, Survey and Monitoring Report No. 78.
2. Taken from '*Prioritisation of lowland peat programme resources*' English Nature Research Report 179, English Nature, Peterborough.

10.2. BLANKET BOG

Other nationally or regionally important species sometimes associated with blanket bog include:
curlew
Baltic bog moss

Blanket bogs are areas in the uplands which have developed a mantle of peat more than 50 cm deep. They are found in areas of high rainfall with a cool humid climate. The vegetation of blanket bogs is usually characterised by the presence of bog mosses *Sphagnum* spp. together with species such as cotton-grass, heather and cross-leaved heath *Erica tetralix*, although on some sites this has been altered by inappropriate management. They usually occur in a mosaic with other habitats such as upland heathland, acid grassland and flushes. Blanket bogs are fed entirely by precipitation (ie, rain, snow etc). This differentiates them from fens, which receive inputs from groundwater.

Bogs in which peat is still accumulating through the growth and impeded decay of *Sphagnum* and *Eriophorum* are described as active. However, many bogs have been degraded through drainage and inappropriate management and are no longer forming peat. Both types of bog are included within the UK Biodiversity Action Plan.

The UK holds a significant proportion of the world's blanket bog and so has a particular responsibility for its conservation. It is a habitat that has formed over thousands of years and which cannot be replaced. It supports a number of specialist plant species that are adapted to wet acidic conditions. These include **bog rosemary**, sundew, and bog asphodel *Narthecium ossifragum*.

Blanket bogs are important areas for breeding birds and support populations of national and international significance, many of which are listed on the RSPB's national red list for birds. Species found include **golden plover**, **merlin**, red grouse, **black grouse** and **dunlin**. A variety of invertebrates are also found on this habitat including the **large heath** butterfly. The blanket bogs of the Region are of national significance for this species, with over 70% of the known sites in England and Wales for large heath occurring in Northumberland.

Current status

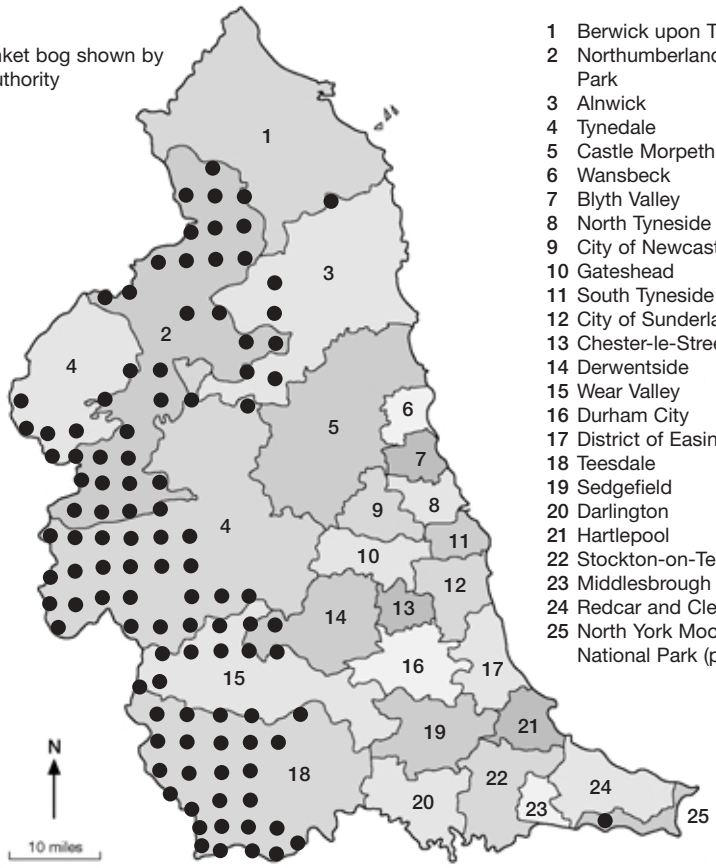
There are estimated to be just under 1.5 million ha of blanket bog in the UK, of which the majority is found in Scotland. England supports some 215 000 ha. This resource is decreasing in both quantity and quality. Figures suggest that there was a 21% reduction in the extent of blanket bog between the 1940s and the 1980s, largely due to afforestation.

The North East is noted for the quantity and quality of its peatlands. There is approximately 39 229.6 ha of blanket bog in the Region (Tables 33 and 34), which represents about 2.6% of the UK resource. Much of this is concentrated in the North Pennine moors and within the Northumberland National Park and is designated as SSSI. Many sites are regarded as being of international importance for their peatland habitats and/or bird populations and have received appropriate designations such as cSACs, Ramsar sites and/or SPAs.

Threats

- Heavy grazing, especially when accompanied by other damaging practices, can damage vegetation. This is particularly a concern on some common land.

Map 25
Presence of blanket bog shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
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16 Durham City
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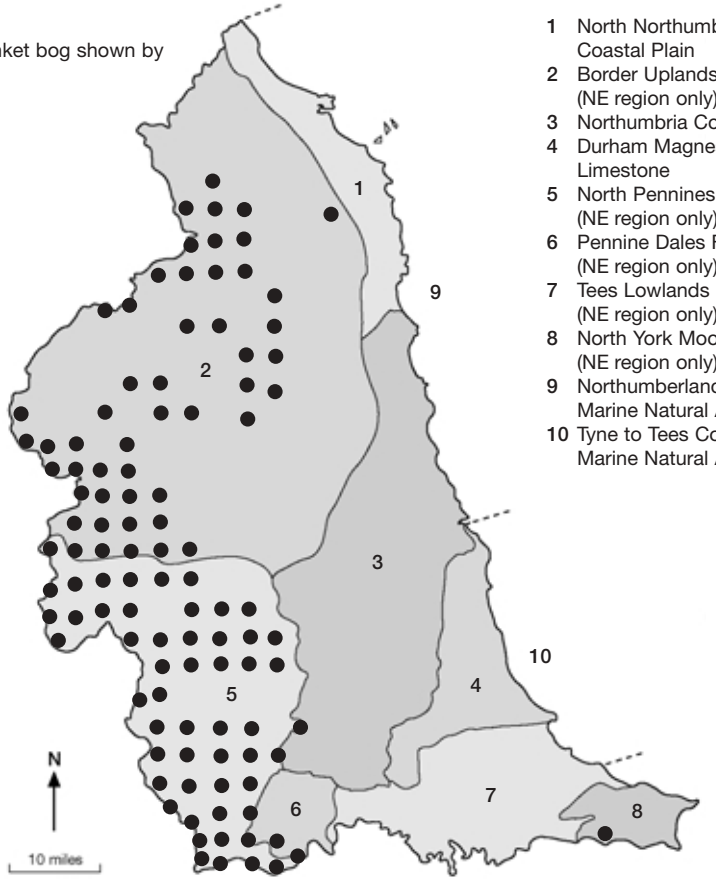
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 26
Presence of blanket bog shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
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8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

- Burning is damaging to blanket bogs and if carried out excessively can lead to the loss of *Sphagnum* species and other plants of interest.
- Extensive tracts of blanket bog have been drained in the past in an attempt to improve the quality of grazing. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and may initiate erosion.
- Some bogs are losing areas of peat because of erosion.
- Blanket bogs are sensitive to recreational and military use. The use of all-terrain vehicles for recreation, agricultural and sporting activities can also result in localised erosion.
- Developments of wind farms, communication masts etc are increasingly being proposed for areas of blanket bog and may lead directly to a loss of habitat, disruption of the local hydrology, or increased disturbance to nesting birds.
- Raptor populations are still subject to persecution.
- Afforestation has led to losses of blanket bog in the past. Forestry can also have indirect effects on bogs by altering their hydrology and increasing predation pressures on ground nesting birds. The seeding of conifers from adjacent plantations on to areas of bog is causing problems in some areas.
- Difficulties in negotiating agreements with commoners are hampering take-up of agri-environment schemes on common land.
- Climate change and global warming are a potential threat to this habitat.

Opportunities for protection and enhancement

- Payments for sympathetic grazing regimes, and blocking of drainage channels, on areas of blanket bogs are available under the Countryside Stewardship Scheme. On land designated as SSSI, payments for grip blocking and off-wintering of stock are available under English Nature's Wildlife Enhancement Scheme.
- The EU funded LIFE Project on the Border Mires has been carrying out restoration work, such as the blocking of drainage channels and the removal of self-seeded conifers.
- Forest Enterprise is restructuring its conifer plantations so that the forest edge can be withdrawn from sensitive mire areas.
- At national and international level, policy change to reduce overgrazing in the uplands, such as reform of the Common Agricultural Policy (CAP), would be of great benefit to blanket bogs.

Table 33: Estimated area of blanket bog in the North East Region by local planning authority

Local planning authority	Estimated area (ha)
Alnwick[1]	≥375.9
Berwick upon Tweed[1]	≥67
Derwentside[2]	191.8
Northumberland National Park[3]	4559
North York Moors National Park[5]	1.3
Teesdale[2]	15955.8
Tynedale[4]	~11695.5
Wear Valley[2]	6383.3

Table 34: Estimated area of blanket bog by Natural Area

Natural Area	Estimated area (ha)
Border Uplands	9390.4
North Pennines*	29837.9
North York Moors and Hills*	1.3

*Figure is for land within North East Region only.

References/data sources
1. Eales, H T (1995-199) *A revision of the status of the large heath butterfly in Northumberland*. Unpublished research reports.
Data for each local planning authority area collated from individual site reports.
2. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council. Figure taken for the areas for blanket bog, dry modified bog and wet modified bog.
3. Data taken from Northumberland National Park Phase 1 survey (1992)
4. English Nature (1997) *Natural Area Profile: The North Pennines*. English Nature, Newcastle upon Tyne. Supplemented with data from the Tyne Valley Phase 1 survey (1996) and EN data on the Kielderhead and Emblehope Moors SSSI and the Kielder Mires SSSI.
5. North York Moors Phase 1 survey (1990).

11.0. OPEN WATER

11.1. MESOTROPHIC LAKES

Other nationally or regionally important species sometimes associated with mesotrophic lakes include:
European otter
water vole
great crested newt
white-clawed crayfish
black-necked grebe
wigeon

Mesotrophic lakes contain a narrow range of nutrients, principally phosphate and nitrate, the concentrations of which are considered to be neither high nor low. Typically mesotrophic lakes have a nutrient concentration of 0.3 - 0.65 mg/l of nitrate and 0.01 - 0.03 mg/l of phosphate.

Mesotrophic lakes potentially have the highest diversity of plants and animals of any lake type. Relative to other types of lake they contain a higher proportion of nationally scarce and rare aquatic plants. They are also important for many types of insect including dragonflies, water beetles and mayflies.

Nationally mesotrophic lakes support some rare fish species, such as vendace. However, none of these occur in the North East Region.

Current status

Mesotrophic lakes are found mainly in the margins of upland areas in the north and west. Several of the largest and most important lakes in the UK were once mesotrophic but have become eutrophic (rich in nutrients) because of pollution.

There has been little monitoring of the trophic status of water bodies within the Region, so the full status of mesotrophic lakes in the North East is unknown. The best examples of mesotrophic lakes are found within the Northumberland National Park and have collectively been notified as the Roman Wall Loughs SSSI and cSAC, although these also show some signs of nutrient enrichment.

Threats

- The main threat to mesotrophic lakes comes from eutrophication (enrichment by excessive nutrient input). This can come from a number of sources including agricultural run-off, sewage effluent and accidental spillages of slurry etc. The important plant communities of mesotrophic lakes may be damaged by relatively small inputs of nutrients.
- Acidification and pesticide pollution may also affect mesotrophic lakes.
- Pollution effects can be exacerbated by excessive water abstraction upstream, leading to a reduction in quality of water reaching lakes.
- Ploughing of land for agriculture or forestry in lake catchments can increase the sediment load in water causing increased turbidity, which in turn decreases the light available to plants for photosynthesis.
- Grazing of livestock on the water's edge can destroy marginal vegetation.
- The introduction of fish to lakes can alter the natural ecosystems of lakes.
- Recreational use of lakes can increase bankside erosion, damage vegetation and disturb birds and animals.
- Introduced species, both plant and animal, may disrupt the ecosystems of mesotrophic lakes and lead to localised extinctions. For example, mink is believed to be partly responsible for the decline of water vole populations within the Region.

Opportunities for protection and enhancement

- Greenlee Lough is managed as a National Nature Reserve by the Northumberland National Park. Grindon Lough is a Northumberland Wildlife Trust nature reserve.
- A national strategy for the control of eutrophication in England and Wales is being developed by the Environment Agency. This will be implemented largely through eutrophication control action plans at key sites and, more widely, through Local Environment Agency Plans (LEAPs).
- The EU Water Framework Directive will provide a basis for the improved management of standing waters.

11.2. EUTROPHIC STANDING WATERS

Other nationally or regionally important species sometimes associated with eutrophic standing waters include:
European otter
water vole
black-necked grebe
wigeon

Eutrophic standing waters contain high levels of plant nutrients, either naturally or because of artificial enrichment. They are characterised by having dense, and persistent populations of algae in mid-summer, often making the water green. Their beds are covered in dark, oxygen free muds which are rich in organic matter. Phosphorus levels in eutrophic waters typically contain at least 0.035 mg/l (including phosphorus bound up in plankton) and nitrogen levels are usually 0.5 mg/l or more. The UK Biodiversity Action Plan includes man-made waters (such as reservoirs) in its definition of eutrophic waters but excludes small pools, ponds and brackish waters.

In their natural state eutrophic standing waters have a high biodiversity. Plankton is abundant, submerged vegetation is diverse and numerous species of invertebrates and fish are present.

The plant species present vary with geographical area and nutrient concentration but fennel-leaved pondweed *Potamogeton pectinatus* and spiked water-milfoil *Myriophyllum spicatum* are characteristic throughout the UK. There is often a marginal fringe of reedswamp, which is an important component of the aquatic ecosystem. Coarse fish such as roach, tench and pike are typical of eutrophic waters. Amphibians, including the protected **great crested newt**, are often present and the abundance of food can support important bird populations.

Current status

The total UK area for eutrophic standing waters has been estimated at around 1785 km^2, with an estimated 675 km^2 in England. Many lowland water bodies are now polluted and have become eutrophic. Such pollution means that naturally eutrophic lakes are likely to be relatively rare in the UK. Some naturally eutrophic lakes have been damaged by nutrient enrichment and have suffered a reduction in species-richness.

The full extent of eutrophic standing waters, both nationally and regionally, is not yet known. Several waterbodies within the region are thought to show eutrophic characteristics, such as Holywell Pond SSSI, but data on water chemistry is not available for most sites. Some of the individual lakes within the Roman Wall Loughs SSSI show low eutrophic conditions based on their vegetation.

Threats

- The main threat to eutrophic lakes comes from further enrichment by excessive nutrient input. This can come from a number of sources including agricultural run-off, sewage effluent and accidental spillages of slurry etc.
- Pollution effects can be exacerbated by excessive water abstraction upstream, leading to a reduction in quality of water reaching lakes.
- Ploughing of land for agriculture or forestry in lake catchments can increase the sediment load in water causing siltation and nutrient enrichment.
- Grazing of livestock on the water's edge can destroy marginal vegetation.

- The introduction of fish to lakes can alter the natural ecosystems of lakes, leading to the loss of existing fish stocks and potential effects on plant and invertebrate populations.
- Recreational use of lakes can increase bankside erosion, damage vegetation and disturb birds and animals.
- Introduced species, both plant and animal, may disrupt the ecosystems of eutrophic standing waters and lead to localised extinctions. For example, mink is believed to be partly responsible for the decline of water vole populations within the Region.

Opportunities for protection and enhancement

- A national strategy for the control of eutrophication in England and Wales is being developed by the Environment Agency. This will be implemented largely through eutrophication control action plans at key sites and, more widely, through Local Environment Agency Plans (LEAPs).
- The EU Water Framework Directive will provide a basis for the improved management of standing waters.

12. MARITIME CLIFFS AND SLOPES

Other nationally or regionally important species sometimes associated with maritime cliffs and slopes include:
juniper
northern brown argus butterfly

Maritime cliffs and slopes form through land slippage or coastal erosion. Slopes can vary between 15° and vertical, although there is no generally accepted definition of the minimum height or angle of slope. Maritime cliffs can be broadly defined as either 'hard cliffs' or 'soft cliffs' although in practice there are a number of intermediate types. Hard cliffs are usually vertical or steeply sloping. Soft cliffs are often unstable and are generally prone to slumping and landslips.

Maritime cliffs and slopes support a wide range of plant species and are an important breeding ground for many birds. The vegetation of maritime cliffs varies according to geology, degree of slope, and exposure to sea-spray but typically includes species such as red fescue *Festuca rubra*, thrift *Armeria maritima* and sea plantain *Plantago maritima*. Rock faces may also support a diverse lichen flora.

Ledges on maritime cliffs are important nesting sites for sea birds such as kittiwake, fulmar, shag and cormorant. Puffins may nest in burrows in the turf of cliff-tops or slopes.

Many maritime cliffs are of particular geological interest. Sea caves within cliff faces may support a diverse array of marine species, including mussels, cushion sponges and colonial sea-squirts, depending on the degree of water movement and scour at particular points in the cave system.

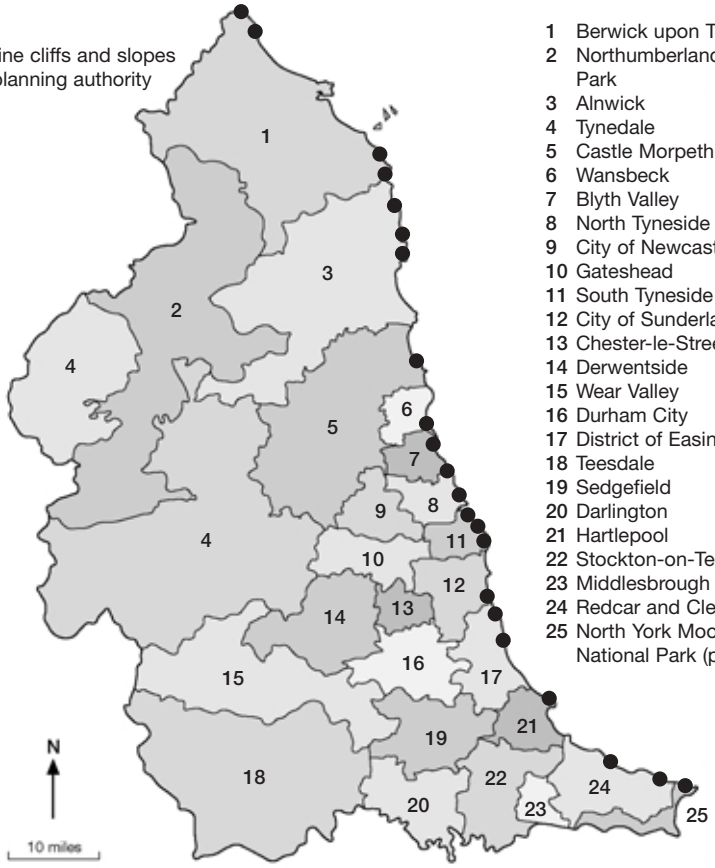
Current status

The UK coastline contains about 4000 km of cliffs. The North East contains around 112 km of cliff and cliff-top habitat (Table 35), which represents about 3% of the British resource. Most of the Region's cliffs are non-vertical and less than 50 m in height, the main exception being Boulby Cliffs which at 200 m rank among some of the highest sea cliffs on the British mainland. A mix of hard and soft cliffs are found, with hard cliffs generally being more prevalent in Northumberland and soft cliffs being more common in County Durham.

The majority of the maritime cliffs in the Region are protected by some form of designation. The North Northumberland coast between Amble and the Scottish border is designated as an Area of Outstanding Natural Beauty (AONB) and as a Heritage Coast. In Redcar and Cleveland, the coast between Saltburn and Staithes forms part of the North Yorkshire and Cleveland Heritage Coast. The Durham Coast has recently been designated a Heritage Coast.

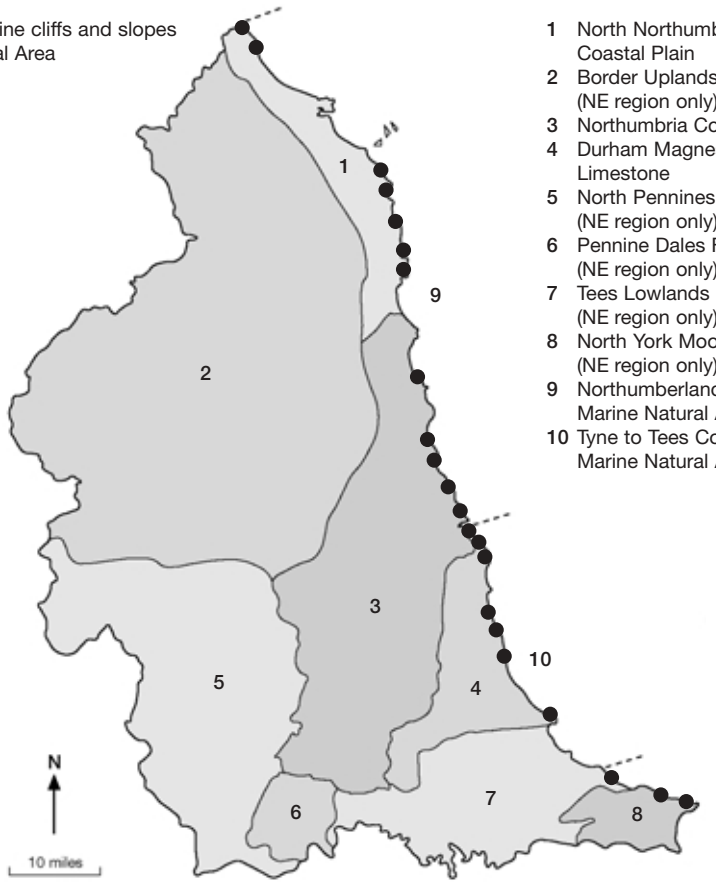
Extensive sections of maritime cliff have been designated as SSSIs in recognition of their geological and/or biological interest. Important colonies of cliff nesting seabirds are found at Cullernose Point and at the Farne Islands in Northumberland, at Marsden in South Tyneside and at Boulby Cliffs in Redcar and Cleveland (although this latter is not designated as a SSSI). The flora supported by the Region's sea cliffs is very diverse. Of particular note is the flora of the Durham coast, which supports a range of interesting species, such as bird's-eye primrose *Primula farinosa* and sea spleenwort *Asplenium marinium*. The vegetated sea cliffs of the Durham coast are now considered to be of international importance and have been designated as a cSAC. Sea caves form one of the interest features of the Berwickshire and North Northumberland Coast cSAC.

Map 27
Presence of marine cliffs and slopes shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 28
Presence of marine cliffs and slopes shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Threats

- Erosion is a significant process for soft cliffs. While this is important for renewing geological exposures and for maintaining a full range of cliff-dwelling plant species, it can result in cliff-top vegetation being destroyed through being squeezed between a receding cliff-face and cultivated land. This is a problem on some areas of the Durham coast.
- Trampling by the public and by livestock may cause the erosion of cliff-top vegetation and disturbance to birds.
- Coastal grasslands can be destroyed by cultivation taking place too close to the cliff edge. Fertilizer run-off and herbicide spray-drift may also affect cliff-top vegetation.
- Heavy grazing in some areas may reduce the diversity of coastal grasslands. Alternatively, lack of grazing may lead to invasion by scrub and coarse grasses.
- Urban development can lead to a demand for coastal protection works which will impede natural coastal processes, including the erosion and slumping which helps to maintain the vegetation of sea cliffs.
- Sea cave communities, including microalgal, lichen and faunal turfs, are sensitive to toxic contaminants. Increases in nutrients and organics may locally alter the physio-chemical environment and lead to a change in structural composition of these communities.

Opportunities for protection and enhancement

- Coastal Management Plans and Shoreline Management Plans offer the opportunity to address issues affecting maritime cliffs and slopes.

Table 35: Lengths of maritime cliffs and areas of maritime grassland in the North East Region

County/former county	Soft cliff (km)	Hard cliff (km)	Total cliff (km)	Maritime cliff grassland
Northumberland	2.1	16.9	19	16.3
Tyne & Wear	0	11	11	2.3
Durham	8	3.5	11.5	15.7
Tees Valley	3.4	7.1	10.5	24.7

Data from Barnes *et al*, 1995[1].

References/data sources
1. Barnes *et al* (1995) *Coasts and seas of the United Kingdom, Region 5 North East England: Berwick upon Tweed to Filey Bay*, JNCC, Peterborough.

13. COASTAL SAND DUNES

Sand dunes develop behind large sandy beaches which dry out at low tide allowing sand grains to be blown landward. For dunes to develop and be maintained there must be a sufficient supply of sand of the size 0.2 to 2 mm. Sand dune vegetation varies depending upon the time elapsed since sand was deposited, sand stability and localised hydrological conditions. Embryonic and mobile dunes occur mainly on the seaward side of a dune system where sand deposition is occurring; these areas are often dominated by marram grass *Ammophila arenaria*. Fixed dunes form where sand has stabilized and where a rudimentary soil has had a chance to develop. These areas usually have lime-rich soils and are particularly rich in plant species. On older dunes calcium may be leached from the soils leading to the development of acid dune grassland or dune heath. In wet depressions between dune ridges, dune slacks may develop. These are often characterised by the presence of creeping willow *Salix repens* and a number of moss species.

Other nationally or regionally important species sometimes associated with coastal sand dunes include:
grey partridge
reed bunting

Sand dunes support a wide range of plant and animals, including some species which have very specialised requirements. The flora of the region's dunes is characterised by species such as **bloody crane's-bill** *Geranium sanguineum*, burnet rose *Rosa pimpinellifolia*, purple milk-vetch *Astralagus danicus* and lesser meadow-rue *Thalictrum minus*. A number of rarities are also found, such as **petalwort** *Petalophyllum ralfsii* (a species listed in Annex 1 of the EU 'Habitats Directive' and a priority in the UK BAP), **dune helleborine** *Epipactis leptochila* var. *dunensis* and coralroot orchid *Corallorhiza trifida*.

Sand dunes are also an important habitat for species such as **skylark** and meadow pipit. Twite overwinter on some of the Region's dune systems. Important breeding colonies of **little tern** are found on the dune/beach interface at Low Newton in Northumberland, Crimdon in County Durham, and South Gare in Redcar and Cleveland. The invertebrates found on many dune systems are of note and may include species such as dark green fritillary and grayling butterflies.

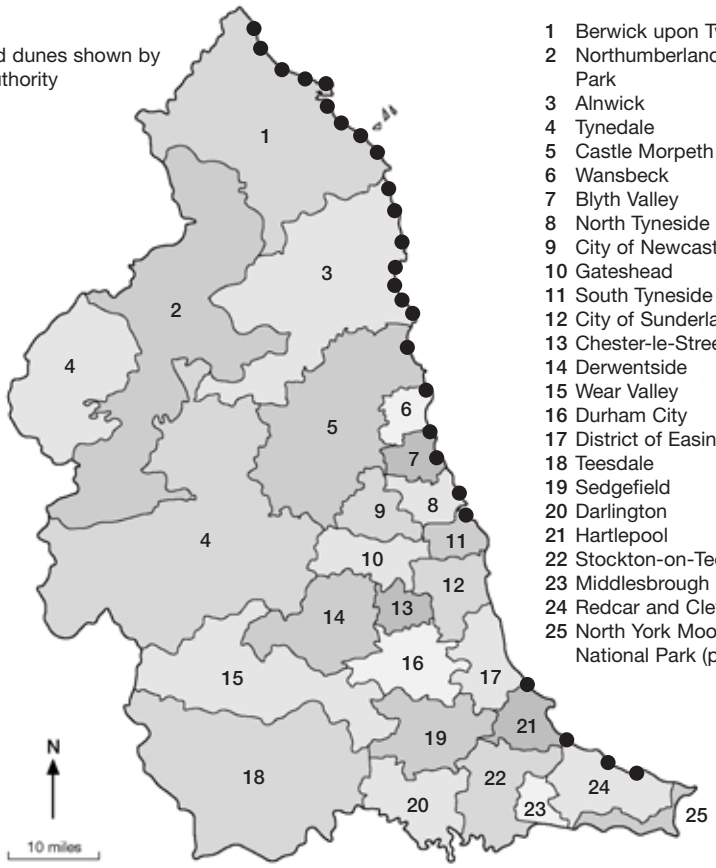
Current status

It has been estimated that England contains 11 897 ha of sand dunes. The North East contains something like 15% of the English sand dune resource (Tables 36 and 37). The Region's dunes are considered to be of great interest for the diversity of habitats that they support. By far the largest area of dunes is found in Northumberland, with smaller areas in Tees Valley and Tyne & Wear. The coast of County Durham is mostly backed by high cliffs and has a single dune system at Crimdon, near to the county boundary with Hartlepool.

Many of the Region's dune systems have been designated as SSSIs and the dunes at Lindisfarne form part of a NNR. The best examples of these have been designated as the North Northumberland Dunes cSAC under the EU 'Habitats Directive'. The dunes at Lindisfarne also form part of a SPA, designated under the EU 'Birds Directive', and have been declared as a wetland of international importance under the Ramsar Convention. Parts of the Tees Bay dune systems similarly fall within the Teesmouth and Cleveland Coast SPA.

The Northumberland coastline between Amble and the Scottish border forms part of an Area of Outstanding Natural Beauty (AONB) and Heritage Coast.

Map 29
Presence of sand dunes shown by local planning authority



1 Berwick upon Tweed
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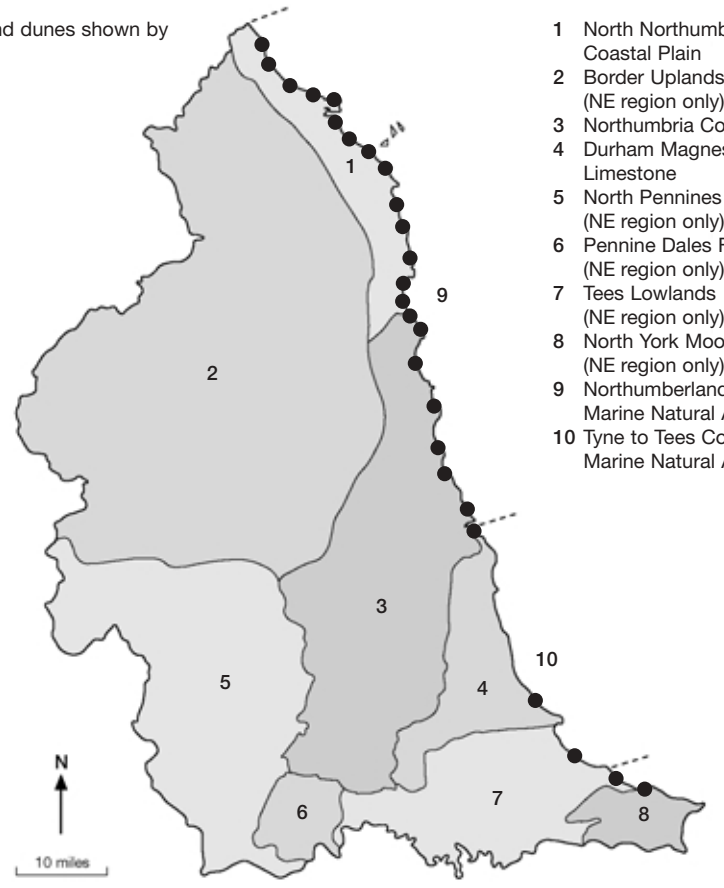
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 30
Presence of sand dunes shown by Natural Area



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8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Threats

- Recreation pressures on dunes is causing erosion and a loss of plant communities on a number of sites; fires can also cause damage.
- Overgrazing by stock can reduce the species diversity of dune grasslands and lead to eutrophication, erosion, and the spread of nettles and rank grasses. Alternatively, a lack of grazing may result in the invasion of scrub species and coarse grasses at the expense of the distinctive dune flora.
- The non-native invasive species pirri-pirri bur *Acaena novae-zelandiae* is found on the dunes at Lindisfarne where it occupies a sizeable area and threatens to displace some of the native flora. It is likely to become established on other dune systems. Sea buckthorn *Hippophae rhamnoides* is a native shrub which forms dense stands on ungrazed dunes and can displace dune grassland communities. This is a particular problem on Seaton Dunes & Common SSSI.
- Increases in sea-level may increase the rate of erosion at the base of sand dunes and can reduce the amount of material available for dune formation.
- Stabilization at the back of dunes caused by agriculture, golf course management and road construction can prevent the natural landward movement of dunes. If sea levels rise this could result in dune systems being squeezed out and lost.
- Sand extraction removes sediment which might otherwise contribute to dune formation.
- Loss of areas of dune to developments, such as roads and golf courses, and because of agricultural improvements, leads to habitat fragmentation and can make appropriate management more difficult to implement.
- Falling water tables can affect the hydrology of dune slacks.

Opportunities for protection and enhancement

- English Nature manages the dunes at Holy Island on the Northumberland coast as part of the Lindisfarne National Nature Reserve. Management is aimed at maintaining a botanically diverse grassland sward and includes the control of invasive pirri-pirri bur.
- A number of the dune systems on the North East coast are owned and managed by conservation bodies such as the National Trust, or by local authorities.
- The Countryside Stewardship Scheme makes payments for the management of sand dunes.
- Control of sea buckthorn is being practised by Hartlepool Borough Council at Seaton Dunes & Common SSSI.

Table 36: Estimated area of coastal sand dunes in the North East by local planning authority

Local planning authority	Estimated area (ha)
Alnwick[1]	273
Berwick upon Tweed[1]	823
Blyth Valley[2]	32.4
Castle Morpeth[1]	154
Easington[5]	11.2
Hartlepool[6]	157.5
North Tyneside[3]	9.9
Redcar and Cleveland[6]	325.5
South Tyneside[4]	15
Stockton-on-Tees[6]	7.5
Wansbeck[2]	21.0

Table 37: Estimated area of coastal sand dune by Natural Area

Natural Area	Estimated area (ha)
Durham Magnesian Limestone	26.2
North Northumberland Coastal Plain	1071
Northumbria Coal Measures	242.3
Tees Lowlands	490.5

References/data sources
1. Radley GP (1994) *Sand dune vegetation survey of Great Britain. Part 1- England*. JNCC, Peterborough.
2. Data taken from South East Northumberland Phase 1 survey (2000).
3. Data taken from North Tyneside Phase 1 survey (1995).
4. South Tyneside MBC (1988) *Wildlife Audit of the Borough of South Tyneside*. South Tyneside MBC.
5. Clifton, S & Hedley, S (1995) *Durham Wildlife Audit*. Durham County Council.
6. Weir, A & Allison, N (1987) *Wildlife Habitats in Cleveland*. Cleveland County Council.

14. COASTAL SALTMARSH

Saltmarsh occurs on soft, shallow shores in sheltered coastal areas and estuaries. It generally occupies the upper, vegetated portions of intertidal mudflats, lying approximately between mean high water neap tides and mean high water spring tides. Characteristic species include glasswort *Salicornia* spp., sea aster *Aster tripolium* and common saltmarsh grass *Puccinella maritima*. The plant species found in saltmarsh show a clear zonation according to the frequency of inundation by tidal waters.

Other nationally or regionally important species sometimes associated with coastal saltmarsh include:
bar-tailed godwit
golden plover

Saltmarsh is a highly specialised and productive habitat which supports a flora which is adapted to cope with seawater. Many invertebrates, including GB red data book and nationally scarce species, are confined to saltmarshes. Areas with a high structural and plant diversity, particularly where freshwater seepages provide a transition from fresh to brackish conditions, are particularly important for invertebrates.

Saltmarshes are important feeding grounds for migrating and wintering bird species, including **wigeon**, teal, and **redshank**. The seeds of saltmarsh plants may also attract feeding flocks of twite and snow bunting.

Saltmarsh, like other intertidal areas, dissipates wave energy thus reducing the risk of damage to sea defences and flooding of low-lying areas.

Current status

Coastal saltmarsh is widely distributed around the UK coastline and is believed to cover some 45 500 ha. However, just over ten sites account for 60% of the total resource. Historically, large areas of saltmarsh have been lost as a result of land claim for agriculture and industry. As a result, the upper and transitional zones of saltmarsh have become comparatively scarce in England.

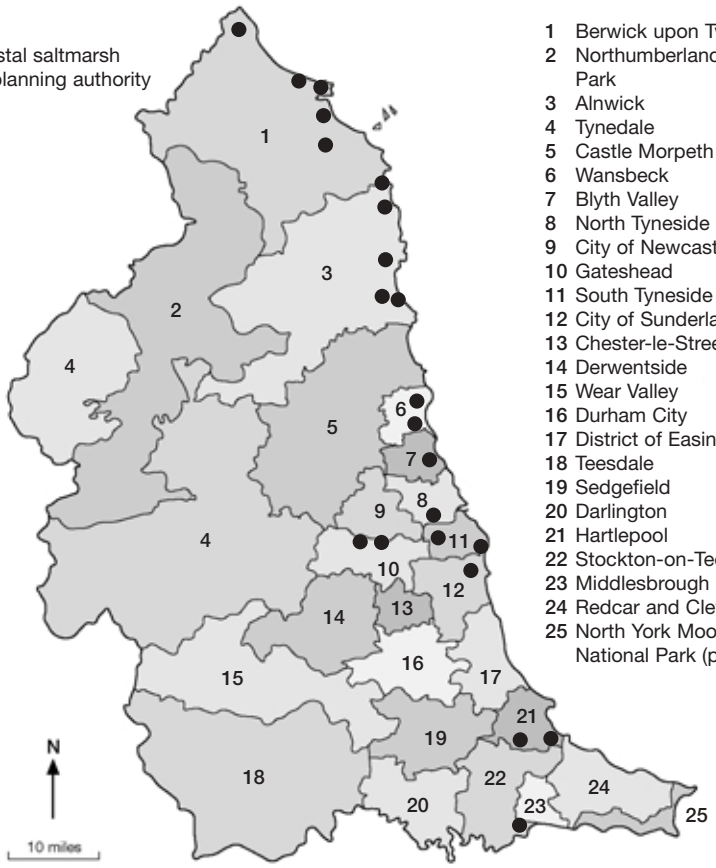
Within the North East, saltmarsh is found in all of the Region's estuaries. The habitat is particularly concentrated within Northumberland with the largest area being found at Lindisfarne (Tables 38 and 39). In other some areas, such as in the tidal stretches of the Tyne and in parts of Tees Valley, the saltmarsh has been reduced to little more than a belt of halophytic (salt-loving) plants. The regional resource is small by UK standards, amounting to a little over 1% of that in England. This is because of a limited supply of sediment, lack of suitable sites for the accumulation of fine sediments, and the land claim of several formerly extensive saltmarshes on estuaries. Since the Industrial Revolution, land reclamation has greatly reduced the amount of saltmarsh found on the Tyne, Wear and Tees.

The largest areas of saltmarsh within the region are notified as SSSI. The Lindisfarne SPA and the Teesmouth and Cleveland Coast SPA both contain sizable areas of saltmarsh. The saltmarsh at Lindisfarne also forms part of the Berwickshire and North Northumberland Coast cSAC.

Threats

- Erosion of the seaward edge of saltmarshes may occur because of rising sea levels and an increase in wave energy. Sediments are usually deposited further up the shore but this is not possible where coastal defences are in place. This can lead to saltmarsh being lost because of the 'squeeze' which takes place between the rising sea and the fixed sea defences.

Map 31
Presence of coastal saltmarsh shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
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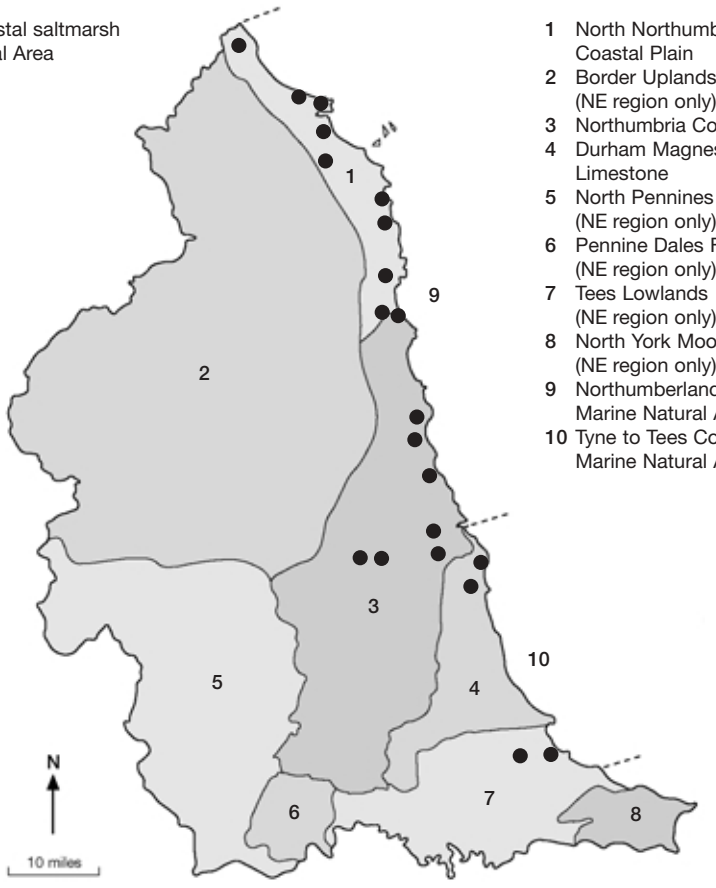
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 32
Presence of coastal saltmarsh shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
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7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

- Industrial development and other forms of land reclamation can lead to the loss of saltmarsh communities.
- Pollution incidents and chronic poor water quality, including increases in nutrient levels, can damage the habitat and the species it supports.
- Cord-grass *Spartina anglica* colonization reduces the diversity of saltmarsh vegetation and the value of the habitat as a feeding ground for birds.
- Coastal defences and other engineering works can disrupt the natural coastal processes of erosion and deposition needed for the maintenance of intertidal habitats such as saltmarsh.
- Recreational and sporting use of saltmarshes can cause disturbance to important bird populations.
- Overgrazing may cause damage on some sites, affecting both breeding birds and saltmarsh vegetation.

Opportunities for protection and enhancement

- Saltmarsh at Holy Island is managed as part of the Lindisfarne National Nature Reserve by English Nature.
- The Countryside Stewardship Scheme has the option of making payments for the creation of inter-tidal habitats, such as saltmarsh, in agreed areas.

Table 38: Estimated area of saltmarsh in the North East Region by local planning authority

Local planning authority	Estimated area (ha)
Alnwick[1]	40.6
Berwick upon Tweed[1]	277.8
Blyth Valley[2]	3.3
Gateshead[3]	0.04
Hartlepool[4]	15
Newcastle upon Tyne[5]	~0.5
North Tyneside[6]	1.9
South Tyneside[7]	9.6
Stockton-on-Tees[4]	11.5
Sunderland[8]	3.4
Wansbeck[2]	2.3

Table 39: Estimated area of saltmarsh in the North East Region by Natural Area

Natural Area	Estimated area (ha)
Durham Magnesian Limestone	3.4
North Northumberland Coastal Plain	318.4
Northumbria Coal Measures	17.6
Tees Lowlands	26.5

References/data sources
1. Data from East Northumberland Phase 1 survey (1995).
2. Data from South East Northumberland Phase 1 survey (2000).
3. Data from Gateshead Phase 1 survey (1998).
4. Weir, A & Allison, N (1987) *Wildlife Habitats in Cleveland*. Cleveland County Council.
5. Saltmarsh occurs as fragmented fringe of halophytic vegetation. Area figure provided by Jim Heslop, Environment Agency.
6. Data from North Tyneside Phase 1 survey (1995).
7. South Tyneside MBC (1988) *Wildlife Audit of the Borough of South Tyneside*. South Tyneside MBC.
8. Data from Sunderland Phase 1 survey (1999).

15. MUDFLATS

Other nationally or regionally important species sometimes associated with mudflats include:
bar-tailed godwit
curlew
dunlin
golden plover
grey plover
knot
lapwing
redshank
ringed plover
sanderling

Mudflats are formed by the deposition of fine sediments in areas of low tidal energy, particularly in estuaries and other sheltered areas. Their sediments consist mainly of silts and clays with a high organic content. The amount of sand present may increase in situations where wave energy is higher, for example at the mouths of estuaries. Mudflats are intimately linked to physical processes too, and may be dependent on other coastal habitats such as soft cliffs and saltmarshes.

Mudflats are highly productive areas which generally support a high density of burrowing invertebrates, such as lugworms, sand mason worms and bivalves. They provide feeding and roosting areas for internationally important populations of migrant and wintering waterfowl, and are also important feeding and nursery areas for flat fish.

Mudflats, like other intertidal areas, dissipate wave energy thus reducing the risk of damage to sea defences and flooding of low lying areas. The mud surface also plays an important part in nutrient chemistry. In areas receiving pollution, organic sediments sequester contaminants and may contain high concentrations of heavy metals.

Current status

The total UK estuarine resource has been estimated at around 588 000 hectares, of which intertidal flats cover about 270 000 ha. The UK has approximately 15% of the north-west European estuarine habitat. Development of estuarine and coastal areas continues to threaten remaining mudflats.

Within the North East, intertidal flats are found within the estuaries of all the Region's rivers. However, by far the largest area of intertidal flats is found at Lindisfarne on the north Northumberland coast. In the past much intertidal land has been lost to reclamation. In some estuaries the areas of intertidal mud are therefore small and linear. Table 40 shows the area of intertidal flats found within each of the Region's estuaries. Table 41 attempts to break these figures up by local planning authority.

The estuaries of the Tweed, Aln, Coquet, Wansbeck, Blyth and Tees are all notified as SSSIs, as is Lindisfarne. The Tweed Estuary has been proposed as a cSAC, while the intertidal flats at Lindisfarne have been included within the Berwickshire and North Northumberland Coast cSAC. The international importance of Teesmouth and Lindisfarne for birds has been recognised by their designation as SPAs.

Threats

- It is estimated that sea level rise will result in a loss of 8000 to 10 000 ha of intertidal flats in England between 1993 and 2013. Much of this loss is expected in southern and south-east England. The presence of sea defences is likely to inhibit the landward movement of intertidal flats in response to these rising sea levels. There is concern that this 'coastal squeeze' is likely to lead to losses of intertidal habitat.

- Land claim has removed 25% of Great Britain's estuarine intertidal flats and over 80% in some estuaries, such as the Tees. Loss of mudflats reduces the biological productivity of estuaries and may influence other estuary habitats such as saltmarsh.
- Fishing and bait digging can affect the sediment structure of mudflats and disrupt the natural food chains of estuaries.
- Disturbance of intertidal flats can affect bird roosting and feeding areas.
- Pollution can cause areas of mudflat that are devoid of burrowing invertebrates to develop or stimulate the growth of mats of algae which can smother mud dwelling animals and reduce feeding opportunities for birds.
- Cord-grass has become established on some intertidal flats, most notably at Lindisfarne. This binds sand to its roots and raises the level of the flats, so allowing them to dry out and permitting saltmarsh vegetation to develop.
- Barrage schemes for water storage, amenity, tidal power and flood defence continue to pose a threat to the integrity and ecological value of mudflats in estuaries and enclosed bays, and may cause changes in critical parameters such as turbidity.
- Dredging can affect the natural movement of sediments in estuaries.

Opportunities for protection and enhancement

- Seal Sands on the Tees Estuary and the mud and sand flats at Lindisfarne are managed as National Nature Reserves by English Nature.
- The scheme of management 'Managing the Berwickshire and North Northumberland Coast European Marine Site' for the Berwickshire and North Northumberland Coast cSAC should help to protect areas of mudflat and sandflat in north Northumberland.

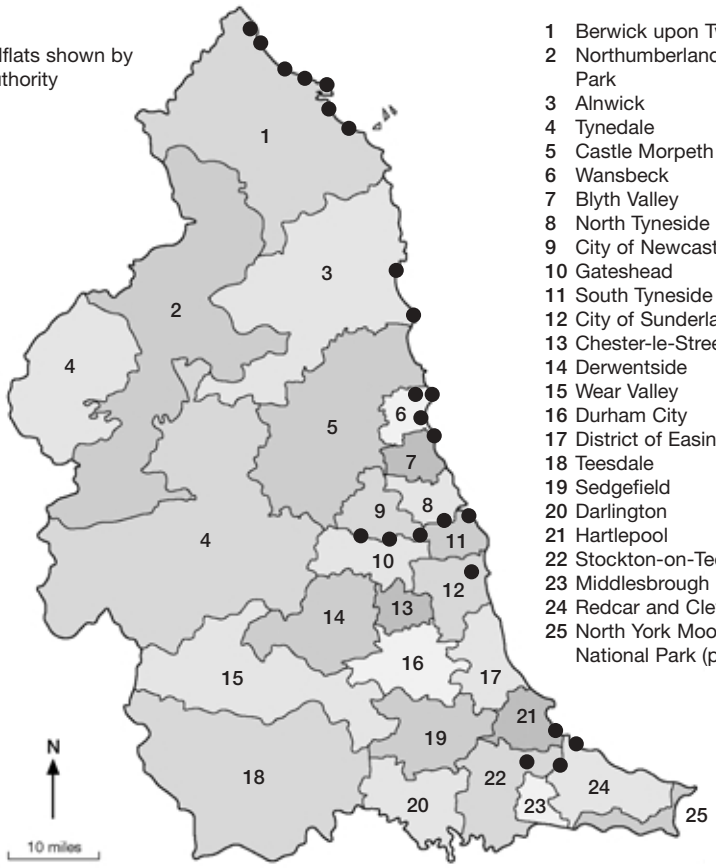
Table 40: Area of intertidal mud and sandflats in North East estuaries

Estuary	Natural Area	Area of mudflat and sandflat (ha)
Tweed Estuary	North Northumberland Coastal Plain	68
Lindisfarne and Budle Bay	North Northumberland Coastal Plain	2713
Alnmouth	North Northumberland Coastal Plain	87
Warkworth Harbour	Northumbria Coal Measures	30
Wansbeck Estuary	Northumbria Coal Measures	37
Blyth Estuary	Northumbria Coal Measures	90
Tyne Estuary	Northumbria Coal Measures	57
Wear Estuary	Durham Magnesian Limestone	23
Tees Estuary	Tees Lowlands	437

Data from JNCC Inventory of UK Estuaries[1]

References/data sources
1. Buck, A L (1997) *An Inventory of UK Esturies, Volume 5: Eastern England*. JNCC, Peterborough.

Map 33
Presence of mudflats shown by local planning authority



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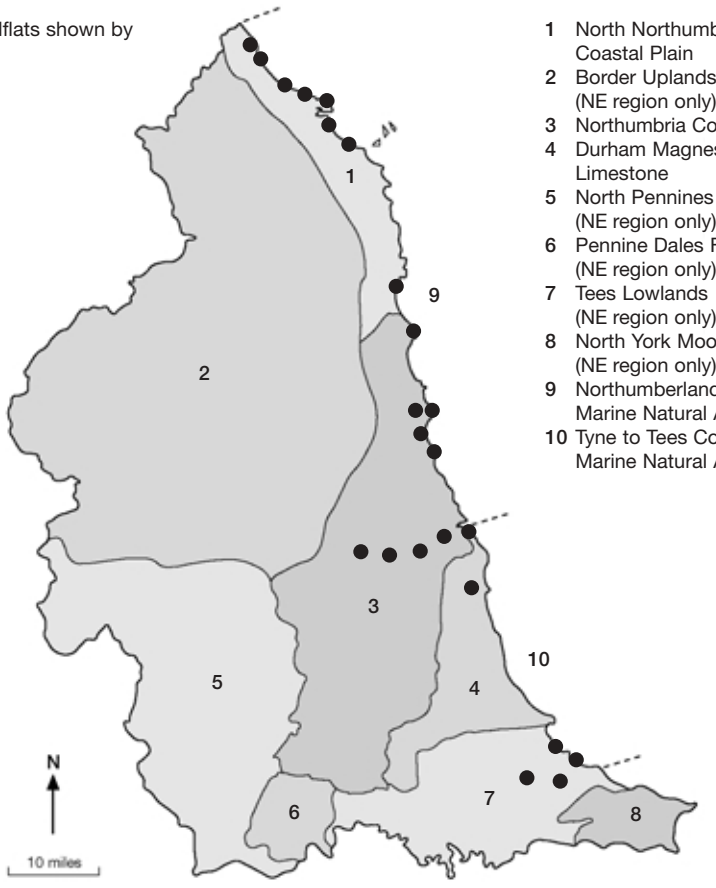
25 North York Moors National Park (part of)

Map 34
Presence of mudflats shown by Natural Area



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9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

Table 41: Estimated area of intertidal mud and sandflats within the Region by local planning authority

Local planning authority	Estimated area (ha)
Alnwick[1]	117
Berwick upon Tweed[1]	2781
Blyth Valley[1]	45
Gateshead[2]	29.1
Hartlepool[6]	105.5
Middlesbrough[6]	≥1
Newcastle upon Tyne[3]	~13
North Tyneside[4]	~1
Redcar and Cleveland[6]	68.4
South Tyneside[3]	~8
Stockton-on-Tees[6]	182.5
Sunderland[5]	53.7
Wansbeck[1]	82

References/data sources
1. Buck, AL (1997) *An Inventory of UK Estuaries. Volume 5: eastern England*. JNCC, Peterborough.
2. Data from Gateshead Phase 1 survey (1998).
3. Measured from 1:10,000 scale OS maps.
4. Data from North Tyneside Phase 1 survey (1995).
5. Data from Sunderland Phase 1 survey (1999).
6. Estimated from 1:10000 scale OS maps and from information on Teesmouth & Cleveland Coast SPA held by English Nature.

16. SEA-GRASS BEDS

Sea-grass *Zostera* spp. beds develop in intertidal and shallow sub-tidal areas on sand and muds. They are generally found in marine inlets, estuaries and bays but may also be found in lagoons, channels and other areas sheltered from significant wave action. Three species of sea-grass occur in the UK, *Zostera marina*, *Z. angustifolia* and *Z. noltii*. All three species are nationally scarce.

Sea-grass beds stabilise the substratum and provide an important source of organic matter. They provide surface attachment and shelter for a number of different organisms, including algae, jellyfish and starfish, and act as nurseries for flat fish. Sea-grass beds are also an important food source for waterfowl such as **wigeon** and **pale-bellied brent goose**, the world biogeographic population of which winters at Lindisfarne on the Northumberland coast.

Current status

Sea-grass beds are found around the UK coast but have a localised distribution.

Within the North East large dense beds of *Z. noltii* and *Z. angustifolia* are found at Fenham Flats. These are considered to be the largest sea-grass beds on the east coast of England. *Z. marina* is found in rockpools on Holy Island. Both of these sites are within the Lindisfarne SSSI and NNR. They also fall within the Berwickshire and North Northumberland Coast cSAC. The fauna within the beds includes a high diversity of polychaetes and molluscs. Some of them are absent or found only in small numbers elsewhere on the north-east coast. For example, the **sea slug** *Akera bullata* is found in relatively large numbers compared to the rest of the Northumbria coast.

There are also records of all three species of sea-grass on the Durham coast, and at Teesmouth. However, these species are probably now extinct in these localities and did not form extensive beds.

Threats

- A wasting disease was responsible for die-back of large areas of sea-grass in the UK during the 1930s. This has recently reappeared in sea-grass beds around the Isles of Scilly. The population at Lindisfarne has so far not been affected.
- The extent of sea-grass beds may change as the result of natural factors such as severe storms, exposure to air, and freshwater pulses. Grazing by wildfowl can have a dramatic seasonal effect with more than 60% reduction in leaf cover reported at some sites. Warm sea temperatures coupled with low levels of sunlight may cause significant stress and die-back of sea-grass.
- Polluted burns and run-off from agricultural land both locally and from the Tweed have increased the nutrient load in offshore waters around Lindisfarne, encouraging the growth of *Enteromorpha* spp. This may affect the growth of sea-grass species due to smothering.
- Changing sediment patterns following the construction of the Holy Island causeway may have affected the growth of sea-grass.

- Cord-grass has colonised the mudflats at Lindisfarne. This binds sand to its roots and raises the level of the flats, so allowing them to dry out, and ultimately decreases the suitability of the substrate for the growth of sea-grass.
- Sea-grass bed communities are highly sensitive to changes in turbidity. This can reduce the degree of light penetration in the water column and affect the plant's ability to photosynthesise.
- Coastal developments, such as sea defences, can cause a change in the hydrological regime of an area and have effects on sea-grass.

Opportunities for protection and enhancement

- The scheme of management, 'Managing the Berwickshire and North Northumberland European Marine Site', for the Berwickshire and North Northumberland Coast cSAC should help to ensure protection of the sea-grass beds at Lindisfarne.

17. SALINE LAGOONS

Other nationally or regionally important species sometimes associated with saline lagoons include:
curlew
lapwing
wigeon

Lagoons are bodies of saline water - natural or artificial - which are partially separated from the adjacent sea. They retain a proportion of their sea water at low tide and may be brackish, full saline or hyper-saline. Several types of lagoons are recognised. These range from those separated from the adjacent sea by a barrier of sand or shingle ('typical lagoons'), to those arising as ponded waters in depressions on soft sedimentary shores, to those separated by a rocky sill or artificial construction such as a sea wall. Sea water exchange in saline lagoons occurs through a natural or modified channel or by percolation through, or over-topping of, the barrier. The salinity of the systems is determined by the relative imputs of fresh water (from ground or surface waters) and of sea water.

Saline lagoons support a range of invertebrates which are not found in any other habitat. Nationally, this invertebrate fauna contains several species which are very rare and are protected under the Wildlife & Countryside Act 1981. None of these protected species are found in the North East, although a lagoonal snail *Hydrobia ventrosa* at Cresswell Ponds is regionally notable.

Saline lagoons are also important habitats for waterfowl and seabirds, including teal and shelduck.

Current status

There are about 5200 hectares of known saline lagoon habitat in the UK. They are found around most of the UK coast but less than 400 individual sites have been identified nationally. The UK's largest saline lagoon is found at The Fleet, Dorset, and contains 70% of the total national resource of this habitat.

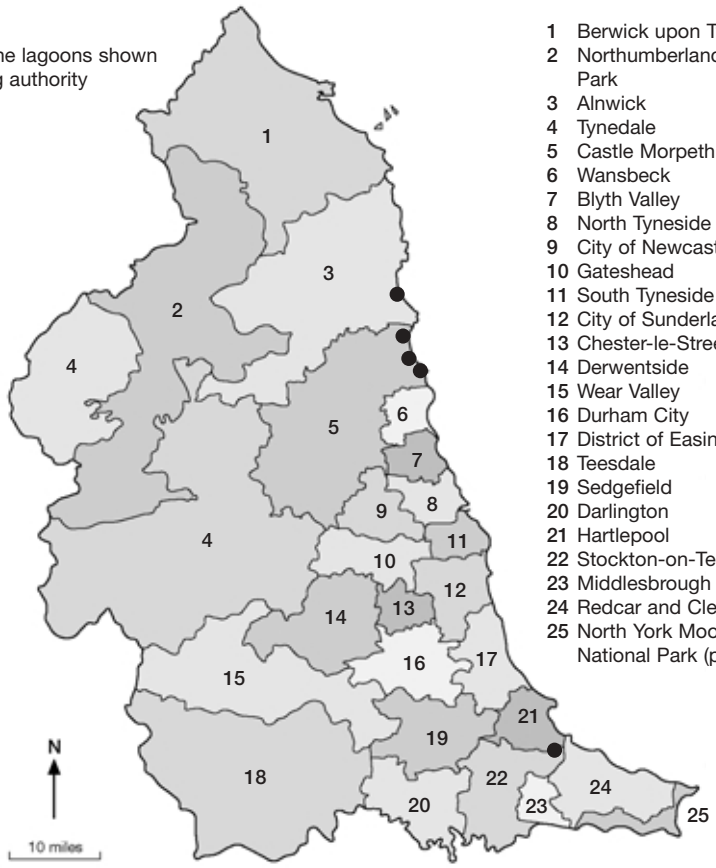
The saline lagoons of the North East Region are mainly restricted to the vicinity of Druridge Bay, on the Northumberland coast, and to Teesmouth. One 'natural lagoon' is found in the Region, at Cresswell Ponds in Northumberland. Table 42 lists the known saline lagoons within the region. Other small pools, predominantly of very low salinity, occur in Northumberland at Cocklawburn and Hadston Links, and on Teesside at Saltholme.

Cresswell Ponds is notified as a SSSI in recognition of its interest as a saline lagoon. It is also an important site for waterfowl and waders. Lagoon sites at Warkworth Harbour, Chevington Burn and North Burn are part of larger SSSIs notified for separate interests.

Threats

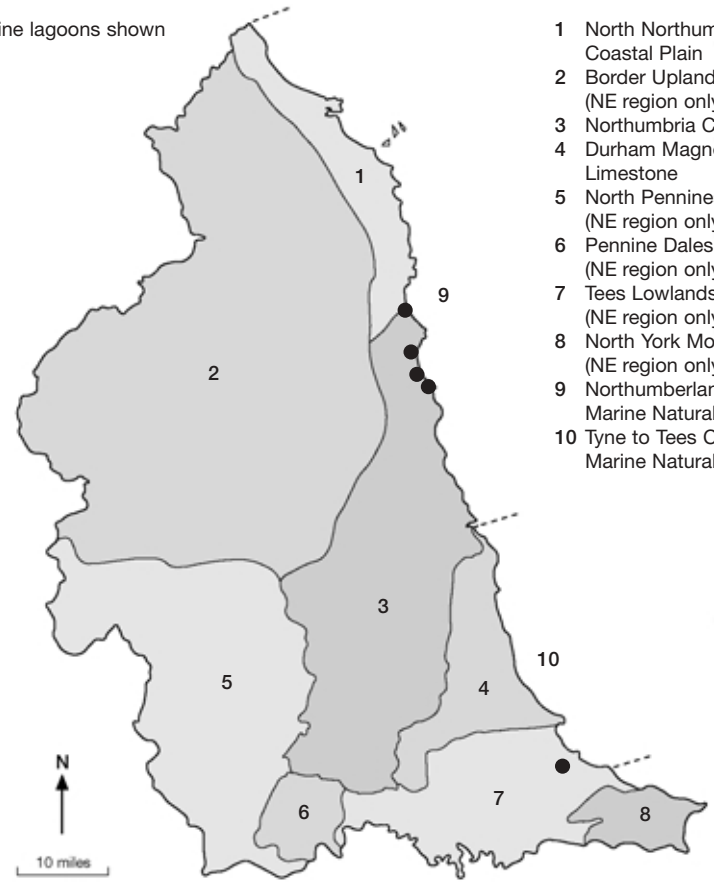
- Many lagoons are naturally transient. Salinity regimes change as succession leads to freshwater conditions and eventually to vegetation such as fen carr. Some formerly saline sites are now freshwater.
- The bar built sedimentary barriers of 'typical' coastal lagoons tend to migrate naturally landwards with time. Lagoons behind them will eventually be infilled as bar sediments approach the shore.
- Pollution, in particular nutrient enrichment leading to eutrophication, can have a major detrimental effect on the water chemistry of lagoons and on the plants and animals they support.

Map 35
Presence of saline lagoons shown by local planning authority



1 Berwick upon Tweed
2 Northumberland National Park
3 Alnwick
4 Tynedale
5 Castle Morpeth
6 Wansbeck
7 Blyth Valley
8 North Tyneside
9 City of Newcastle
10 Gateshead
11 South Tyneside
12 City of Sunderland
13 Chester-le-Street
14 Derwentside
15 Wear Valley
16 Durham City
17 District of Easington
18 Teesdale
19 Sedgefield
20 Darlington
21 Hartlepool
22 Stockton-on-Tees
23 Middlesbrough
24 Redcar and Cleveland
25 North York Moors National Park (part of)

Map 36
Presence of saline lagoons shown by Natural Area



1 North Northumberland Coastal Plain
2 Border Uplands (NE region only)
3 Northumbria Coal Measures
4 Durham Magnesian Limestone
5 North Pennines (NE region only)
6 Pennine Dales Fringe (NE region only)
7 Tees Lowlands (NE region only)
8 North York Moors and Hills (NE region only)
9 Northumberland Coast Marine Natural Area
10 Tyne to Tees Coast Marine Natural Area

- Disruption of either freshwater or seawater inputs can have a detrimental impact on lagoons.
- The introduction of non-native species may disrupt the natural lagoon ecosystems.
- Development or reclamation of sites may lead to a direct loss of habitat.
- The distribution of some lagoon species is so limited that they may be put at risk from single developments.

Opportunities for protection and enhancement

- Cresswell Pond is managed as a nature reserve by the Northumberland Wildlife Trust.
- The Countryside Stewardship Scheme has the option of making payments for the creation of inter-tidal habitats, such as saline lagoons, in agreed areas.
- Lagoon creation has been successfully undertaken at Teesmouth, and more is planned.

Table 42: Saline lagoons in the North East Region

Site name	Local planning authority	Natural Area	Area (hectares)	Description
Warkworth Harbour[1]	Alnwick	North Northumberland Coastal Plain	2	Dammed estuarine
Chevington Burn[1]	Castle Morpeth	Northumbria Coal Measures	0.4	Dune-retained pool
Cresswell Ponds SSSI[1]	Castle Morpeth	Northumbria Coal Measures	7.5	Natural, subsidence pool
Snab Point[1]	Castle Morpeth	Northumbria Coal Measures	0.3	Small saline pool
North Burn[1] (Brinefield Creek)	Hartlepool	Tees Lowlands	7	Reclamation
Greatham NWET[2] saline lagoon	Hartlepool	Tees Lowlands	1.2	New lagoon created in 1998

Area data (apart from Greatham NWET lagoon) from Barnes *et al* (1995)[1]

References/data sources
1. Barnes *et al* (1995) *Coasts and seas of the United Kingdom, Region 5 North East England: Berwick upon Tweed to Filey Bay*, JNCC, Peterborough.
2. Mike Leakey (EN) pers comm.

18. SUBLITTORAL SANDS AND GRAVELS

Sublittoral sands and gravels are the most common habitats found below the lower tidal limit around the coasts of the UK. They occur in a wide range of environments, from sheltered enclosed bays and estuaries to exposed open coast. The particle structure of the habitats ranges from mainly sand, through various combinations of sand and gravel, to mainly gravel.

Sublittoral sand and gravels support a diversity of marine life including molluscs, polychaete worms, starfish, crustaceans and fish such as plaice and sandeel. They are also important feeding grounds for **tern** species.

Current status

This habitat is found throughout the UK coastline and forms the substrate down most of the Region's coast.

Threats

- Sand and gravel habitats are subject to a variety of anthropogenic factors including aggregate dredging activities, physical disturbance by fishing and potential affects of pollutants from rivers.
- Fishing may alter the trophic interactions within these habitats by removing predators and competitors.
- Disturbances such as the construction of marinas and slipways, the widening and dredging of channels, laying of pipes and cables and the construction of sea defences can alter tidal flow regimes. This can cause a change in the way marine sediments are laid down and alter the sediment structure.

Opportunities for protection and enhancement

- The scheme of management, 'Managing the Berwickshire and North Northumberland Coast European Marine Site', for the Berwickshire and North Northumberland Coast cSAC should provide a framework in which the sublittoral sand and gravels in the north of the region can be protected.
- Ensuring that Shoreline Management Plans take proper account of the value of sublittoral sand and gravels would help to protect this habitat.
- Operations that take place below mean low tide require a licence from DEFRA.

A BIODIVERSITY AUDIT OF THE NORTH EAST

HABITATS PART 2

Other Regionally Important Habitats

1. LOWLAND MIXED DECIDUOUS WOODLANDS

Other nationally or regionally important species sometimes associated with lowland mixed deciduous woodland include:
red squirrel
bullfinch
spotted flycatcher

This habitat takes in all the remaining types of semi-natural deciduous woodlands not covered by the existing Habitat Action Plans in the UK BAP. As with other types of woodland, these support a rich flora and fauna which includes many Red Data Book (RDB) and UK BAP priority species. Although still relatively extensive within the UK, the habitat occupies only 1 - 2% of its original range and has declined by around 35% since circa 1935, although the rate of loss has slowed in the last decade. In addition, it has come under threat across its range through factors such as increased deer grazing.

The habitat is present throughout all of the Region's lowlands, where it may show some overlap with low altitude examples of upland mixed ashwoods.

Note: Shortly before going to press it was confirmed that lowland mixed deciduous woodland will be developed as a new priority habitat within the UK BAP, completing the set for semi-natural woodlands in England. There is no timetable yet for drawing up a Habitat Action Plan.

2. RIVERS AND STREAMS

The North East Region is dissected by a number of important river systems. These include the Tweed, Coquet, Tyne, Wear and Tees. The mosaic of features found in rivers and streams supports a wide range of plants and animals. For example, riffles and pools support aquatic species, and exposed sediments such as shingle beds are important for invertebrates, notably ground beetles, spiders and craneflies. Marginal and bankside vegetation support an array of wildflowers and animals. Rivers and streams often provide a wildlife corridor link between fragmented habitats in intensively farmed regions.

A range of habitats are represented in the Region's rivers and streams, from cold, fast flowing upland streams to meandering lowland rivers. They support a number of important species, including **otter**, **water vole**, **white-clawed crayfish**, **river jelly lichen** *Collema dichotomum* (all of which are priorities for action in the UK BAP), **salmon** and **lamprey**. Some river systems are of particular note for their floating beds of water-crowfoot *Ranunculus* spp., a habitat listed on Annex 1 of the EU 'Habitats Directive'. The river gravels of the River South Tyne are of particular importance for the examples of calaminarian grasslands that they support.

Within the North East Region two river systems, the Coquet and the Tweed are notified as SSSIs. The River Tweed is also being proposed as a SAC in recognition of the international importance of many of its features.

Other nationally or regionally important species sometimes associated with rivers and streams include:
allis shad
Atlantic salmon
bullhead
lampreys
Bembidon testaceum
freshwater pearl mussel
beaked beardless-moss
Spruce's bristle-moss
water rock-bristle

Other nationally or regionally important species sometimes associated with post-industrial habitats include:
great crested newt
grey partridge
skylark
song thrush

This habitat occurs in various man-made situations, including disused quarries, pits, mine spoil and abandoned industrial sites. In some instances sites have developed well established semi-natural vegetation as a result of years of natural recolonisation or as the result of management to re-create wildlife habitats. On some sites the succession of plant communities to woodland and scrub is slowed or arrested by poor nutrient status, toxity of substrate or repeated disturbance. Characteristic pioneer communities of lichens, bryophytes and higher plants occur. Post-industrial habitats are especially important in lowland areas where more 'natural' equivalents are rare, and where threats of development or reclamation may be intense. They support a range of wildlife including several UK BAP priority species, and other species of conservation importance.

Of particular importance to the North East Region are a specialised type of habitat known as calaminarian grasslands. This is a rare habitat (listed on Annex 1 of the EU 'Habitats Directive') which occurs on soils or gravels contaminated with heavy metals such as lead and zinc. A number of examples occur within the North Pennines (Teesdale, Weardale and particularly Tynedale) and support a distinctive flora of species that are tolerant of high levels of heavy metals, such as **spring sandwort** *Minuartia verna* and **alpine pennycress** *Thlaspi caerulescens*, and a number of interesting lichen species. Some of the best examples of these can be found on the river gravels and alluvial grasslands of the River Tyne/South Tyne system. The international importance of these has been recognised in their designation as the Tyne & Allen River Gravels cSAC.

A proposal is currently before the UK Biodiversity Action Plan Steering Group to adopt post-industrial pioneer habitats as a priority under the UK BAP.

4. URBAN MANAGED GREENSPACES

Managed greenspaces includes parks, amenity grasslands, roadside verges, churchyards, private gardens and allotments. Such habitats cover large parts of the Region's lowlands and are a significant habitat for many species of birds, mammals, insects and plants. These include species which were once common in the wider countryside but which have suffered a dramatic decline in rural areas, for example **song thrush** or **water vole** (both of which are priorities in the UK BAP).

Some urban greenspaces, such as intensively managed amenity grasslands, are of low value for nature conservation because of their limited variety in plant species and structure. However, with appropriate management (such as less intensive grass-cutting regimes and the use of native tree and shrub species in planting schemes) the biodiversity value of these could be considerably enhanced. Greenspaces also have an important role to play in environmental education and in the public's enjoyment of the natural world.

Other nationally or regionally important species sometimes associated with urban managed greenspaces include:
brown hare
bats
spotted flycatcher

5. PONDS

Other nationally or regionally important species sometimes associated with ponds include:
water vole
great crested newt
Hydroporus rufifrons

This habitat includes a wide range of small water bodies between 1m^2 and 2 ha in area, covering a wide range of nutrient levels, from eutrophic to dystrophic, and encompassing both permanent and seasonal water bodies. The plant and animal life associated with ponds is very rich; for example, at least 40 UK BAP priority species throughout the UK are found in ponds. Ponds are vulnerable to infilling, drainage, pollution, nutrient enrichment and inappropriate management. In past years there have been substantial losses of lowland rural ponds in England. However, the results of the most recent Countryside Survey showed a 6% net increase in lowland ponds between 1990 and 1998[1].

Ponds are found throughout the North East Region and are thought to occur within the boundaries of each local planning authority. They are a particular feature of the Northumbria Coal Measures Natural Area, where ponds formed through mining subsidence are an important habitat for amphibians such as common frog, waterfowl and aquatic plants, in an area where many other wetlands have been lost.

A proposal is currently before the UK Biodiversity Action Plan Steering Group to adopt ponds as a priority habitat under the UK BAP.

References/data sources
1. Department of Environment, Transport and the Regions (2000) *Accounting for nature: assessing habitats in the UK Countryside - an overview*. DETR, London.

6. OFFSHORE ISLANDS

There are many hundreds of offshore islands around the UK mainland many of which are of high nature conservation value. Of particular note within the Region are Coquet Island and the Farne Islands, both of which sites are considered to be internationally important wildlife areas. Owing to their separation from the mainland, and consequent lack of disturbance, these islands have attracted important colonies of breeding birds. The most notable of these are **tern** species, which occur on both sites in internationally important numbers. The Farne Islands also provide nest sites for a wide range of other seabirds, including kittiwake, shag, guillemot and fulmar, and supports the largest breeding population of **grey seals** in England. Both sites are designated as SPAs. The Farne Islands also form part of the Berwickshire and North Northumberland cSAC.

Note: Some of the habitat used by nesting seabirds on offshore islands is covered by the Habitat Action Plan for Marine Cliffs and Slopes.

Other nationally or regionally important species sometimes associated with offshore islands include:
arctic tern
common tern
roseate tern
Sandwich tern

7. ROCKY SHORES AND SANDY BEACHES

Other nationally or regionally important species sometimes associated with rocky shores and sandy beaches include:
black-tailed godwit
redshank
dunlin
curlew

The coastline of the North East consists of a series of rocky headlands with wave-cut platforms, backed by dunes or cliffs, separated by wide sandy bays. The rocky shores support a wide range of seaweed and invertebrate species, while the areas of sand are important for burrowing worms and molluscs and a variety of fish species.

The rocky shores support extensive rock pool systems and provide ideal habitat for brown algae such as *Fucus* spp., red algae and pink coralline crusts. Below the water, dense kelp forests fringe the coast and provide a home for encrusting plants and animals including sea mats and sea firs. In deeper waters sedentary animals are found, such as sponges, sea squirts and, in some locations, a type of soft coral known as dead man's fingers. The marine communities of the rocky reefs of the North Northumberland Coast are considered to be of international importance and form part of the Berwickshire and Northumberland Coast cSAC.

The shoreline of the North East coast supports nationally and internationally important populations of wintering birds, including **purple sandpiper** (which are largely restricted to rocky shores), **turnstone**, **golden plover**, **sanderling** and **ringed plover**. Species such as **little tern** and ringed plover use beaches for nesting.

8. CONIFER PLANTATIONS

Conifer plantations generally consist of monocultures of fast growing, non-native conifer species, managed for commercial timber production. Many have been established on sites which previously had high wildlife value, such as semi-natural woodlands or open habitats such as blanket bog, and in such cases removal of the plantation woodland and restoration of appropriate vegetation would lead to significant biodiversity gains. However, where existing conifer plantations have not been located on land of high biodiversity value, and where restoration to other habitats is not the main conservation aim, this habitat may be of intrinsic importance for wildlife. This statement deals with such situations and should be considered in conjunction with the other habitat entries in this audit.

Other nationally or regionally important species sometimes associated with conifer plantations include:
black grouse
pine marten

Within the North East conifer plantations are perhaps of greatest nature conservation value as habitat for **red squirrel**, a UK BAP priority species which is being displaced from broadleaved woodlands by the introduced grey squirrel and is becoming increasingly restricted to large tracts of coniferous woodland. If the future decline of this species continues it is likely that large afforested areas such as Kielder Forest will become a stronghold for the red squirrel. Conifer plantations are also important to another BAP priority species, **nightjar**, which nests within the Region in clear-felled areas.

Young plantations can support a fauna which initially may be more abundant and diverse than the habitat that they replace. The species associated with young conifer plantations include small mammals such as voles and shrews, birds of prey such as kestrel, short-eared owl, **goshawk** and **merlin**, and song birds such as **bullfinch** and **linnet**. These are lost as the plantation matures and a dense canopy forms, although species such as crossbill and siskin may make use of the habitat.

9. DRY STONE WALLS

Dry stone walls are characteristic boundary features within the Region's uplands. The total length present within the North East is not known, although there is an estimated 112 500 km of dry stone walls in England, of which 50% can be described as derelict.

Dry stone walls provide a habitat for a wide range of flowering plants, ferns, mosses and lichens adapted to rock habitats. A number of invertebrates, reptiles, birds and mammals also use dry stone walls for feeding, breeding or shelter.

10. UPLAND ACID GRASSLANDS

Upland acid grasslands are typically found at altitudes above 250 m and consist of species such as sheep's fescue *Festuca ovina*, common bent *Agrostis capillaris*, mat grass *Nardus stricta*, heath bedstraw *Galium saxatile* and tormentil *Potentilla erecta*. Acid grasslands may be found as enclosed inbye land, which may contain abundant rushes *Juncus* spp. or have undergone some degree of agricultural improvement, or on open moorland, where the habitat may form extensive tracts. Such grasslands are often the result of poor management of other habitats such as dwarf-shrub heath or woodland, and in such situations it is a long term aim to restore the original vegetation cover. This statement should therefore be read in conjunction with the other habitat entries in this audit.

Other nationally or regionally important species sometimes associated with upland acid grassland include:
golden plover
grey partridge

Upland acid grasslands are species poor in terms of the flora present although areas of flush may be quite diverse. In many respects they have a low nature conservation value but a proportion contribute to the ecological interest of the uplands. Such grasslands are important in the North East Region because of the breeding birds that they support. The enclosed inbye land and damp pastures of the North Pennines support nationally important populations of waders such as **redshank**, **lapwing**, **curlew** and **snipe**. Acid grasslands of open moorlands are used by breeding skylarks and are an important source of prey for raptors such as **merlin** and **hen harrier**. Acid grassland forms part of the mosaic of moorland-edge habitat utilized by **black grouse**.

Lapwing

11. INLAND ROCK AND SCREE

Other nationally or regionally important species sometimes associated with inland rock and scree include:
elm gyalecta
Opegrapha paraxanthodes
oblong woodsia

Across the North East Region there are a number of rocky outcrops, crevices and screes which support specialised plant communities, varying according to rock type, stability, slope, aspect and shelter. Upper Teesdale in the North Pennines has extensive areas of acidic and base-rich screes which are important for their relatively rich flora and act as refuges for a number of rare species. In other upland areas screes of acidic shales and gritstone support fern communities, characteristically with parsley fern and lichens, while the base-rich limestone screes in Upper Teesdale support a richer flora that includes species such as **alpine forget-me-not** *Myosotis alpestris*. The crevices and cliffs of the limestone scars of the Pennine escarpment and hill summits also support an important vegetation type, characterised by bryophytes and vascular plants including green spleenwort *Asplenium viride* and brittle bladder fern *Cystopteris fragilis*. Within Northumberland, the inland cliffs formed by the Great Whin Sill support a number of interesting plant species such as maiden pink *Dianthus deltoides*.

The international importance of Upper Teesdale for these scree and crevice vegetation communities is reflected in their inclusion as an interest feature of the Moor House-Upper Teesdale cSAC.

12. MONTANE HEATHS AND GRASSLANDS

This internationally important habitat encompasses montane heaths, grasslands, willow scrub and snowbeds. Montane habitats form in areas above the natural level of tree development, and represent some of the most natural and undisturbed habitats in the UK. They often contain a wide diversity of plant and animal species, including rare arctic-alpine flowers. Montane habitats are locally extensive in the Scottish Highlands but are very rare elsewhere in the UK. There has been a substantial degradation of this habitat in recent decades through grazing pressure, and more locally from recreational and vehicular impacts.

There is known to be 4 ha of montane heath (as defined by Phase 1 habitat survey methodology) near to the summit of the Cheviot, in the Northumberland National Park. No other areas of true montane habitat are known from the Region, although elements of a montane flora can be found in Upper Teesdale and at other locations within the Cheviot.

A BIODIVERSITY AUDIT OF THE NORTH EAST

SPECIES

overleaf
Procas granulicollis - a weavil
juniper
dormouse
lapwing
great crested newt
goshawk
pink meadow cap
European otter

Part 1

Part 1 of the species audit is a review of those UK BAP priority species found within the North East Region.

A brief summary is given for each of these species. Some priority species are now thought to have become extinct within the Region and this is clearly stated in the text. The likelihood of this being the case will vary greatly between taxa, depending on the recording effort. For example, some bryophytes and fungi may not have been recorded for many years, yet still be present, simply because there are very few bryologists or mycologists in the Region. For other groups, such as birds, recorders are much more abundant and data easier to come by. Species that are considered extinct in the Region do not have a threats category attached in the summaries. Under the heading 'Current status' is a list of its protected status under the law and any conventions or Red Data Book classification. The abbreviated terms used are explained below. The species summaries have notes on distribution, population trends or habitat associations where known. Under 'Threats' the known or potential threats are listed. The threats are not all proven causes of population decline, but they do indicate important issues for the conservation of a species.

Following the summaries are two large tables (Tables 43 and 44). The first gives the known records for each species by local planning authority boundaries. Where local planning authority and National Park boundaries overlap, the National Parks are the planning authority and so records are ascribed to them. The second table gives the records by Natural Areas. Both use the symbols below, dividing records into three date bands:

R recent (from 1990 onwards)
O old (from 1960 to 1989 inclusive)
H historic (1900 - 1959 inclusive)

The tables should be used in conjunction with the species summaries.

The original sources of the numerous records have not been referenced. They have been collected or collated from a number of places. Many have been taken directly from the database of the Biological Records Centre at Monkswood in Cambridgeshire, while additional records and background information have come from a variety of publications. Old and historic records have been given for most species, but records for birds and for pipistrelle bat *Pipistrellus pipistrellus* show only their present distributions. These species are more often recorded than most, so only recent records have been used. Regular wintering and breeding birds have been included but not passage or vagrant species.

Within the UK BAP some species have been grouped together under a single action plan because of their similar conservation requirements. In this report each species is listed separately in the summaries, with a note indicating that it falls within a grouped UK plan. The only exception to this are commercial fish species, which are given as a single entry. The grouped action plans relevant to this audit are: baleen whales; medium and large odontocetes (toothed whales); small odontocetes; and commercial marine fish.

Part 2

The second section of the audit attempts to identify those species which are not priorities in the UK BAP but which are important to the biodiversity resource of the Region. Selecting these species is problematic, and is potentially a subjective exercise. A two phase approach was used to identify Regionally important species. This process is described fully in Appedix 1.

An initial long list of species was made using a set of seven criteria. These are shown in Table 45 (Annex 1). This initial list was used to make a selection of species for which it was considered the North East Region has a special role to play in their conservation. Summaries are given for each of these selected species, following the same format as presented in Section 1. It should be remembered that biodiversity is concerned with all species, not just the rare and endangered. **The omission of a species from this report does not therefore indicate that it is of no significant conservation value.**

Current status abbreviations

Bonn I/II/bats: Convention on the Conservation of Migratory Species of Wild Animals, giving the appendix number, 'bats' showing the species' inclusion on the convention's Agreement on the Conservation of Bats in Europe.

Bern I/II/III: Convention on the Conservation of European Wildlife and Natural Habitats, giving the appendix number.

CITES I/II: Convention on the International Trade in Endangered Species of Wild Fauna and Flora, giving the appendix number. All whales in the EU are treated as if they were CITES I species under annex A of the EU Council Regulation 338/97.

ASCOBANS: Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas. This was formulated in 1992 and has now been signed by seven European countries, including the UK. Under the agreement, provision is made for the protection of specific areas, information exchange, pollution control and heightening public awareness.

CR94, 2/4: The Conservation (Natural Habitats & Conservation) Regulations 1994, a transposal of the EU 'Habitats' and 'Birds' Directives into law in England, Scotland and Wales, giving the schedule number.

EU II/IV/V: EU Directive on the Conservation of Natural Habitats and Wild Fauna and Flora ('Habitats Directive'), giving the annex number.

EU Birds: EU Directive on the Conservation of Wild Birds ('Birds Directive'), annex 1.

Game Acts: England and Wales, 1831, Scotland 1832. These specify when certain game species may not be hunted or shot.

References/data sources
1. Selman R, Dodd F and Bayes, K 1999 *A biodiversity audit of Yorkshire and the Humber*. Yorkshire & Humber Biodiversity Forum.

RDB: Red Data Book. The coverage of each Red data list is given in brackets eg RDB (GB). The criteria used by the IUCN were changed in 1994. Not all of the lists have been updated. Species have been categorised as either *Extinct*, *Critically Endangered* (most threatened), *Vulnerable* (less threatened) using the new categories or as *Extinct*, *Endangered* (most threatened), *Vulnerable* or *Rare* (least threatened) using the old system. Near threatened and Lower Risk species are of lower risk of extinction than Vulnerable or Rare species. In addition, some species are considered *Data Deficient* or *Indeterminate*, ie, they would likely be included under one of the main categories, but lack the required information to categorise them.

WCA1/5/6/8/9: Wildlife and Countryside Act 1981 including amendments, giving schedule number.

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SPECIES PART 1

UK Biodiversity Action Plan Priority Species

water vole

Arvicola terrestris **water vole**

Current status: WCA5 (protecting burrows but not the voles themselves)

The water vole is found throughout Britain but is confined mainly to lowland areas near water. Once common and widespread, this species suffered a significant decline in numbers and distribution during the latter half of the last century. A national survey of 3000 sites carried out between 1996 and 1998 found that only 15.5% supported water vole, compared to 47.4% in the 1989 - 1990 survey of the same sites. The recent sharp decline has been attributed in large part to predation by mink. Within the North East Region, water vole is now largely concentrated in urban areas which are largely free from predation by mink. Scattered populations exist elsewhere but these may be too isolated and vulnerable to survive in the long term without conservation effort.

Threats: Loss and fragmentation of habitat; predation by mink; disturbance of riverside habitat and inappropriate management of waterways.

Lepus europeaus **brown hare**

Current status: Protected under the Game Acts

The brown hare is a widespread farmland species in Britain, often seen at the edges of arable fields and rough pasture, and on marginal land in the uplands. Formerly considered abundant, the species has undergone a national decline of 25 - 49% in the last 25 years, possibly due to agricultural changes. The current national population is estimated to be between 817 500 and 1 250 000. The species is thought to be widely distributed across suitable habitats within the Region, but no detailed local surveys have yet been carried out.

Threats: Conversion of grassland to arable crops; loss of habitat diversity in the agricultural landscape; changes in planting and cropping regime, such as a move from hay to silage, and autumn sowing of cereals.

brown hare

European otter

Lutra lutra **European otter**

Current status: WCA5, 6; EU II, IV; Bern II; CITES I; CR94, 2

The otter was formerly widespread throughout the UK but underwent a decline in numbers from the 1950s to the 1970s and was lost from many rivers. This decline has now been halted and otters are found within the catchment area of all of the Region's rivers. Otter numbers within the Region are thought to be increasing. In recent years a lot of work has been done to improve riparian habitats for otters (eg through the Northumbrian Otters and Rivers Project). Action taken includes the building of artificial holts, creation and restoration of riverside habitats, and the provision of advice to land managers.

Threats: Pollution of watercourses, especially by PCBs; incidental mortality, primarily by road deaths; insufficient prey associated with poor water quality; impoverished bankside habitat features needed for breeding and resting.

Muscardinus avellanarius **dormouse**

dormouse

Current status: WCA5, 6; EU IV; Bonn III; CR94, 2

This species is known from England and a few sites in Wales. There has been a 25 - 49% decline in the British population of dormouse over the last 25 years and in England it has become extinct over half its former range over the last 100 years. The North East Region contains the most northerly population of dormouse in Britain, at a National Trust managed property in Northumberland. The species was also recorded from the Derwent Valley until the mid 1980s.

Threats: Fragmentation of woodland and reduction in the size of woodlands leaving isolated, non-viable populations (short distances, possibly as little as 100 m, may form absolute barriers to dispersal, unless arboreal routes are available); changes in woodland management practice, notably cessation of hazel coppicing, are a threat in other parts of the country but it is doubtful whether these have had any effect in the Region.

Pipistrellus pipistrellus **pipistrelle bat**

Current status: WCA5, 6; EU IV; Bern III; Bonn II, bats; CR94, 2

The pipistrelle is the most abundant and widespread bat in the UK but has suffered a severe decline this century. Estimates from the National Bat Colony Survey suggest a population decline of approximately 70% between 1978 and 1993. Recent research has shown that there are two distinct species of pipistrelle bat in the UK, common pipistrelle and soprano pipistrelle, each having distinct calls and maternity roosts. No data is yet available on their relative distributions within the Region.

Threats: Reduction in insect prey abundance, due to high intensity farming practice and inappropriate riparian management; loss of insect-rich feeding habitats and flyways, due to loss of wetlands, hedgerows and other suitable prey habitats; loss of winter roosting sites in buildings and old trees; disturbance and destruction of roosts, including the loss of maternity roosts due to the use of toxic timber treatment chemicals.

red squirrel

Sciurus vulgaris **red squirrel**

Current status: WCA5, 6; Bern III

Populations of red squirrel in the UK have suffered markedly over the last 50 years with the introduced grey squirrel replacing the species throughout most of England and Wales. Red squirrels are usually displaced by grey squirrels within 15 years of the latter arriving in an area. This appears to be through competitive exclusion by the grey squirrel, a species which is better adapted to the now fragmented British woodland, where acorns are the principal food source. The North East Region, and Northumberland in particular, remains the English stronghold for the species, although grey squirrel is now present throughout much of County Durham and is beginning to be seen in the Tyne Valley. Conifer plantations, a habitat where greys find it hard to compete, have become particularly important for the red squirrel. The red squirrel is currently the subject of a strong conservation effort within the Region. Actions being taken include control of grey squirrels, supplementary feeding of red squirrels, and promoting long term habitat management which will benefit the species.

Threats: Spread of grey squirrels; habitat fragmentation making some areas less suitable for red squirrels, increasing their vulnerability to displacement by grey squirrels; disease, particularly the parapox virus which is believed to be transmitted to red squirrels by greys.

Balaenoptera acutorostrata **minke whale**

Current status: WCA5; EU IV; Bern III; CITES 1

Minke whale is a common migratory species present in all oceans. It is widely distributed along the Atlantic seaboard of Britain and Ireland and also regularly occurs in the northern and central North Sea as far south as the Yorkshire coast. The species is covered by a grouped UK Species Action Plan for Baleen whales.

Threats: Continued whaling in the north Atlantic by Norway. Other factors are not well understood but may include noise and chemical pollution and lack of prey.

Globicephala melas **long-finned pilot whale**

Current status: WCA5; EU IV; Bonn II; Bern II; CITES II; ACOBANS

The long-finned pilot whale is widespread in temperate regions of the world. It is common in deep north Atlantic waters but seasonally enters coastal areas. Although recorded in UK waters throughout the year, it occurs in northern Britain mainly between June and September, and between November and January further south. It is covered by a grouped UK Species Action Plan for Toothed whales.

Threats: Not well understood but may include noise, chemical pollution and human disturbance.

Lagenorhynchus albirostris **white-beaked dolphin**

Current status: WCA5; EU IV; Bonn II; Bern II; CITES II; ASCOBANS

White-beaked dolphin occurs over a large part of the northern European continental shelf. It is common in UK and Irish waters, occurring most abundantly in the central and northern North Sea across to north-west Scotland. The species is covered by a grouped UK Species Action Plan for Small dolphins.

Threats: Drowning in fishing nets; disturbance from boat noise and damage from propellers; pollution is a potential threat.

Orcinus orca **killer whale**

Current status: WCA5; EU IV; Bern II; Bonn II; CITES II; ASCOBANS

The killer whale is a cosmopolitan species in all marine regions, and is widely distributed in the North Atlantic and in northern European coastal waters. In UK waters, killer whales occur in all months of the year, but are recorded near shore mainly between May and October. They are not uncommon off the Northumberland coast, particularly around the Farne Islands where they are sighted most years. Covered by a grouped UK Species Action Plan for Toothed whales.

Threats: Not well understood but thought to include disturbance from boat noise, damage from propellers, and pollution.

Phocoena phocoena **harbour porpoise**

Current status: WCA5, 6; EU II, IV; Bern II; Bonn II; CITES II; ASCOBANS

The harbour porpoise is widely distributed in coastal waters of the temperate and subarctic North Atlantic, and is probably the most frequently observed (and stranded) cetacean in British and Irish waters. There is some evidence of a decline in numbers of harbour porpoise in UK waters since the 1940s, especially in the southern North Sea and English Channel. The species is seen regularly off the North East coast.

Threats: Not well understood but may include drowning in fishing nets; marine debris; noise pollution; chemical pollution; depletion of prey. A virus infection has been detected in stranded porpoises.

Tursiops truncatus **bottle-nosed dolphin**

Current status: WCA5, 6; EU II, IV; Bonn II; Bern II; CITES II

Bottle-nosed dolphins are found world-wide, mainly in coastal waters. Although once amongst the commonest of inshore cetacean species in Britain and Ireland, this species has declined in the last twenty years, particularly in the southern North Sea and English Channel. Bottle-nosed dolphins are recorded regularly along the North East coast. They are covered by a grouped UK Species Action Plan for Small dolphins.

Threats: Drowning in fishing nets; disturbance from boat noise and damage from propellers; pollution is a potential threat.

bottle-nosed dolphins

Alauda arvensis **skylark**

skylark

Current Status:

The skylark has a wide distribution in the UK. The resident population is joined in winter by a significant proportion of the northern European population. However, the UK breeding population on lowland farmland has declined by 54% between 1969 and 1991. The population has also declined substantially in other European countries. Skylark is widely distributed across the Region.

Threats: Intensive management of arable fields has reduced ephemeral weeds and insect prey through the use of agrochemicals; an increased trend towards autumn sown cereals has reduced the number of essential winter stubble fields and may provide unsuitable habitat in comparison with spring sown varieties; conversion of lowland grassland to arable; early silage cutting which destroys nests and exposes skylarks to predators.

bittern

Botaurus stellaris **bittern**

Current Status: WCA1; EU Birds; Bern III

The bittern is a localised, declining and rare breeding species. It is confined almost entirely to lowland marshes in Norfolk, Suffolk and Lancashire which are dominated by the common reed *Phragmites australis*. The UK population has decreased from 70 pairs in the 1960s to only 19 booming males in 1999. Bittern is a regular visitor to the North East, although the last confirmed breeding record was in 1956. The creation of new and expanded reedbeds would assist recolonisation. A long term aim is to encourage birds to overwinter and then stay to breed in the Region.

Threats: Loss of suitable large reedbeds and internal ditch systems through natural succession, inappropriate management (particularly drainage and water abstraction) and fragmentation; degradation of habitats through water pollution, pesticide and heavy metal pollution; food availability, especially of eels, affected by inappropriate habitat management and pollution; problems associated with small population size.

Caprimulgus europaeus **nightjar**

Current Status: EU Birds; Bern II

The nightjar is a summer migrant which breeds mainly in southern England but also has scattered populations as far north as central Scotland. The species has declined in numbers and range for most of this century. Lowland heathland and young forestry plantation are its most important habitats. In the North East, nightjar has adapted to clear felled forestry areas and is thought to be increasing as a breeding species.

Threats: Loss of lowland heathland; invasion of heathland by scrub and woodland; a lack of uncultivated land for feeding close to nesting areas; changes in the availability of large insects (particularly moths).

linnet

Carduelis cannabina **linnet**

Current Status: Bern II

The linnet is a common and widespread species across the UK countryside where it uses weedy fields, hedgerows, gorse thickets, heathland and scrub. It has declined by 56% on farmland between 1968 and 1991. Linnets are particularly dependent on wildflower seeds during the breeding season, when chicks are fed on seeds rather than insects. Their decline is therefore thought to be linked to changes in agricultural practice both in the UK and in their wintering range in Europe. The linnet is widespread as a breeding species in the lowlands of the North East but populations are declining.

Threats: The increased use of herbicides and fertilizers; the switch from spring sown to winter sown crops and the consequent loss of winter stubble fields; the general decrease in farmland diversity due to a loss of mixed farming and increased specialization; loss of hedges and scrub leading to losses of suitable nesting habitat.

corncrake

Crex crex **corncrake**

Current Status: WCA1; Bern II; EU Birds

Over the past 100 years the corncrake has shown a sustained decline in numbers in the UK and a contraction in range. This is thought to have been caused by changes in agricultural practice, especially the use of mechanised haymaking and the switch to early cut silage from hay. By 1993 there were only 478 calling males in the UK, 90% of which were located in the Hebrides. The species is considered to be globally threatened. Corncrake bred commonly in parts of the North East in the 1930s and sporadically into the 1950s. The last suspected breeding record within the Region was in 1992 in Northumberland, but is unconfirmed.

Threats: Loss of traditional grassland habitat mosaics, especially tall vegetation throughout the breeding season; changes in grass management and cutting techniques (eg earlier cutting); predation and disturbance may be contributing to the decline in some localities.

Emberiza schoeniclus **reed bunting**

Current Status: Bern II

Reed bunting is common throughout the UK, in wetland habitats and drier farmland sites, such as hedgerows and overgrown ditches. The species showed a 50% decline in numbers between the 1970s and early 1980s but the population now appears stable. Reed bunting is widely distributed within the Region, being reasonably common at lowland wetland sites.

Threats: Use of pesticides and insecticides; switch from spring sown to autumn sown crops; loss of farmyard habitat diversity; loss of hedges and scrub for nesting.

Melanitta nigra **common scoter**

Current status: WCA1; EU birds; Bern III

The UK breeding population of common scoter has declined by more than 50% in the last 25 years, with all the remaining breeding pairs being found in Scotland. They winter along the North East coast in nationally significant numbers.

Threats: Wintering concentrations of common scoter are particularly vulnerable to large scale oil spills; modern commercial harvesting of sand-dwelling shellfish may threaten common scoter's food resources.

common scoter

Miliaria calandra corn bunting

Current status:

The corn bunting is a characteristic resident species of lowland arable farmland and is one of the few British species largely dependent on cropped land. Its numbers and distribution have been declining steadily in some areas since the last century and in most places since the 1970s, a trend which appears to be continuing. There was a 76% decline in the breeding population between 1968 and 1991, and a decline of 32% in the British range in the 1970s and 1980s. The regional decline in the species has mirrored the national decline. The main population centre for the species within the North East is now the Durham coast.

Threats: Loss of extensive mixed farming and winter stubble fields; decline of wildflowers and insects on farmland due to intensification.

spotted flycatcher

Musicapa striata spotted flycatcher

Current status:

The spotted flycatcher is an insectivorous summer migrant which breeds in open wooded habitats throughout the UK. The species has declined by 62% in woodland and 70% in farmland between 1968 and 1991. The spotted flycatcher is found in most parts of the North East Region. It breeds in open woodlands, parkland and hedges.

Threats: Summer weather conditions can affect breeding; drought in African wintering grounds or along the migration route may affect survival; changes in agriculture which reduce invertebrate availability on lowland farms; loss of nest sites (eg large trees).

tree sparrow

Passer montanus **tree sparrow**

Current status:

The tree sparrow is patchily distributed on farmland across Britain. Numbers appear to undergo irregular fluctuations, but the Common Bird Census recorded an 85% decline in numbers during the 1970s and 1980s. The tree sparrow is found in lowland arable areas throughout the North East.

Threats: Changes to agricultural practices, particularly increased use of herbicides; the shift from spring sown to winter sown crops with the consequent loss of winter stubble fields; loss of farmland habitat diversity; limited availability of suitable nest holes.

Perdix perdix **grey partridge**

Current status: Protected under the Game Acts; EU III; Bern III

Once common, the grey partridge declined in numbers by 50% between 1969 and 1990. Populations in some mixed farming areas seem stable, but in other areas the decline has been as great as 95%. The species is almost extinct in Northern Ireland. It is most commonly found on farmland and moorland margins. The population in the North East is thought to be stable but further research is needed.

Threats: Loss of nest sites, such as hedge bottoms, to farm intensification; reduced food supplies and sources for chick food through the use of pesticides and herbicides, as well as the loss of winter stubble feeding grounds for overwintering birds; vulnerability of nests to predators in farmland with poor cover; nest destruction caused by early mowing and other farm operations.

Pyrrhula pyrrhula **bullfinch**

Current status:

The bullfinch is a fairly common and widespread species found in woodland and farmland, where it is closely associated with dense scrub and untrimmed hedges. It has undergone a decline of 75% on farmland and 47% in woodland between 1968 and 1991. Breeding in the North East is widespread but numbers are uncertain.

Threats: Removal of farmland trees and hedgerows, and a reduction in the quality of remaining hedges due to over-frequent trimming, leading to a loss of food sources and nesting habitat; the loss of winter food sources through the use of herbicides and loss of winter stubble fields.

Sterna dougalli **roseate tern**

Current status: WCA1; EU Birds; Bern II

The roseate tern has a highly fragmented breeding range in the north-east Atlantic. Its European stronghold is in the Azores (Portugal), while elsewhere the bird breeds at scattered locations in Britain, Ireland and France. It is one of the UK's rarest breeding seabirds. Numbers in the UK have declined greatly since the 1970s, although many of these birds are thought to have moved to the colony at Rockabill in the Irish Republic. Roseate tern breeds on the Farnes and Coquet Island on the Northumberland coast in internationally important numbers.

Threats: Trapping of terns in west African wintering grounds; long term changes in sea-surface temperatures may be responsible for reducing availability of prey items within African wintering grounds; competition with gulls and late-nesting common terns for nesting areas; predation; flooding of nesting areas has been a problem at some sites.

roseate terns

Tetrao tetrix **black grouse**

black grouse

Current status: Protected under the Game Acts; EU II; Bern III

The black grouse is usually found in a mosaic of upland habitats including moorland edge, rough grassland, shrubs and rushes, young plantations and hay meadows. In the UK black grouse has declined in range by more than 25% since the 1970s. The most recent population estimate (1996) is 6510 lekking males compared with an estimate of 25 000 in 1990. The North Pennines remains the English stronghold for the species. Local action to enhance the habitat and raise awareness of the plight of black grouse has taken place under the North Pennines Black Grouse Recovery Project. This has promoted stock reductions, scrub planting, wetland creation and the marking of fences and wires.

Threats: Loss of key food plants, and sources of invertebrate prey items for chicks, due to overgrazing, agricultural improvements, land drainage, afforestation etc; fragmentation of suitable habitat leading to small, more isolated populations; predation by foxes, stoats and crows is a problem in some areas; disturbance to lekking birds; deaths caused by collision with fences and overhead cables.

Turdus philomelos **song thrush**

Current status:

The song thrush is a common and widespread species which has suffered a sharp decline since the 1970s. It is a partial migrant and large numbers of continental breeders overwinter in the UK, while some UK breeders winter in southern Europe. The species is widely distributed within the Region, being reasonably common in suburban and urban areas.

song thrush

Threats: Changes in farming affecting food supply (such as increased use of molluscides) and the availability of nest sites; severe winter weather and dry soil conditions affecting food supply; predation by corvids and foxes; competition with blackbirds; hunting in southern France.

Triturus cristatus great crested newt

Current status: WCA5; EU II, IV; Bern II

The British population of great crested newt is among the largest in Europe, where it is threatened in several countries. Within the UK the species is widespread but has suffered a decline in recent years. Studies in the 1980s indicated a national rate of colony loss of approximately 2% over five years. For breeding, the species needs still water of at least 30 - 55 cm depth, with some vegetation and open spaces nearby. Much time is spent on land, including time spent in hibernacula such as wood piles and hedgerows. Colonies of great crested newt are widely scattered across the lowlands of the Region.

Threats: Loss of suitable breeding ponds caused by water table reduction, in-filling for development, farming, waste disposal, neglect or fish stocking; degradation, loss and fragmentation of terrestrial habitats; pollution, and toxic effects of agro-chemicals.

great crested newt

Alosa alosa **allis shad**

Current status: WCA5; EU II, IV; Bern II

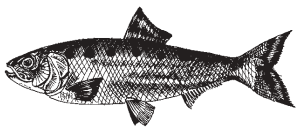
The allis shad is found along the coasts of western Europe and in the Mediterranean eastwards to northern Italy. It occurs mainly in shallow coastal waters and estuaries, but in the breeding season may penetrate large rivers to spawn. The population of this fish has declined significantly throughout Europe. In the UK adult fish are found in small numbers around the coast in most years. There have been occasional records for this species in Northumberland, particularly in the Tweed.

Threats: Pollution; overfishing; habitat destruction; artificial river obstructions.

Alosa fallax **twaite shad**

Current status: EU II, V; Bern III

The twaite shad occurs along the west coast of Europe, the eastern Mediterranean, and in the lower reaches of a few large rivers along these coasts. It has declined in several parts of Europe and is now virtually absent from several UK rivers where it was previously thought to spawn. Locally caught specimens were reported at North Shields Fish Quay until the early 1980s.



twaite shad

Threats: Pollution; overfishing; habitat destruction; river and estuary barriers.

Cetorhinus maximus **basking shark**

Current status: WCA5; Vulnerable RDB (IUCN)

The basking shark is the largest fish in UK waters, and the second largest fish in the world. It is a plankton feeder which occurs in temperate waters throughout the world. In the UK, it is mostly seen in surface waters from April to September. The species was frequently sighted by local fisherman until the mid-1980s but recent records from the region have been scarce.

Threats: Changes in the distribution of plankton fronts; deliberate or accidental capture in fishing nets.

Clupea harengus **herring**
Gadus morhua **cod**
Merluccius merluccius **hake**
Pleuronectes platessa **plaice**
Pollachius virens **saithe**
Scomber scombrus **mackerel**
Solea solea **sole**

Current status:

The species listed above are included within the grouped UK Species Action Plan for commercial marine fish. Few, if any, of the commercial fish species exploited in the UK are in immediate danger of extinction as they are found across wide geographical areas. However, within these wide distributions there are local fish stocks subject to excessive exploitation and risk of collapse, even though the species itself may not be in immediate danger. Such a collapse would represent a reduction in the natural range of the species and effective action to minimise the risk is needed under the UK BAP. The North Sea stocks of the fish listed above are close to or below their Safe Biological Limits, as defined by the International Council for the Exploration of the Seas (ICES).

Threats: Overfishing.

Raja batis **common skate**

Current status: Endangered provisional RDB (IUCN)

The common skate is widely distributed, but very scarce, throughout European waters. It has probably been fished to extinction in the Irish Sea and is extremely rare in the central and southern North Sea. The status of stocks is unknown. Once common at fish quays within the Region, the skate is now rarely seen.

Threats: The common skate is vulnerable to capture in static and towed fishing gear when fishing for rays. Slow growth and large size at maturity make this species vulnerable, juveniles being exterminated from heavily fished areas.

Bombus distinguendus great yellow bumblebee

Regionally extinct?

great yellow bumblebee

Current status: Nationally notable

Widespread in northern and central Europe and in Asia, although declining in many parts of its range. Most records have been associated with extensive areas of meadowland supporting large numbers of plant species. The loss of this habitat has caused a dramatic reduction in the range and abundance of the species. Populations are now strongly biased towards the Outer Hebrides. A post-1980 record exists for a single site in Northumberland, although it has been suggested that this was an error in identification. The species is possibly regionally extinct.

Bombus sylvarum shrill carder bee

Regionally extinct

Current status: Nationally notable

The shrill carder bee was formerly common throughout the UK but has suffered a severe decline during the last century and is now limited to seven sites in the south of England. The decline is thought to have been caused by the loss of herb-rich grasslands in which the bee can nest and forage. The last record of the species from the region was in 1957 and came from east Durham. It is now considered to be regionally extinct.

Hydroporus rufifrons **a water beetle**

Current status: Vulnerable RDB (GB)

Hydroporus rufifrons occurs in extremely shallow, temporary pools in unimproved pasture, often in old oxbow systems. It is found scattered throughout north and central Europe and is generally regarded as a rare species. The species was formerly recorded at Boldon Flats in South Tyneside, where it has apparently become extinct. It has also been found in temporary water features associated with the Till Riverbanks SSSI in Northumberland.

Procas granulicollis

Procas granulicollis **a weevil**

Current status: Indeterminate

Procas granulicollis is a species endemic to Britain. It is found in woodland clearings or woodland edges where there is light shading from well-dispersed trees. It is associated with bracken *Pteridium aquilinum* and climbing corydalis *Ceratocapnos claviculata*. The species is found in southern Scotland, Wales and at three colonies in England. It is known from Heddon Common in Northumberland.

Threats: Not known.

Bembidion testaceum **a ground beetle**

Current status: Nationally scarce

Bembidion testaceum is a predatory riparian species associated with sand and gravel by slow running or standing waters. The species is widely distributed in mainland Europe and is at the northern and western limit of its distribution in Britain. There are records for the species from Tyne Watersmeet and Dilston Haughs in Northumberland.

Threats: River and coastal engineering works; sustained periods of flooding; pollution; livestock encroachment on river shingle; colonisation of river banks by invasive plant species such as Himalayan balsam *Impatiens glandulifera*.

Formica lugubris **hairy wood ant**

Current status:

The hairy wood ant is a major scavenger and predator of other invertebrates in woodland in northern Britain. The UK distribution extends from the Highlands of Scotland through the upland areas of northern England as far south as mid-Wales. Populations appear stable and are even increasing at some sites. The species was recorded from Bothal in Northumberland in 1986.

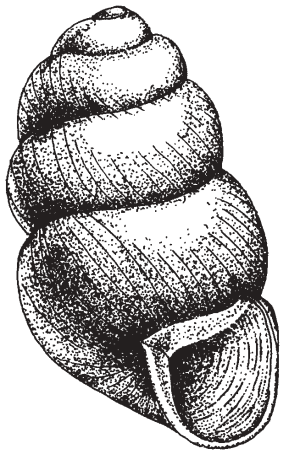
Threats: Loss of woodland habitat through agricultural clearance, development or unsympathetic afforestation; inappropriate woodland management, including loss of sunny rides and clearings.

Margaritifera margaritifera **freshwater pearl mussel**

Current status: WCA5 (for killing or injuring only); EU II, IV; Vulnerable RDB (IUCN); Bern II

A bivalve found in fast running water with a mixture of sand and stones. The British range is to the north and west of a line running from Scarborough to Beer Head in Devon. The species is long lived (80 - 100 years). Larvae live in the gills of salmonid fish and may die after leaving the host, possibly due to intolerance of changes in water chemistry. Many populations are moribund and have not produced young for over 30 years. The species is facing extinction in England. Freshwater pearl mussel has been recorded in parts of the Tyne catchment. These populations are believed to be senescent.

Threats: Poor land management in catchment (eg overgrazing leading to sedimentation from soil erosion); poor water quality, including eutrophication and acidification exacerbated by conifer plantations; habitat degradation and alteration, through development, drainage schemes and fisheries management; decline in population of host fish; illegal pearl fishing.



round-mouthed whorl snail

Vertigo genesii **round-mouthed whorl snail**

Current status: Endangered RDB (IUCN); Vulnerable RDB (GB); EU II

Within Europe *Vertigo genesii* occurs locally in the Alps and the mountains of central Scandinavia. The only known English population is found at Upper Teesdale, within the National Nature Reserve. A second colony has recently been identified in Scotland. The Teesdale population forms one of the interest features of the Moor House - Upper Teesdale cSAC, and is therefore considered to be of international importance.

Threats: None currently known, but would be susceptible to changes in hydrology or an increase in trampling.

Aricia artaxerxes **northern brown argus**

northern brown argus

Current status: WCA5 (with respect to sale only); Nationally scarce

The northern brown argus occurs on well drained soils, usually on limestone, where its larva feed on common rock-rose *Helianthemum nummularium*. It occurs throughout northern England and Scotland, including populations in east Durham. The northern brown argus is represented in Britain by two sub-species. One of these, the Durham argus *A. Artaxerxes* ssp. *salmacis*, is found only in County Durham and may be endemic.

Threats: Undergrazing leading to scrubbing over of sites and loss of habitat; overgrazing leading to loss of larval foodplants; increasing isolation of populations leading to increased risk of local extinctions, bracken encroachment.

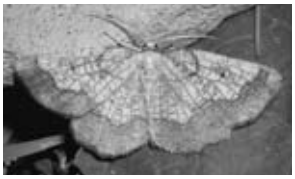
Boloria euphrosyne **pearl bordered fritillary**

Regionally extinct

Current status: WCA5 (with respect to sale); Nationally notable

Pearl bordered fritillary was formerly widespread and locally abundant through much of Britain, but has declined rapidly over the last fifty years and is now extinct over much of its former range. It is usually associated with woodland clearings or unimproved grassland with scattered scrub or bracken. The larvae feed on violets *Viola* spp. The last regional record for the species was from Tynedale in 1970. It is now believed to be regionally extinct.

pearl bordered fritillary



dark bordered beauty

Epione parallelaria **dark bordered beauty**

Current status: Rare RDB (GB)

The dark bordered beauty is associated with damp places where its larvae feed on willow *Salix* spp. and birch *Betula* spp.. Only a few sites for the species are found in the UK. There are post-1980 records for Northumberland, from Newham Fen (where the colony was first identified in 1890) and from Wallington.

Threats: Inappropriate habitat management, leading to loss of larval food-plants.

Hemaris tityus **narrow-bordered bee hawk-moth**

Regionally extinct

Current status: Nationally scarce

The narrow-bordered bee hawk-moth occurs on a wide range of unimproved grasslands, on acid bogs, peat cuttings and heathlands. The larval foodplant is devil's-bit scabious *Succisa pratensis*. The species was formerly widespread in Britain but has declined severely, probably due to the loss of suitable habitats, and now seems to be restricted to the west of the country. There have been scattered records from within the Region, the last of which were for the period 1975 - 1979 and came from Geltsdale in south-east Northumberland.

narrow-bordered bee hawk-moth

Hydrelia sylvata **waved carpet**

Current status: Nationally scarce

The waved carpet occurs in coppiced woods with a long history of active coppice management, and open sunny areas with younger growth of its larval foodplants. These foodplants are sallow *Salix* spp., alder *Alnus glutinosa*, birch *Betula* spp. and blackthorn *Prunus spinosa*. In Britain, the waved carpet is a highly localised species with post-1980 records concentrated in the south of England. There are also records from a single locality in south Northumberland. Historically this species was recorded over much of England and Wales but has declined following the widespread cessation of active coppice management.

Threats: The loss of young regrowth due to the decline of coppicing in the lowlands; the loss of broadleaved woodland due to replanting with conifers.

Rheumaptera hastata **argent and sable**

Current status:

The argent and sable breeds in woodland with birch regrowth and in open moorland and bogs, particularly those at higher altitudes or in coastal areas. The larva of the species feeds on birch *Betula* spp. and on bog myrtle *Myrica gale*. Many of the populations that survive are in the rides and edges of conifer plantations where a weed growth of birch is still available. The argent and sable occurs throughout most of England but has declined and is now only thinly distributed. Within the Region post-1980 records exist for a single location in south Northumberland.

argent and sable

Threats: Lack of birch regeneration at woodland edges and on the rides in high forest systems due to the decline of coppicing and other active woodland management; overgrazing by sheep, preventing birch regeneration and impacting on bog myrtle.

Scotopteryx bipunctaria **chalk carpet**

Current status: Nationally scarce

The chalk carpet occurs on chalk and limestone grassland. The main habitats occupied are short-grazed areas with bare ground, including embankments, cliffs and quarries. Populations can be quite large and may persist for decades. The larvae feed on bird's-foot trefoil *Lotus corniculatus* and other trefoils and clovers. It is found throughout England, north to the Magnesian Limestone of Durham.

Threats: Inappropriate grazing management; loss of unimproved calcareous grasslands and fragmentation of remaining habitats.

Tyta luctosa **four-spotted moth**

Current status: Vulnerable RDB (GB)

The four-spotted moth is a grassland species typically found on south-facing banks on well-drained soils with sparse vegetation and bare earth. The larvae feed on field bindweed *Convolvulus arvensis* at night. It was formerly widespread and fairly common in England south of a line from Norfolk to Somerset but has suffered a massive decline since the 1930s. The moth was seen and photographed in a field at Durham in 1994.

Threats: Loss of habitat due to agricultural intensification and development; inappropriate grassland management.

Xestia alpicola alpina **northern dart**

Current status: Nationally scarce

The northern dart is usually restricted to montane areas, generally above 450 m, although it occurs at lower altitudes in the extreme north and west of its range. The main larval foodplant is crowberry *Empetrum nigra*, but it may also feed on a number of other dwarf-shrubs. The only record within the region is of a single individual recovered from the summit of The Cheviot in 1975.

Threats: Not known

northern dart

Xestia rhomboidea **square spotted clay**

Current status: Nationally scarce

Square spotted clay occurs in broadleaved and mixed woodlands where the undergrowth is sparse and contains patches of scrub and bare ground. The larval foodplant is unknown. In Britain it is a widespread but local species. A few, mainly coastal, records exist for Northumberland and these may represent immigrants.

Threats: Difficult to assess because of the lack of knowledge about the ecological requirements of the species. May include the loss of open areas and sparse undergowth in woodlands due to a decline in coppicing.

Xylena exsoleta **sword-grass**

Regionally extinct?

Current status: Nationally scarce

The sword-grass has been recorded in a wide range of habitats, mostly in the uplands and moorlands. Almost nothing is known about its larval ecology. In the UK it was formerly widespread but has undergone a substantial decline since the 1960s. Since the 1980s it has been recorded only occasionally in England, usually as a single individual. A single post-1980 record exists for a site on the north Northumberland coast. Sword-grass may be regionally extinct.

Austropotamobius pallipes **white-clawed crayfish**

Current status: WCA5; globally threatened RDB (IUCN); Bern III; EU II, V.

The only species of crayfish native to the UK, it is found in clean, calcareous streams, rivers and lakes. White-clawed crayfish was once widespread in Britain, France, Spain and Italy but is now confined to a diminishing number of areas. It has suffered a severe national decline since the 1970s due to loss of habitat and declines in water quality. More recently, it has suffered through the spread of a fungal disease known as crayfish plague, which has been introduced via escaped signal crayfish. Competition with a number of introduced, non-native, crayfish has also contributed to the decline of the species. The national decline has been mirrored in the North East Region. The River Wansbeck in Northumberland now supports the largest population within the Region.

Threats: Crayfish plague is of particular concern due to the absence of any resistance within the native species which means that populations affected are often totally wiped out; competition with introduced non-native crayfish; water pollution, particularly pesticides and synthetic pyrethroids which kill crayfish at very low levels of contamination; habitat modification and management of waterbodies/watercourses.

Bacidia incompta a crustose lichen

Regionally extinct?

Current status: Vulnerable RDB (GB)

Bacidia incompta grows on the trunks of mature trees with base-rich bark. In Britain it is largely restricted to elm *Ulmus* spp., but also occasionally occurs on ash *Fraxinus excelsior*, beech *Fagus sylvatica*, holly *Ilex aquifolium*, hornbeam *Carpinus betulus* and sycamore *Acer psuedoplantanus*. It is typically found in old parkland and on wayside trees in open situations. Once relatively widespread throughout Britain, the lichen has a scattered distribution which extends northwards to Aberdeenshire, but is most frequent in southern England. The species has declined markedly since the 1960s probably due to losses of mature trees from Dutch elm disease. Within the Region *Bacidia incompta* was recorded from one site in Teesdale in 1970. It is now thought to be extinct within the Region.

Calicium corynellum a crustose lichen

Current status:

Within Britain, *Calicium corynellum* is restricted to two sites in Northumberland. At one of these sites, a church tower in Tyne Valley, the lichen has decreased by 90% since 1972. A stone slab placed beneath this colony caused rainwater from an above pipe to splash back high up the tower wall. The removal of this slab is thought to have led to the development of a drier microclimate and to the consequent decline of the species. The slab has recently been replaced. The second site for *Calicium corynellum*, discovered in summer 2000, is a churchyard in the North Pennines where the species grows on a number of headstones.

Threats: Collection by botanists; building works such as re-pointing and restoration of church walls; cleaning of headstones.

Caloplaca luteoalba orange-fruited elm-lichen

Regionally extinct?

Current status: WCA8; Vulnerable RDB (GB)

Orange-fruited elm-lichen is widely distributed in western Europe, but has declined markedly. It is also recorded from North America. The species used to be relatively widespread in the UK, with a distributional bias towards eastern lowland Britain. It has suffered a severe decline during the last hundred years and is now largely confined to the bark of mature elm *Ulmus* spp. trees in areas of parkland, old pasture or roadsides in areas with less than 750 mm rainfall per annum. It may occasionally also occur on other tree species in dry, well-lit situations and on soft calcareous rocks. Orange-fruited elm-lichen is an uncommon species in the Region. There are old records from Northumberland and County Durham, and it is possible that the species is now regionally extinct.

Threats: Felling of host trees; loss of habitat due to Dutch elm disease; pollution from intensive agriculture and sulphur dioxide emissions.

Collema dichotomum river jelly lichen

Current status: WCA8; Vulnerable RDB (GB)

This aquatic lichen grows on submerged rocks in partial shade in fast-flowing intermediate and upland streams. It is rare in the UK and has been declining since the 1960s and is now only known from northern England, mid-Wales, Scotland and Northern Ireland. Its distribution extends into northern Europe and Russia. It has been recorded from sites on the Rivers Tweed, Tyne and Coquet.

Threats: Eutrophication of streams leading to the species being replaced by algae; increases in silt loads in rivers and streams; water acidification; reduced water levels caused by water abstraction.

Gyalecta ulmi elm gyalecta

Current status: Endangered RDB (GB)

Within the UK this species is confined to six sites in Scotland and one in Northumberland, although it was once more widespread for example being historically present in North Northumberland. On all of the known sites it grows on calcareous rocks but was formerly known as an epiphyte on elms. The European distribution of the species is widespread but scattered.

Threats: Collection by botanists; overshading by trees and scrub; agricultural spray drift.

Opegrapha paraxanthodes a crustose lichen

Current status:

Opegrapha paraxanthodes is thought to be endemic to Britain and Ireland, where it has a scarce but widespread distribution. It is restricted to base-rich rocks where it grows in crevices, in deeply shaded situations, often in the wooded bottoms of river valleys. Within the North East it is recorded from one site in County Durham.

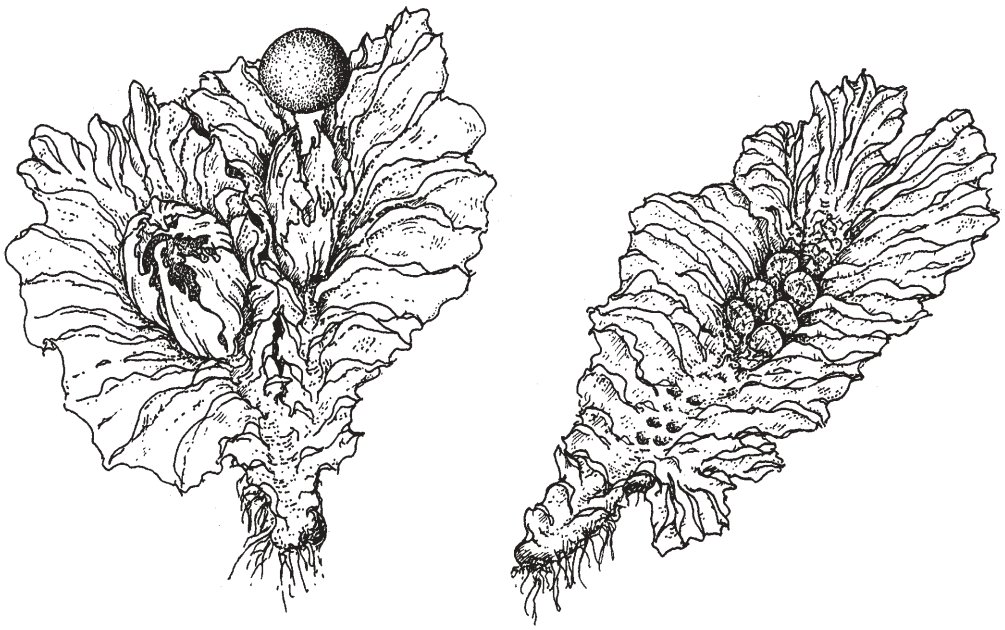
Threats: Not known.

Petalophyllum ralfsii **petalwort**

Current status: WCA8; EU II; Bern I; Vulnerable RDB (GB)

Petalwort is predominantly found on damp calcareous dune slacks and can vary in abundance from year to year. It may disappear from view in summer, surviving as tubers underground. It is widely but sparsely distributed in the UK, Mediterranean countries, Portugal, Ireland and North America. Within the Region it is known from two sites, one within the Lindisfarne NNR in Northumberland, and the other from a nearby dune SSSI. Petalwort is an interest feature of the North Northumberland Dunes cSAC, and the Northumberland populations are therefore considered to be of international importance.

Threats: Loss of habitat due to development, dune stabilisation and natural succession; drainage; recreation; botanical collection.



petalwort

Ditrichum plumbicola **lead-moss**

Current status: Vulnerable RDB (European Bryophytes)

Lead-moss is a pioneer species that is restricted to sparsely vegetated, acid, peaty, silty or gravelly soils on old lead-mine spoil heaps where it typically occurs on rough knobbly surfaces. The species is endemic to Europe where it is found in only Britain and Germany. It has been recorded from one site in Northumberland.

Threats: Landscaping and afforestation of lead-mine spoil is the main threat to this species; encroachment by rank grasses and scrub; reworking of commercially viable mine spoil; fly tipping; works promoted by health and safety considerations.

Orthodontium gracile **slender thread-moss**

Regionally extinct

Current status: Critically endangered RDB (UK);
Endangered RDB (European Bryophytes)

Slender thread-moss grows mainly on damp,vertical, shaded acid rock faces, and sometimes in rock crevices, where it forms bright green cushions up to 1 cm tall. It was once widespread in the UK but has suffered a severe decline over the last 150 years, and is now restricted to south-east England and Midlothian. Slender thread-moss was recorded from the Kyloe Hills area of Northumberland during the 1920s but recent searches have failed to locate the species. It is thought to be extinct within the Region.

Orthotrichum sprucei **Spruce's bristle-moss**

Current status: Nationally scarce

Spruce's bristle-moss is an epiphyte which grows on the bark of trees within the flood-zones of streams and rivers, at levels which remain dry for most of the year but which are inundated at times of peak flow. In the UK the moss is widely but sparsely distributed over England and Wales. Outside Britain, it is only known from western Europe. The moss has been recorded from five 10 km grid squares in Northumberland.

Threats: Removal of trees from the edges of rivers and streams; alterations to river flows so that tree bases are no longer (or less regularly) inundated.

Seligeria carniolica **water rock-bristle**

Current status: Critically endangered (IUCN)

Water rock-bristle is a minute moss that grows mainly on moist, shaded, calcareous rocks in or near streams in small ravines. It is a European endemic only known from Britain and a few localities in the Alps, France and Scandinavia. In Britain it is recorded from only two sites, one in Scotland and the other in Northumberland. The Scottish site was discovered in 1948 but has never been relocated. The Northumberland site is within the Simonside Hills SSSI.

Threats: Inappropriate collection; changes in water quality and quantity.

Sphagnum balticum **Baltic bog-moss**

Current status: WCA8, Endangered RDB (GB)

Baltic bog-moss is a species that is found in the wetter parts of raised or, more rarely, blanket bogs. It has been recorded from seven widely scattered sites within England, Scotland and Wales. Elsewhere, it is found in much of lowland northern Europe and also in northern Asia, North America and Greenland. Within England, Baltic bog-moss is known only from Muckle Moss NNR in Northumberland.

Threats: No threats are currently known to the Muckle Moss site. However, the following have been identified as factors in the decline of the species in the UK: afforestation, leading to direct loss of sites or changes in local hydrology; peat cutting and its associated effects on site hydrology; drainage of peatland sites; inappropriate collection of bog-moss for horticultural purposes.

Weissia rostellata **beaked beardless-moss**

Current status:

Beaked beardless-moss is most often recorded from mud or gravelly surfaces exposed when water levels of reservoirs fall in late summer and autumn. It has also been found in similar situations beside rivers and occasionally as a colonist of bare, clayey or humic substrates on the banks of ditches, woodland rides and bare patches in fields. Recent UK records of the species are thinly scattered, although it has not been re-found at many of its pre-1950 localities and is probably in decline. The species has been recorded from two 10 km squares in Northumberland and there is an unconfirmed report from one location in County Durham.

Threats: Threats are not well known but are thought to include the following: maintenance of higher water-levels than previously at certain lakes and reservoirs; eutrophication of waters leading to increased nutrient status of mud in lakes and reservoirs; increased use of fertilizers and other agricultural improvements, reducing the availability of bare patches on nutrient-poor soils.

Hygrocybe calyptriformis **pink meadow cap**

Current status:

This is principally, but not exclusively, a species of montane to sub-alpine regions. Its main habitats include grassy meadows, pastures and woodland margins on both calcareous turf and acidic grassland. Fruiting bodies are seldom abundant and appear between August and October. Within the region, recent records come from one site in Northumberland.

Threats: Historical changes in the populations of this species are poorly understood, but potential threats to extant sites across the UK include: improvement of its grassland habitat through ploughing or the addition of fertilizers; reduced intensity, or cessation of grazing or mowing, leading to the development of rank vegetation and woody species.

pink meadow cap

Centaurea cyanus **cornflower**

Regionally extinct

Current status: Endangered RDB (GB)

Cornflower is an annual plant of arable fields, often on sandy, acidic soils. It once occurred throughout the UK and was considered a troublesome weed in cereal fields. Like many once common plant species of arable fields it has suffered a serious decline over the last fifty years and is close to extinction as a genuinely wild plant in the UK. In Europe as a whole it is not threatened and is still widely distributed. Wild forms of cornflower are probably extinct within the Region, although it stills occurs as a casual introduction and in horticultural forms.

Cypripedium calceolus **lady's slipper orchid**

Regionally extinct

Current status: WCA8; critically endangered RDB (GB); EU II, IV; Bern II; CR94, 4

Lady's slipper orchid was formerly widespread, though local, throughout northern England on moderately grazed species-rich limestone grassland. It suffered a severe decline in the UK and has survived naturally at only one site in the Yorkshire Dales. Micro-propagation techniques are being used to re-introduce lady's slipper orchid to new sites. The species, extinct in the Region, is currently the subject of a species recovery programme.

lady's slipper orchid

Epipactis youngiana **Young's helleborine**

Current status: WCA8; Endangered

Young's helleborine, first described in 1978, was believed to have evolved as a stable hybrid between broadleaved helleborine *E. helleborine* and a second species of helleborine (possibly *E. leptochila* or *E. phyllanthes*). It was considered to be a species endemic to the UK and was included within the UK Biodiversity Action Plan as a priority species. It is found on derelict spoil heaps where trees have colonised. Recent genetic studies have thrown doubts on its status as a distinct species. A taxonomic re-assessment of the Young's helleborine is likely to follow, which may lead to it being removed from the list of UK priority species. Updates to this Audit will follow progress on the matter.

Threats: Habitat destruction.

Fumaria purpurea **purple ramping-fumitory**

Current status: Nationally notable

Purple ramping-fumitory is endemic to Britain, Ireland and the Channel Islands. It is found over much of the UK but its strongholds are in Cornwall and Lancashire. Purple ramping-fumitory is a species of hedge-banks, arable land and waste ground, preferring recently disturbed sites or habitats opened up by summer drought. It is known from one site within the Region but this has possibly been destroyed by tipping.

Threats: Habitat destruction; changes to agricultural practices and crop varieties.

red hemp-nettle

Galeopsis angustifolia **red hemp-nettle**

Regionally extinct

Current status: Nationally notable

Red hemp-nettle is a species of arable land, found mostly on calcareous soils but also on coastal sands and shingle in the southern counties of England and Wales. It is found on well drained soils in sunny locations with low rainfall. It is a summer annual which tends to germinate in the spring. Consequently, many plants are eradicated during harvest or by early autumn cultivation before they set seed. Red hemp-nettle has suffered a severe decline since 1930, largely due to changes in agricultural practice. The species is long extinct within the Region, with most records dating from the 19th century. It is still sometimes seen as a casual colonist and in horticultural forms.

Juniperus communis **juniper**

Current status:

Juniper has a widespread distribution within the UK and can tolerate a range of climatic and soil conditions. The two main population centres for the species are in the Scottish Highlands and the chalk downlands of southern England. The species is thought to be declining nationally. A study of juniper distribution in the North East during the period 1973 to 1995 showed an overall population decline of 30%, with 16% of colonies having become extinct.

juniper

Within the Region scattered colonies of juniper are found throughout the uplands, with outposts on the cliffs of the Durham coast and the North Northumberland coast. The juniper stand close to High Force in Upper Teesdale is of particular note as it is the largest in England. This forms one of the interest features of the Moor House - Upper Teesdale cSAC and so is considered to be of international importance.

The larger of the remaining stands of juniper within the Region are now protected in SSSIs. Many populations are under some form of positive management. Actions taken include stock exclusion measures and planting of new juniper bushes. *Juniperus communis* formations on calcareous heaths or grassland are listed on Annex 1 of the EU 'Habitats Directive'.

Threats: Excessive grazing which prevents the establishment of young bushes; insufficient grazing which reduces the area suitable for juniper regeneration; direct clearance of juniper stands; excessive burning which may threaten regeneration and adult bushes; adult bushes are long lived and so some recorded colonies may be moribund.

Linnaea borealis twinflower

Current status: Nationally notable

Twinflower is found primarily on podsolic soils in the native pinewood remnants of north-east Scotland. It is also found, more rarely, in scots pine plantations. The species has a favourable conservation status within Europe but has declined considerably in the UK. Twinflower is at its southern limit within the Region but is present at two sites in Northumberland. These colonies are possibly introductions.

Threats: Mechanical harvesting of timber and ground preparation for replanting; unrestricted grazing by deer, sheep or cattle; reproductive isolation of twinflower colonies consisting of single clones; shade resulting from dense tree regeneration.

yellow marsh saxifrage

Saxifraga hirculus yellow marsh saxifrage

Current status: WCA8; EU II, IV; Bern I; CR94, 4

This is a species of base-rich flushes and mires in the north of England, Northern Ireland, and south and central Scotland. Yellow marsh saxifrage is declining throughout much of Europe. The UK stronghold is in the North Pennines, where something like 80-90% of the population is found. The majority of this occurs within the Moor House - Upper Teesdale NNR and forms an interest feature of the Moor House - Upper Teesdale cSAC. The population within the Region is therefore of international importance.

Threats: Loss of habitat through drainage, afforestation and over-grazing.

Scandix pecten-veneris **shepherd's needle**

Regionally extinct

Current status: Nationally notable

This is an annual species of arable land favouring heavy calcareous soils which are dry in summer. It is associated with open crop conditions and cereal field margins. Shepherd's needle has suffered a dramatic decline during the last century, reflecting changes in agricultural practice. The North East is at the northern limit of its UK distribution. During the 19th century it was recorded as being common in the Region but is now only recorded as a casual introduction and is probably extinct.

oblong woodsia

Woodsia ilvensis **oblong woodsia**

Regionally extinct

Current status: WCA8; Endangered

Oblong woodsia is a small tufted fern found in treeless rock habitats above 350 m, mainly on cliffs and crags. Around a dozen colonies are known in the UK, most of which are extremely small in size (1 - 7 plants). It was eliminated from many sites during the 19th century owing to the activities of fern collectors. It is now extinct in the Region and is the subject of a species recovery programme.

Table 43: A summary of records of UK BAP Priority Species in the North East Region by local planning authority

R Recent (1990 onwards)
O Old (1960 - 1989)
H Historic (1959 or earlier)

			Alnwick	Berwick upon Tweed	Blyth Valley	Castle Morpeth	Chester-le-Street	Darlington	Derwentside	Durham City	Easington	Gateshead
Mammal	*Arvicola terrestris*	water vole	R	R	R	R	O	O	R	R	R	R
Mammal	*Lepus europaeus*	brown hare	R	R	R	R	R	R	R	R	R	R
Mammal	*Lutra lutra*	European otter	R	R	R	R	R	R	R	R	R	R
Mammal	*Muscardinus avellanarius*	dormouse										O
Mammal	*Pipistellus pipistellus*	pipistrelle bat	R	R	R	R	R	R	R	R	R	R
Mammal	*Sciurus vulgaris*	red squirrel	R	R	R	R	R		R	R	R	R
Bird	*Alauda arvensis*	skylark	R	R	R	R	R	R	R	R	R	R
Bird	*Botaurus stellaris*	bittern*										
Bird	*Caprimulgus europaeus*	nightjar	R	R		R						R
Bird	*Carduelis cannabina*	linnet	R	R	R	R	R	R	R	R	R	R
Bird	*Crex crex*	corncrake*										O
Bird	*Emberiza schoeniclus*	reed bunting	R	R	R	R	R	R	R	R	R	R
Bird	*Miliaria calandra*	corn bunting	R	R	R	R	R	R			R	
Bird	*Muscicapa striata*	spotted flycatcher	R	R	R	R	R	R	R	R	R	R
Bird	*Passer montanus*	tree sparrow	R	R	R	R	R	R	R	R	R	R
Bird	*Perdix perdix*	grey partridge	R	R	R	R	R	R	R	R	R	R
Bird	*Pyrrhula pyrrhula*	bullfinch	R	R	R	R	R	R	R	R	R	R
Bird	*Sterna dougallii*	roseate tern	R	R								
Bird	*Tetrao tetrix*	black grouse	R									
Bird	*Turdus philomelos*	song thrush	R	R	R	R	R	R	R	R	R	R
Amphibian	*Triturus cristatus*	great crested newt	R	R	R	O	R	R	R	R	R	R
Fish	*Alosa alosa*	allis shad		R	O							
Bee	*Bombus distinguendus*	great yellow bumblebee	O	O					H		H	
Bee	*Bombus ruderatus*	large garden bumblebee							H			H
Bee	*Bombus slyvarum*	shrill carder bee							H		H	H
Beetle	*Bembidion testaceum*	a ground beetle										
Beetle	*Hydroporus rufifrons*	a water beetle		O								
Beetle	*Procas granulicollis*	a weevil				O						
Ant	*Formica lugubris*	northern wood ant										
Butterfly	*Boloria euphrosyne*	pearl bordered fritillary				H	H		H		H	
Butterfly	*Articia artaxerxes*	northern brown argus		H			O			R	R	
Moth	*Epione paralellaria*	dark bordered beauty		O		O						
Moth	*Hemaris tityus*	narrow-bordered bee-hawkmoth										
Moth	*Hydrelia sylvata*	waved carpet										
Moth	*Idaea dilutaria*	silky wave		O								
Moth	*Pechipoga strigilata*	common fan-foot		O								
Moth	*Rheumaptera hastata*	argent and sable										
Moth	*Scotopteryx bipunctaria*	chalk carpet								O	O	
Moth	*Tyta luctuosa*	four spotted moth								R		
Moth	*Xestia rhomboidea*	square-spotted clay										
Moth	*Xestia alpicola alpina*	northern dart										

Hartlepool	Middlesbrough	Newcastle upon Tyne	North Tyneside	Northumberland National Park	North York Moors National Park	Redcar and Cleveland	Sedgefield	South Tyneside	Stockton	Sunderland	Teesdale	Tynedale	Wansbeck	Wear Valley	
R	R	R	R	R	O	R	O	R	R	R	R	R	R	R	water vole
R		R	R	R	R	R	R	R	R	R	R	R	R	R	brown hare
H	R	R	H	R	R	R	H	H	R	R	H	R	R	R	European otter
												R			dormouse
R	R	R	R	R	R	R	R		R	R	R	R	R	R	pipistrelle bat
R		R	R	R			R			R		R	R	R	red squirrel
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	skylark
		H													bittern*
											R	R		R	nightjar
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	linnet
											O	H			corncrake*
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	reed bunting
R			R			R	R	R	R	R	R	R	R	R	corn bunting
R	R				R	R	R	R	R	R	R	R	R	R	spotted flycatcher
R			R	R		R	R	R	R	R	R	R	R	R	tree sparrow
R		R	R	R	R	R	R	R	R	R	R	R	R	R	grey partridge
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	bullfinch
										R					roseate tern*
				R								R		R	black grouse
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	song thrush
R	R	R	R		O	R	R	O	R	R	O	R	R	R	great crested newt
															allis shad
									H			H		O	great yellow bumblebee
															large garden bumblebee
															shrill carder bee
												O			a ground beetle
								H							a water beetle
															a weevil
													O		northern wood ant
H		H					H		H			O		H	pearl bordered fritillary
H							R	H		H				O	northern brown argus
				H											dark bordered beauty
												O			narrow-bordered bee-hawkmoth
															waved carpet
															silky wave
															common fan-foot
												O			argent and sable
										O					chalk carpet
															four spotted moth
							O								square-spotted clay
				O											northern dart

Table 43 continued

			Alnwick	Berwick upon Tweed	Blyth Valley	Castle Morpeth	Chester-le-Street	Darlington	Derwentside	Durham City	Easington	Gateshead
Moth	*Xylena exsoleta*	sword-grass		O								
Crustacean	*Austropotamobius pallipes*	white clawed crayfish	R		O	R		R		R		O
Mollusc	*Margaritifera margaritifera*	freshwater pearl mussel										
Mollusc	*Vertigo genesii*	round-mouthed whorl-snail										
Lichen	*Bacidia incompta*	a crustose lichen										
Lichen	*Calicium corynellum*	a crustose lichen										
Lichen	*Caloplaca luteoalba*	orange-fruited elm-lichen		O								
Lichen	*Collema dichotomum*	river-jelly lichen		O								
Lichen	*Gyalecta ulmi*	elm gylecta		O								
Lichen	*Opegrapha paraxanthodes*	a crustose lichen										
Moss	*Ditrichum plumbicola*	lead moss										
Moss	*Orthodontium gracile*	slender thread moss		H								
Moss	*Orthotrichum sprucei*	Spruce's bristle-moss	O	O								
Moss	*Orthotrichum obtusifolium*	blunt-leaved bristle moss										
Moss	*Seligeria carniolica*	water rock bristle										
Moss	*Shagnum balticum*	Baltic bog-moss										
Moss	*Weissia rostellata*	beaked beardless moss										
Liverwort	*Petalophyllum ralfsii*	petalwort		R								
Fungus	*Hygrocybe calyptraeformis*	pink wax cap				R						
Vascular plant	*Centaurea cyanus*	cornflower								H	O	H
Vascular plant	*Cyripedium calceolus*	lady's slipper orchid									H	
Vascular plant	*Epipactis youngiana*	Young's helleborine										
Vascular plant	*Fumaria purpurea*	purple ramping fumitory	O									
Vascular plant	*Galeopsis angustifolia*	red hemp-nettle										
Vascular plant	*Juniperus communis*	juniper	R	R					R		R	
Vascular plant	*Linnaea borealis*	twinflower										
Vascular plant	*Saxifraga hirculus*	yellow marsh saxifrage										
Vascular plant	*Scandix pecten-veneris*	shepherd's needle								H	H	H

*Breeding only

Hartlepool	Middlesbrough	Newcastle upon Tyne	North Tyneside	Northumberland National Park	North York Moors National Park	Redcar and Cleveland	Sedgefield	South Tyneside	Stockton	Sunderland	Teesdale	Tynedale	Wansbeck	Wear Valley	
											H				sword-grass
				R						R		R	R	R	white clawed crayfish
				O								R			freshwater pearl mussel
											R				round-mouthed whorl-snail
											O				a crustose lichen
												R			a crustose lichen
				O								O			orange-fruited elm-lichen
				R								O			river-jelly lichen
												R			elm gylecta
											O				a crustose lichen
												O			lead moss
															slender thread moss
															Spruce's bristle-moss
												H			blunt-leaved bristle moss
				R											water rock bristle
												R			Baltic bog-moss
												O			beaked beardless moss
															petalwort
												O			pink wax cap
											H				cornflower
															lady's slipper orchid
		R	R									R			Young's helleborine
															purple ramping fumitory
									H						red hemp-nettle
R				R							R	R		R	juniper
												R			twinflower
											R			R	yellow marsh saxifrage
			H				H						H	H	shepherd's needle

*Breeding only

Table 44: A summary of records of UK BAP Priority Species in the North East Region by Natural Area

R Recent (1990 onwards)
O Old (1960 - 1989)
H Historic (1959 or earlier)

			Border Uplands	Durham Magnesian Limestone	North Northumberland Coastal Plain	North Pennines	Northumbria Coal Measures	North York Moors and Hills	Pennine Dale Fringes	Tees Lowlands	Northumberland Coast	Tyne to Tees Coast
Mammal	*Arvicola terrestris*	water vole	R	R	R	R	R	O	O	R		
Mammal	*Balaenoptera acutorostrata*	minke whale									R	R
Mammal	*Globicephala melas*	long-finned pilot whale									R	R
Mammal	*Lepus europaeus*	brown hare	R	R	R	R	R	R	R	R		
Mammal	*Lutra lutra*	European otter	R	R	R	R	R	R	O	R		
Mammal	*Muscardinus avellanarius*	dormouse				R	O					
Mammal	*Orcinus orca*	killer whale									R	
Mammal	*Pipistellus pipistellus*	pipistrelle bat	R	R	R	R	R	R	R	R		
Mammal	*Phocoena phocoena*	harbour porpoise									R	R
Mammal	*Sciurus vulgaris*	red squirrel	R	R	R	R	R			R		
Mammal	*Tursiops truncatus*	bottlenosed dolphin									R	R
Bird	*Alauda arvensis*	skylark	R	R	R	R	R	R	R	R		
Bird	*Botaurus stellaris**	bittern					H					
Bird	*Caprimulgus europaeus*	nightjar	R			R	R	R	R	R		
Bird	*Carduelis cannabina*	linnet	R	R	R	R	R	R	R	R		
Bird	*Crex crex**	corncrake	H			O	O					
Bird	*Emberiza schoeniclus*	reed bunting	R	R	R	R	R	R	R	R		
Bird	*Miliaria calandra*	corn bunting		R	R	R	R	R		R		
Bird	*Muscicapa striata*	spotted flycatcher	R	R	R	R	R	R	R	R		
Bird	*Passer montanus*	tree sparrow	R	R	R	R	R	R	R	R		
Bird	*Perdix perdix*	grey partridge	R	R	R	R	R	R	R	R		
Bird	*Pyrrhula pyrrhula*	bullfinch	R	R	R	R	R	R	R	R		
Bird	*Sterna dougallii**	roseate tern									R	R
Bird	*Tetrao tetrix*	black grouse	R			R			R			
Bird	*Turdus philomelos*	song thrush	R	R	R	R	R	R	R	R		
Amphibian	*Triturus cristatus*	great crested newt	R	R	O	O	R	O		R		
Fish	*Alosa alosa*	allis shad			R		O				R	R
Fish	*Alosa fallax*	twaite shad					O				O	O
Fish	*Cetorhinus maxinus*	basking shark									R	R
Fish	*Clupea harengus*	herring									R	R
Fish	*Gadus morhua*	cod									R	R
Fish	*Merluccius merluccius*	hake									O	H
Fish	*Pleuronecetes platessa*	plaice									R	R
Fish	*Pollachius virens*	saithe									R	R
Fish	*Raja batis*	common skate									R	R
Fish	*Scomber scombus*	mackerel									R	R
Fish	*Solea solea*	sole									R	R
Bee	*Bombus distinguendus*	great yellow bumblebee	O	H			H					
Bee	*Bombus ruderatus*	large garden bumblebee					H					
Bee	*Bombus slyvarum*	shrill carder bee		H			H					
Beetle	*Bembidion testaceum*	a ground beetle	O									
Beetle	*Hydroporus rufifrons*	a water beetle	O	H								

			Border Uplands	Durham Magnesian Limestone	North Northumberland Coastal Plain	North Pennines	Northumbria Coal Measures	North York Moors and Hills	Pennine Dale Fringes	Tees Lowlands	Northumberland Coast	Tyne to Tees Coast
Beetle	*Procas granulicollis*	a weevil					O					
Ant	*Formica lugubris*	northern wood ant					O					
Butterfly	*Boloria euphrosyne*	pearl bordered fritillary	O	H		H	H			H		
Butterfly	*Articia artaxerxes*	northern brown argus	H	R			H			O		O
Moth	*Epione paralellaria*	dark bordered beauty	O		O							
Moth	*Hemaris tityus*	narrow-bordered bee-hawkmoth			H	O						
Moth	*Hydrelia sylvata*	waved carpet	O									
Moth	*Idaea dilutaria*	silky wave			O							
Moth	*Pechipoga strigilata*	common fan-foot	O			O						
Moth	*Rheumaptera hastata*	argent and sable	O		H	O						
Moth	*Scotopteryx bipunctaria*	chalk carpet		O								
Moth	*Tyta luctuosa*	four spotted moth		R								
Moth	*Xestia rhomboidea*	square-spotted clay					O					
Moth	*Xestia alpicola alpina*	northern dart	O									
Moth	*Xylena exsoleta*	sword-grass			O							
Crustacean	*Austropotamobius pallipes*	white clawed crayfish	R		R	R	R		R	R		
Mollusc	*Margaritifera margaritifera*	freshwater pearl mussel	R									
Mollusc	*Vertigo genesii*	round-mouthed whorl-snail				R						
Lichen	*Bacidia incompta*	a crustose lichen				O	H					
Lichen	*Calicium corynellum*	a crustose lichen	R			R						
Lichen	*Caloplaca luteoalba*	orange-fruited elm-lichen	O			O						
Lichen	*Collema dichotomum*	riverjelly lichen	R									
Lichen	*Gyalecta ulmi*	elm gylecta	O			R						
Lichen	*Opegrapha paraxanthodes*	a crustose lichen				O						
Moss	*Ditrichum plumbicola*	lead moss				O						
Moss	*Orthodontium gracile*	slender thread moss	H									
Moss	*Orthotrichum sprucei*	Spruce's bristle-moss	O		O		O					
Moss	*Orthotrichum obtusifolium*	blunt-leaved bristle moss							H			
Moss	*Seligeria carniolica*	water rock bristle	R									
Moss	*Shagnum balticum*	Baltic bog-moss	R									
Moss	*Weissia rostellata*	beaked beardless moss	O									
Liverwort	*Petalophyllum ralfsii*	petalwort			R							
Fungus	*Hygrocybe calyptraeformis*	pink wax cap	R									
Vascular plant	*Centaurea cyanus*	cornflower		O		H	H					
Vascular plant	*Cyripedium calceolus*	lady's slipper orchid		H								
Vascular plant	*Epipactis youngiana*	Young's helleborine	R				R					
Vascular plant	*Fumaria purpurea*	purple ramping fumitory			O							
Vascular plant	*Galeopsis angustifolia*	red hempnettle								H		
Vascular plant	*Juniperus communis*	juniper	R	R		R	R					
Vascular plant	*Linnaea borealis*	twinflower				R						
Vascular plant	*Saxifraga hirculus*	yellow marsh saxifrage				R						
Vascular plant	*Scandix pecten-veneris*	shepherd's needle		H			H					

*Breeding only

A BIODIVERSITY AUDIT OF THE NORTH EAST

SPECIES PART 2

Other Regionally Important Species

pine marten

Martes martes **pine marten**

Current status: WCA5, 6

This omnivorous member of the weasel family has its UK stronghold in the Highlands of Scotland but is currently expanding its range. Following persecution, the pine marten had become extinct throughout much of Britain but small relic populations survived in suitable parts of Northumberland. Recent records, including road casualties, suggest it may re-establish itself in the Region over the next few years. Suitable habitat is abundant in the Region, consisting primarily of undisturbed areas with scattered woodland or forest edge. Its solitary and largely nocturnal nature make assessment of populations difficult.

Threats: Illegal persecution; human disturbance; small population renders the species vulnerable.

Myosotis mystacinus **whiskered bat**
Myosotis brantii **Brandt's bat**
Myosotis nattereri **Natterer's bat**
Myosotis daubentonii **Daubenton's bat**
Nyctalus noctula **noctule**
Plecotus auritus **brown long-eared bat**

Current status: EU II; CR94, 2; WCA 5; Bonn II, bats; Bern II

Bats are widespread throughout Britain in both rural and urban habitats. The south and west of Britain support the greatest numbers of species; species diversity declines towards the north. Bats are able to occupy a range of roost sites including a variety of man made structures, disused mines, caves, fissures and hollow trees. Foraging for flying invertebrates takes place in woodland and wetland habitats, and linear features in the landscape are important to bats.

Roost site preferences vary between bat species and according to the time of year. Conditions required in a summer breeding roost with many females and their young will differ greatly from those in a winter hibernation site.

All bat species have shown a dramatic, though poorly recorded, decline in numbers in the last 50 years, usually attributed to the loss of roosting and feeding sites, use of pesticides and disturbance. The need for a range of roost sites with different internal microclimates makes bats more vulnerable when habitat is lost or fragmented.

Threats: Loss and fragmentation of habitat, changes in habitat composition, the loss of deciduous woodland, the 'tidying' of dead or hollow trees from the countryside. Loss of diversity in the agricultural landscape coupled with the increased use of pesticides leading to decreased numbers of invertebrates as food for bats. Loss of wetlands as a source of invertebrate prey for bats, along with the loss of mature riverside trees as foraging and roost sites.

Refurbishment or demolition of buildings and man made structures is a threat to bats using cavities as roost sites. Remedial timber treatment within buildings poisons bats if unsuitable chemicals are used. Cavity wall insulation destroys bat roost sites.

Human recreational disturbance and loss through capping for safety reasons threaten caves and mines. There is the potential for climbing as a sport to impact upon bats in cliff fissures.

Halichoerus grypus **grey seal**

Current status: EU II; Bonn II

Grey seals are Britain's largest carnivores. They divide their time between land, where they breed, moult and rest, and the sea where they forage, rest and play. The UK holds some 114 000 grey seals, approximately 33% of the world population and 95% of the European population. The largest breeding site in England is on the Farne Islands, where around 1000 pups are produced annually. This population is of international importance and forms one of the interest features on the Berwickshire and North Northumberland Coast cSAC.

Threats: Illegal persecution; disturbance; pollution.

grey seals

Arenaria interpres **turnstone**
Calidris maritima **purple sandpiper**

Current status: Bern II

Purple sandpiper and turnstone are migratory species which winter along the North East coast in internationally important numbers, and form part of the reason for designation of the Northumbria Coast SPA/Ramsar site. The UK therefore has an international obligation for their conservation. Purple sandpipers are virtually restricted to rocky shores where they feed on a variety of molluscs and invertebrates. Turnstones also feed extensively on rocky sea coasts but may be found in a variety of other coastal habitats such as estuaries and along the strandline of sandy bays. Both species also use man-made structures such as piers and jetties as roosting sites.

Threats: Chemical pollution and oil spill incidents; disturbance at roosting and feeding sites; decreases in the abundance of prey items may be a problem for purple sandpiper, possibly caused by a reduction in marine sewage inputs.

knot

Calidris alba **sanderling**
Calidris canutus **knot**
Charadrius hiaticula **ringed plover**
Limosa lapponica **bar-tailed godwit**

Current status: Bern II (sanderling and ringed plover only)

These wading bird species winter on the North East coast in nationally important numbers. They are particularly associated with the Region's sandy beaches and estuaries where they feed on a variety of invertebrates. Much of the Region's coastline is designated as a SSSI in recognition of its importance for these species. Knot occurs on the Tees Estuary in internationally important numbers and is one of the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar site. The UK therefore has an international obligation for its conservation at this site.

Threats: Disturbance of feeding or roosting birds; pollution causing reduction in the availability of invertebrate prey items; oil spills incidents are a potential threat.

Branta bernicla hrota **pale-bellied brent goose**

Current status:

A distinct biogeographical population of the pale-bellied brent goose breeds in Svalbard and winters in Denmark and at Lindisfarne on the Northumberland coast, where the wintering birds feed on seagrass *Zostera* spp growing on the intertidal mudflats. The North East Region therefore holds the entire world population of this race during part of the year, and has a vital part to play in its conservation. Pale-bellied brent goose is an interest feature of the Lindisfarne SPA/Ramsar site.

Threats: Loss of *Zostera* beds for winter feeding; illegal shooting.

Podiceps nigricollis **black-necked grebe**

Current status:

This scarce and fluctuating breeder throughout Britain and Ireland is showing a gradual increase in numbers and range. Black-necked grebes show a preference for small, shallow, plentifully vegetated and highly productive water bodies. The North East has been a British stronghold for this rare bird since the first confirmed breeding attempt in the late 1970s and continues to hold nationally significant numbers.

Threats: Habitat loss or change brought about by natural succession or human interference eg drainage. Disturbance from a variety of recreational pursuits eg boating, water sports may also be responsible for birds failing to breed.

Sterna albifrons **little tern**
Sterna hirundo **common tern**
Sterna paradisaea **arctic tern**
Sterna sandvicensis **Sandwich tern**

Current status: EU Birds; Bern II

The North East of England is generally an important area for breeding tern species. Roseate tern is referred to in Part 1 of this Species Audit, but four other species are well represented with, common, arctic and, especially, Sandwich, breeding in nationally significant numbers. The Farne and Coquet islands form the key sites for these generally vulnerable ground nesting birds, and provide the breeding sites for all Sandwich, and the vast bulk of the common, terns in the Region. Teesside contains the largest mainland colony of common tern in England. Arctic terns are also found on the Farnes and Coquet but a sizeable colony is also present on the North Northumberland coast. Finally there are two main little tern colonies, one at the North Northumberland site and the other at Teesmouth.

Threats: Mainland colonies are always susceptible to disturbance, tidal flooding, ground predators and occasionally to egg collection. Shortage of food supply, especially sand eels, has caused dramatic declines in some Scottish colonies and is always a potential threat. Trapping of birds at their winter sites may also influence breeding populations. The Tees common tern colony is extremely vulnerable to port related development.

arctic tern

hen harrier

Accipiter gentilis **goshawk**
Circus cyaneus **hen harrier**
Falco columbarius **merlin**
Falco peregrinus **peregrine**

Current status: Bern II (merlin and peregrine only); Bonn II

These raptors have experienced different fortunes in the North East of England. Both the hen harrier and merlin are closely associated with open heather moorland, but while merlin regularly breeds successfully with around 1% of the British population present in the Region, the hen harrier rarely breeds successfully. The peregrine is primarily found on inland cliffs and crags in the Region where it breeds in relatively modest numbers (around 20 or so pairs). Unlike the previous species goshawks are more associated with upland woodlands and have increased in numbers following extensive afforestation. However they still remain uncommon residents. Merlin, hen harrier and peregrine all form interest features of the North Pennine Moors SPA.

Threats: Habitat damage, particularly to heather moorland, remains a threat but human persecution, particularly of the hen harrier, is by far the biggest impediment to population increases. Egg collection and illegal collection of young are also factors.

Calidris alpina **dunlin**
Gallinago gallinago **snipe**
Numenius arquata **curlew**
Pluvialis apricaria **golden plover**
Tringa totanus **redshank**
Vanellus vanellus **lapwing**

Current status: EU birds (golden plover only); Bern II (dunlin only)

Breeding waders in the UK are generally suffering population declines, particularly as a result of intensification of farming practices. As a consequence the upland areas of the Region are becoming increasingly important for a number of these declining species. The Region is particularly significant for its population of that most evocative of moorland birds, the curlew, with over 10% of the British population present. Dunlin and golden plover are also quintessential upland species generally well represented in the Region's hills. Snipe, lapwing and redshank are declining rapidly in lowland areas but, for the moment at least, are found in our uplands in nationally significant numbers. The internationally important numbers of golden plover in the Region's uplands form one of the reasons for the designation of the North Pennine Moors SPA.

Threats: Agricultural intensification including drainage, re-seeding, overgrazing, trampling by stock, crushing by agricultural machinery, as well as inappropriate afforestation form the key threats to these species.

dunlin and turnstone

Anas penelope **wigeon**

Current status:

Wigeon are common and widespread wintering visitors to the UK but relatively scarce breeders, with the main population in Scotland. The upland areas of the North East of England form the English stronghold of breeding wigeon, and numbers have gradually increased following a re-colonisation in the late 1970s. Wigeon generally favour shallow, open, fresh waters of medium quality, neither strongly eutrophic nor oligotrophic, and with ample floating or submerged vegetation. In this region the species is primarily concentrated at two reservoirs, though small numbers breed in other upland loughs.

Threats: Any species confined to a few key breeding sites is vulnerable to a catastrophic event of some kind, or to a habitat change rendering the site unsuitable.

Motacilla flava **yellow wagtail**

Current status: Bern II

Yellow wagtails are summer visitors to the UK and are widely but patchily distributed throughout England. They favour wet meadows, riversides, rough grassland and freshwater coastal marshes. Approaching its northerly British range limit in our Region, the population seems to be mirroring the national decline in both range and population.

yellow wagtail

Threats: Agricultural intensification including drainage of wet areas, hay meadow conversion, silage cutting, overgrazing and high pesticide/fertiliser application have impaired habitat. Drainage and development of coastal sites also contribute to habitat loss.

Buteo buteo **buzzard**

Current status:

In the early 1990s only a handful of birds were resident in the region with only two to three pairs breeding successfully. Over the past decade numbers have increased in north and east Northumberland largely from birds moving south from Scotland. It is likely that in excess of 75 pairs are now resident in this area. Elsewhere in the Region the buzzard is still an uncommon species. It is particularly scarce in the North Pennines where there is much suitable habitat and where the species should be plentiful. In Cumbria and southern Scotland the buzzard is a common species occupying similar habitat to that of the North East.

Threats: The buzzard's range in the North East is not restricted by the distribution of suitable habitat nor by food supplies. Historically it has been widely subjected to persecution. This has limited its distribution in the North East and only in the last decade have numbers started to increase. However this has generally been in the areas away from intensive shooting management. In areas managed for shooting, particularly the North Pennines there are concerns that continuing persecution may be limiting the spread of this species.

Corvus corvax **raven**

Current status:

The raven is a very rare resident in the uplands of the Region although just to the west in Cumbria it is a relatively common resident. Less than half a dozen pairs attempt to breed in most years and the success of these birds is very poor. For example in west Durham a pair regularly attempts to breed at the same site but has only been successful once in twenty years. Whilst the distribution of this species is limited by suitable nest sites there remain many suitable areas which are not occupied.

Threats: As with the buzzard, persecution is still thought to be a continuing limiting factor to the spread of this species. Other forms of disturbance, for example egg collecting, may also pose a threat.

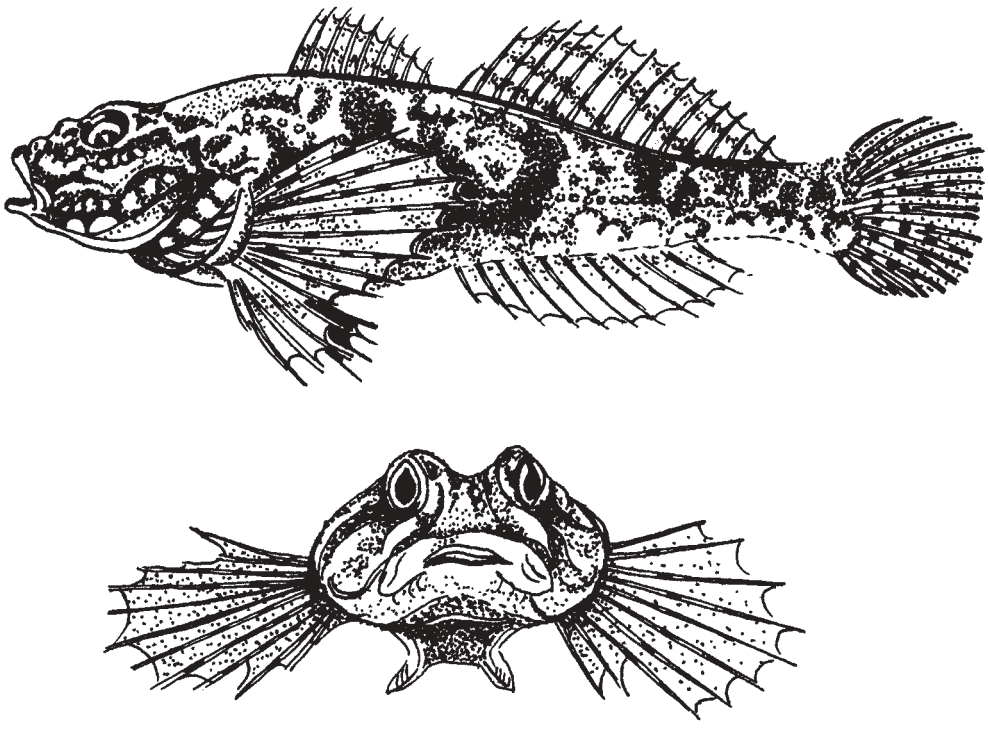
Cottus gobio **bullhead**

Current status: EU II

Bullheads occur in rivers, streams and large stoney-bottomed lakes. Usually in shallow water, they can be found under large stones and amongst coarse gravel. The bullhead feeds at night foraging over gravel for crustaceans and bottom living insect larvae. This species rarely exceeds 10 cm, reaching maturity at the age of two and living for up to six years. The female may lay up to 100 eggs spawned between March and May, which are then guarded by the males for 3 - 4 weeks. Within the Region they occur in nationally important populations. There are particularly good numbers on the rivers Browney, Wansbeck and Tees.

Threats: Pollution and poor water quality as the bullhead requires oxygen-rich waters. Other threats to population status include predation and inter-specific competition.

bullhead



Lampetra fluviatilis **lampreys**
Lampetra planeri
Petromyzon marinus

Current status: EU II, V (*Lampetra fluviatilis* only); Bern III

The North East Region has all three lamprey species present in the Coquet, Tyne, Till, Wear and Tees catchments. They are also present in a number of the smaller rivers, including the Aln. Lampreys require a mosaic of habitat types within a river catchment. The larval lamprey ammocoetes live buried in silted areas of the river, feeding on minute benthic organisms. After three to five years they metamorphose into adults. The brook lamprey remains in fresh water and does not feed as an adult. The river and sea lampreys migrate downstream to the estuaries and sea where they parasitise other fish. Adult sea and river lampreys return to freshwater to spawn in spring or early summer in riffle areas of rivers. These adults do not feed in freshwater and die after spawning.

Threats: Impacts to their freshwater habitat include; pollution, land use change, river engineering. Artificial weirs and dams can create barriers to migration, stocks may be reduced by predation and exploitation. Difficulties in identifying the three species in their ammocoete stages result in species management being difficult, as well as in restricting an understanding of distribution.

Salmo salar **Atlantic salmon**

Current status: EU II, V; Bern II

Atlantic salmon is an anadromous species, widely distributed throughout the Region. Adults spawn in freshwater in shallow riffles, which are then used by juvenile fish as nursery areas. As juvenile salmon grow, they utilise deeper water habitats. The species occurs in nationally important numbers within the Region. Widespread populations are present within the accessible reaches of the Tyne, Coquet, Till and Wear catchments, with smaller populations recorded on the Blyth, Wansbeck, Aln and Northumbrian coastal streams. High densities of fish are recorded where habitat is suitable. The Tees supports a moderate but recovering salmon population.

Threats: Loss or degradation of spawning and nursery areas in freshwater, over-exploitation in commercial and recreational fisheries, illegal exploitation of stocks, water pollution, barriers to migration such as weirs and dams, and predation.

Coenonympha tullia large heath butterfly

Current status:

large heath butterfly

The large heath butterfly is confined to areas where its larval foodplant (hare's-tail cotton-grass *Eriophorum vaginatum*) and adult nectar source (cross-leaved heath *Erica tetralix*) grow in abundance. As a result, the species is found almost exclusively on areas of mire or wet heath. The North East Region (and Northumberland in particular) probably has three quarters of the known colonies of large heath butterfly in England and Wales, and therefore has an important role to play in its conservation. Large heath has suffered a drastic decline in England and Wales due to the loss of suitable habitat. Its specialised requirements make large heath a good indicator of the health of the Region's peatlands.

Threats: Loss of suitable habitat due to drainage, overgrazing and afforestation.

Boloria selene small pearl-bordered fritillary

Current status:

The small pearl-bordered fritillary occurs mainly in wetland habitats in northern Britain and in coppiced woodland, grassland and moorland habitats in the south and west. In the North East Region, the species is confined to wet areas of mires, acid grasslands and heathland. Small pearl-bordered fritillary is declining nationally because of habitat loss and is a high priority for action within the Region. In Durham, the butterfly is under threat and declining. Most known colonies are small and isolated and therefore vulnerable. New colonies have recently been discovered in Northumberland, due to increased recorder effort and it is possible that colonies may have been lost without ever being recorded.

Threats: Loss of suitable habitat containing marsh violet *Viola palustris*, the butterfly's foodplant. This loss is particularly marked in County Durham, where particular threats to sites include scrub invasion, over-grazing and clearing of ditches.

Natrix natrix **grass snake**

Current status: WCA5 (killing and sale only); Bern III

The grass snake is the UK's largest native reptile. Its preferred habitats tend to be associated with water (eg ponds, river valleys and marsh) but it also requires a range of associated terrestrial habitats, such as grassland, scrub and woodland. Grass snakes are widespread over much of England and Wales, but are absent from Scotland and Ireland. The species is thought to be in decline nationally and many suitable breeding sites have been lost. Grass snake reaches its northern limit within the North East, and the Region therefore has an important role to play in maintaining the range of the species. Most local records come from the Derwent and Team valleys, Derwentside and Gateshead. Isolated populations are also known to occur in Northumberland.

Threats: Habitat loss, degradation and fragmentation caused by urbanisation, development, agricultural intensification and increased recreational land use; loss of egg laying sites such as manure heaps and leaf piles; lack of knowledge on distribution; persecution and disturbance.

Bryoria nadvornikiana **a lichen**

Current status: Vulnerable RDB (GB)

This species of lichen is only recorded in Britain from two sandstone crags in Northumberland, close to the county boundary with Cumbria. Elsewhere it has a widespread distribution throughout northern and central Europe, North America, Hawaii, Africa, the Himalayas and Japan. It shows a preference for sheltered north-facing aspects on exposed sandstone cliffs.

Threats: Encroaching conifer plantations may alter the microclimate favoured by the species; lichens are particularly sensitive to atmospheric pollution.

Alchemilla acutiloba **lady's mantle species**
Alchemilla monticola
Alchemilla subcrenata

Current status: RDB (GB)

These three lady's mantle species are associated with traditionally managed upland hay meadows, and within the British Isles are found only in the North East Region, principally in County Durham. *A. subcrenata* is restricted to two very limited areas of Teesdale and Weardale, where it was recorded from about five sites. It may now be extinct in Weardale and is thought to be declining within Teesdale. However, because of its similarity to commoner species, new localities may yet be discovered and a thorough survey is required. *A. monticola* has a distribution strongly centred on Upper Teesdale, where it occurs on roadside verges and banks as well as in hay meadows. A partial survey in 1996 indicated a possible decline in the species. *A. acutiloba* occurs in both Weardale and Teesdale, with a single outlying population in south-east Northumberland. It is likely that several populations of this species have been lost through agricultural improvements of hay fields.

Threats: The main threats to these species are the cessation of traditional hay meadow management and agricultural improvements to grassland sites. Populations of *A. acutiloba* and *A. monticola* which occur on roadside verges are threatend by unsympathetic cutting regimes.

Alchemilla micans **a lady's mantle**

Current status: RDB (GB)

Alchemilla micans is one of the most recent additions to the British flora and within the British Isles it is only known from Northumberland. It was previously present in four adjacent sites within the county but the main site, where about 800 flowering plants have been recorded in the past, has recently been destroyed by quarrying activities. The plants present at this site have been translocated to a new location but it has not yet been established whether this has been successful. At the three remaining sites, colonies are small and consist of a few clumps of plants.

Threats: The cessation of grazing and improvement of limestone grassland and hay meadows are likely to be the main threats to the survival of this species.

bog rosemary

Andromeda polifolia **bog rosemary**

Current status:

Northumberland contains a high proportion of the British population of this species, which is abundant on many of the raised and blanket bogs which have escaped damage from afforestation or drainage. Predominantly in the Kielder area, many of the sites are now designated or managed as nature reserves, but a small population at Prestwick Carr, on the outskirts of Newcastle, is threatened by a lack of management. The plant also occurs on the wetter bogs of south-west Durham.

Threats: Afforestation and/or drainage (with associated encroachment by trees); grazing pressures.

Bartsia alpina **alpine bartsia**
Dryas octopetala **mountain avens**
Gentiana verna **spring gentian**
Helianthemum canum **ssp**. *levigatum* **Teesdale rock-rose**
Kobresia simpliciuscula **false sedge**
Minuartia stricta **Teesdale sandwort**
Myosotis alpestris **alpine forget-me-not**
Polygala amarella **dwarf milkwort**
Potentilla fruticosa **shrubby cinquefoil**
Viola rupestris **Teesdale violet**

Current status: RDB (GB)

These species all contribute to what is described as the 'Teesdale flora', an assemblage of rare, usually arctic-alpine, species found in Upper Teesdale, which represents one of the most important botanical assets of the Region. Two of these species, *M. stricta* and *H. canum* ssp. *levigatum*, have their only British localities within Upper Teesdale. The others are found to a greater or lesser extent at sites outside of the Region but often have their main UK or English populations within Upper Teesdale. All have nationally important populations within the Region.

spring gentian

Threats: The specific threats to these species vary according to their individual ecology and the habitat in which they are found. However, general threats include inappropriate grazing management (either over- or under-grazing), trampling by stock or humans, or temperature rises due to global warming.

Epipactis leptochila narrow-lipped helleborine
Minuartia verna spring sandwort
Thlaspi caerulescens alpine penny-cress

Current status:

These three nationally scarce metallophytic (heavy-metal tolerant) species are particularly associated with the heavy metal contaminated river alluvium and gravels of the South Tyne/Tyne river system. *M. verna* and *T. caeruluescens* are generally found in open, short grassland while *E. leptochila* is found in areas of light shade (usually under birch). Many of the most important sites on which these species are found are designated as SSSIs and cSACs.

Note: A variety of narrow-lipped helleborine, *Epipactis leptochila* var. *dunesis*, is found on the edges of dune slacks and occurs within the Lindisfarne NNR in Northumberland. In southern England it is also found in beech woods on calcareous soils.

Threats: The habitats of *M. verna* or *T. caerulescens* may be threatened by over-grazing and succession to scrub. *E. leptochila* requires light shade but may fail to flower and seem to disappear from heavily shaded sites. It is also threatened by competition from other, more competitive, vegetation and by grazing, particularly by rabbits.

Geranium sanguineum bloody crane's-bill

Current status:

Bloody crane's-bill is a distinctive and characteristic plant of the Region's sand-dune systems. The Region is a stronghold for the species, which is generally plentiful and widely distributed on the Northumberland coast but also occurs on parts of the Durham coast in the dune system at Hart Warren in Hartlepool. Bloody crane's-bill has been adopted as an indicator species for the health and extent of the Region's sand-dunes (English Nature 1999 Sustainable Development Indicators for the North East).

Threats: Over-grazing; habitat loss to development, inappropriate management or increasing sea-levels, or recreational pressure.

ANNEX 1

SELECTION OF REGIONALLY IMPORTANT SPECIES

The UK BAP sets out those species considered to be national priorities for action. At the regional level, there are many more species of importance for maintaining the overall biodiversity resource of the North East of England, but which are not considered national priorities. Selecting these species is problematic, and is potentially a subjective exercise. A two phase approach was used to identify Regionally important species. In the first stage a long list of species was compiled using the seven selection criteria listed below. This approach is based on that identified in annex 1 of A Biodiversity Audit of Yorkshire and the Humber. The list of species chosen and the criteria under which they were selected is shown in Table 45. This list contains both species which are locally rare, and others which are locally common but which have been identified as under threat nationally. It should be remembered that biodiversity is about common species as well as rare and **the omission of a species from this Table should not be taken as an indication that it is of no conservation value**.

In the second stage, this initial list was used by the Biodiversity Forum to select those species which it considered the North East Region can play a special role in conserving. These species are shown in bold in Table 45. Brief descriptions of each species are given in Section 2 of the Species Audit.

Selection criteria

1. **The species is declining or threatened within the Region or the species is stable in the Region but declining or threatened within a UK or international context**

   Changes in population need to be considered within an appropriate time scale. Many species have undergone significant declines since the Second World War and those which have become extinct within the Region during this period should nevertheless be considered within the Audit. Threats to species are numerous and include lack of management, recreation, pollution and development. Red Data Books provide the standard for assessing the degree of threat relating to many groups. In addition the Nationally Scarce listings for vascular plants and lists in Birds of Conservation Concern include species which have previously had large and extensive populations and which have undergone significant decline. Among these may be species which are declining within the Region, but which are not necessarily also in national decline.

2. **The North East Region has, or has recently had, a significant proportion of the UK population of the species**

   This should include species for which a significant proportion of the UK population has been lost from the Region, therefore resulting in a significant contraction of the species' UK range; endemic species; or species for which the Region contains a high proportion of the national population. In this audit 'recent' is defined as within the last 25 years, or where an extinction date is not known to the most recent record. (This follows the advice of the UK Local Issues Advisory Group, Guidance Note 4 *Evaluating priorities and setting targets for habitats and species*).

References/data sources
1. Selman R, Dodd F and Bayes, K 1999 *A biodiversity audit of Yorkshire and the Humber*. Yorkshire & Humber Biodiversity Forum.

3. **The species is not adequately covered by a Habitat Action Plan**

   The conservation of many species can be effectively addressed by conservation of the habitat within which they are found. Some species, however, may not be adequately conserved in this way because:

   - The habitats in which they are found may be otherwise of low biodiversity interest and therefore may not receive appropriate protection or management;
   - The species may be dependent upon a variety of different habitats and therefore requires the existence of these habitats as a matrix within close proximity to each other;
   - The species may be subject to direct pressures or factors such as persecution, collection or susceptibility to predation, pollution etc that may have negligible impact upon the habitat;
   - The species may have particular requirements not met through non-specific habitat management, or may have needs that conflict with the requirements of other species;
   - Local populations may be reduced to the level where, despite sympathetic habitat management, there is no real prospect of significant recovery without additional intervention.

4. **The species occurs on the UK BAP list of Species of Conservation Concern (SOCC)**

   This includes Species of Conservation Concern (formerly long list) listed within the UK BAP. Priority list species (formerly short and middle lists) have already been considered within this audit.

5. **A real difference can be made to the status of the species through effective local action with the Region**

   One purpose of the Audit is to inform policies and local action plans. It is therefore vital that consideration is given to maximising its effectiveness and benefits, by ensuring that those species for which the most significant contributions to national status can be made within the Region are accorded due attention. This could include species currently at the edge of their geographical ranges or were previously having significant ranges within the Region. Species which have been artificially introduced or released by man into an area outside their natural geographical range are not included.

6. **The species is a 'keystone' or indicator species**

   These are species which are ecologically important and/or which are particularly associated with the Region and can be used as direct indicators of habitat health or quality. They can be useful in linking biodiversity issues with wider principles of sustainability, and can be included within local sustainability indicators. Indicator species listed in the Regional Sustainability Plan are included under this criterion.

7. The species has popular appeal and can be used to promote wider biodiversity issues in the Region

Species with wide popular appeal to the public or a high profile are important in establishing broad support for biodiversity and its promotion as a 'quality of life' indicator. These species would be useful in dealing with educational questions of the importance of biodiversity.

Table 45: Initial selection of potential species of Regional importance shown against selection criteria

Selection criteria			1	2	3	4	5	6	7
Mammal	*Capra hircus*	feral goat		●					
Mammal	*Capreolus capreolus*	roe deer				●			
Mammal	*Erinaceus europaeus*	hedgehog				●			
Mammal	***Halichoerus grypus***	**grey seal**		●		●			●
Mammal	*Lepus timidus*	mountain hare				●			
Mammal	***Martes martes***	**pine marten**				●			
Mammal	*Meles meles*	badger				●			
Mammal	*Mustela erminea*	stoat	●			●			
Mammal	*Mustela nivalis*	weasel	●			●			
Mammal	*Mustela putorius*	polecat				●			
Mammal	***Myotis brantii***	**Brandt's bat**				●			
Mammal	***Myotis daubentonii***	**Daubenton's bat**				●			
Mammal	***Myotis mystacinus***	**whiskered bat**				●			
Mammal	***Myotis nattereri***	**Natterer's bat**				●			
Mammal	*Neomys fodiens*	water shrew				●			
Mammal	***Nyctalus noctula***	**noctule bat**	●			●			
Mammal	*Phoca vitulina*	common seal				●			
Mammal	*Pipistrellus nathusii*	Nathusius pipistrelle				●			
Mammal	***Plecotus auritus***	**brown long-eared bat**	●			●			
Mammal	*Sorex araneus*	common shrew	●			●			
Mammal	*Sorex minutus*	pygmy shrew	●			●			
Bird	***Accipiter gentilis***	**goshawk**				●	●		
Bird	*Accipiter nisus*	sparrowhawk				●			
Bird	*Acrocephalus schoenobaenus*	sedge warbler				●			
Bird	*Acrocephalus scirpaceus*	reed warbler				●			
Bird	*Alca torda*	razorbill				●			
Bird	*Alecedo atthis*	kingfisher				●			
Bird	*Anas clypeata*	shoveler				●			
Bird	*Anas crecca*	teal				●			
Bird	***Anas penelope***	**wigeon**		●		●			
Bird	*Anas platyrhynchos*	mallard				●			
Bird	*Anas querquedula*	garganey				●			
Bird	*Anas strepera*	gadwall				●			
Bird	*Anser anser*	greylag goose		●		●			
Bird	*Anser brachyrhynchos*	pink footed goose				●			
Bird	*Anthus petrosus*	rock pipit				●			
Bird	*Anthus pratensis*	meadow pipit	●			●			
Bird	*Anthus trivialis*	tree pipit	●			●			
Bird	***Arenaria interpres***	**turnstone**	●	●		●			
Bird	*Asio otus*	long-eared owl				●			
Bird	*Asio otus*	short-eared owl	●			●			
Bird	*Aythya ferina*	pochard				●			
Bird	*Aythya fuligula*	tufted duck				●			
Bird	***Branta bernicla hrota***	**pale bellied brent goose**		●		●			●

Selection criteria			1	2	3	4	5	6	7
Bird	*Bucephala clangula*	goldeneye		●		●			
Bird	***Buteo buteo***	**buzzard**				●	●		
Bird	***Calidris alba***	**sanderling**		●		●			
Bird	***Calidris alpina***	**dunlin**				●			
Bird	***Calidris canutus***	**knot**	●	●		●			
Bird	***Calidris maritima***	**purple sandpiper**		●		●			
Bird	*Carduelis chloris*	greenfinch	●			●			
Bird	*Carduelis carduelis*	goldfinch	●			●			
Bird	*Carduelis flammea*	redpoll				●			
Bird	*Carduelis flavirostris*	twite	●			●			
Bird	*Carduelis spinus*	siskin				●			
Bird	*Certhia familaris*	treecreeper				●			
Bird	*Charadrius dubius*	little ringed plover				●			
Bird	***Charadrius hiaticula***	**ringed plover**		●		●			
Bird	*Cinclus cinclus*	dipper				●			
Bird	***Circus cyaenus***	**hen harrier**	●	●		●	●		
Bird	*Coccothraustes coccothraustes*	hawfinch	●			●			
Bird	***Corvus corax***	**raven**	●				●		
Bird	*Coturnix coturnix*	quail	●			●			
Bird	*Cygnus columbianus bewickii*	Bewick's swan				●			
Bird	*Cygnus cygnus*	whooper swan				●			
Bird	*Cygnus olor*	mute swan		●		●			
Bird	*Delichon urbica*	house martin				●			
Bird	*Dendrocopus major*	great spotted woodpecker				●			
Bird	*Dendrocopus minor*	lesser spotted woodpecker	●			●			
Bird	*Emberiza citronella*	yellowhammer	●			●			
Bird	***Falco columbarius***	**merlin**	●	●		●			
Bird	***Falco peregrinus***	**peregrine**		●		●			
Bird	*Falco tinnunculus*	kestrel	●			●			
Bird	*Ficedula hypoleuca*	pied flycatcher				●			
Bird	*Fratercula arctica*	puffin				●			
Bird	*Fringilla montifringilla*	brambling				●			
Bird	*Gallinago gallinago*	snipe	●	●		●			
Bird	*Hirundo rustica*	swallow	●			●			
Bird	*Larus argentatus*	herring gull	●			●			
Bird	*Larus canus*	common gull		●					
Bird	*Larus fuscus*	lesser black-backed gull				●			
Bird	***Limosa lapponica***	**bar-tailed godwit**		●		●			
Bird	*Limosa limosa*	black-tailed godwit	●			●			
Bird	*Locustella naevia*	grasshopper warbler	●			●			
Bird	*Loxia curvirostra*	common crossbill		●		●			
Bird	*Lymnocryptes*	jack snipe				●			
Bird	*Mergus merganser*	goosander				●			
Bird	*Mergus serrator*	red-breasted merganzer		●		●			
Bird	*Monticilla alba*	pied wagtail	●			●			

Table 45 continued

Selection criteria			1	2	3	4	5	6	7
Bird	*Monticilla cinerea*	grey wagtail	●			●			
Bird	***Monticilla flava***	**yellow wagtail**	●			●	●	●	
Bird	***Numenius arquata***	**curlew**		●		●			
Bird	*Oenanthe oenanthe*	wheatear							
Bird	*Parus ater*	coal tit				●			
Bird	*Parus caeruleus*	blue tit				●			
Bird	*Parus major*	great tit				●			
Bird	*Parus montanus*	willow tit	●			●			
Bird	*Parus palustris*	marsh tit	●			●			
Bird	*Passer domesticus*	house sparrow	●						
Bird	*Phalacrocrax aristotelis*	shag				●			
Bird	*Phalacrocrax carbo*	cormorant				●			
Bird	*Philomachus pugnax*	ruff				●			
Bird	*Phoenicurus phoenicurus*	redstart				●			
Bird	*Phylloscopus collybita*	chiffchaff				●			
Bird	*Phylloscopus sibilatrix*	wood warbler				●			
Bird	*Phylloscopus trochilus*	willow warbler	●			●			
Bird	*Picus viridis*	green woodpecker				●			
Bird	*Plectrophenax nivalis*	snow bunting	●			●			
Bird	***Pluvialis apricaria***	**golden plover**	●	●		●			
Bird	*Pluvialis squatarola*	grey plover		●		●			
Bird	*Podiceps nigricollis*	black-necked grebe		●		●			
Bird	*Prunella modularis*	dunnock	●			●			
Bird	*Rallus aquaticus*	water rail	●			●			
Bird	*Regulus regulus*	goldcrest				●			
Bird	*Riparia riparia*	sand martin				●			
Bird	*Saxicola rubetra*	whinchat				●			
Bird	*Saxicola torquata*	stonechat				●			
Bird	*Scolopax rusticola*	woodcock	●			●			
Bird	*Sitta europaea*	nuthatch				●			
Bird	*Somateria mollissima*	eider	●			●			●
Bird	***Sterna albifrons***	**little tern**		●		●			
Bird	***Sterna hirundo***	**common tern**		●		●			
Bird	***Sterna sandvicensis***	**sandwich tern**		●		●			
Bird	***Sternus paradisaea***	**arctic tern**		●		●			
Bird	*Strix aluco*	tawny owl	●			●			
Bird	*Sturnus vulgaris*	starling	●			●			
Bird	*Sylvia atricapilla*	blackcap	●			●			
Bird	*Sylvia borin*	garden warbler				●			
Bird	*Sylvia carruca*	lesser whitethroat				●			
Bird	*Sylvia communis*	whitethroat				●			
Bird	*Tadorna tadorna*	shelduck	●			●			
Bird	***Tringa totanus***	**redshank**	●	●		●			
Bird	*Turdus iliacus*	redwing				●			

Selection criteria			1	2	3	4	5	6	7
Bird	*Turdus merula*	blackbird	●						
Bird	*Turdus pilarius*	fieldfare				●			
Bird	*Turdus torquatus*	ring ouzel	●			●			
Bird	*Tyto alba*	barn owl	●			●			●
Bird	***Vanellus vanellus***	**lapwing**	●	●		●			
Reptile	*Vipera berus*	adder				●			
Reptile	*Anguis fragilis*	slow worm				●			
Reptile	***Natrix natrix***	**grass snake**	●			●	●		
Amphibian	*Triturus heleveticus*	palmate newt			●	●			
Amphibian	*Triturus vulgaris*	smooth newt			●	●			
Amphibian	*Rana temporaria*	common frog			●	●			
Amphibian	*Bufo bufo*	common toad			●	●			
Fish	***Cotus gobio***	**bullhead**		●	●	●			
Fish	***Lampetra fluviatilis***	**lampern**			●	●			
Fish	***Lampetra planeri***	**brook lamprey**			●	●			
Fish	***Petromyzon marinus***	**marine lamprey**			●	●			
Fish	***Salmo salar***	**salmon**		●	●	●		●	
Fish	*Thymallus thymallus*	grayling			●	●			
Mollusc	*Ashfordia granulata*	a gastropod	●			●			
Mollusc	*Leiostyla angelica*	a land snail				●			
Mollusc	*Limax tenellus*	lemon slug				●			
Mollusc	*Lymnaea glabra*	a mud snail	●			●			
Mollusc	*Modiolus modiolus*	horse mussel				●			
Mollusc	*Nucella lapillus*	dog whelk				●			
Butterfly	*Argynnis aglaja*	dark green fritillary	●						
Butterfly	*Erynnis tages*	dingy skipper	●			●			
Butterfly	*Callophrys rubi*	green hairstreak	●						
Butterfly	*Celastrina argiolus*	holly blue				●			
Butterfly	***Coenonympha tullia***	**large heath**		●		●	●	●	
Butterfly	*Quercusia quercus*	purple hairstreak				●			
Butterfly	***Boloria selene***	**small pearl-bordered fritillary**	●			●	●		
Butterfly	*Hipparchia semele*	grayling	●						
Butterfly	*Strymonidia w-album*	white letter hairstreak				●			
Moth	*Acleris abientana*	a micro moth				●			
Moth	*Adscita statices*	the forester				●			
Moth	*Agrostis cinerea*	light feathered rustic	●			●			
Moth	*Anarta melanopa*	broad bordered white underwing	●			●			
Moth	*Chesias rufata*	broom tip				●			
Moth	*Heliophubus reticulata*	bordered gothic				●			
Moth	*Photedes capiuncula*	least minor moth	●			●			
Moth	*Yponomeuta rorrella*	a micro moth				●			
Beetle	*Hydraena pulchella*	a water beetle				●			
Beetle	*Hydroporus rufifrons*	a water beetle	●			●			
Beetle	*Negastrius sabulicola*	a click beetle				●			
Beetle	*Quedius riparius*	a rove beetle				●			

Table 45 continued

Selection criteria			1	2	3	4	5	6	7
Beetle	*Tachinus rufipennis*	a rove beetle				●			
Beetle	*Trechus rivularis*	a ground beetle				●			
Beetle	*Triplax scutellaris*	Triplax scutellaris				●			
Bee	*Andrena ruficrus*	a mining bee				●			
Bee	*Nomoda hirtipes*	a cuckoo bee				●			
Fly	*Dichetophora findlandica*	a snail killing fly				●			
Fly	*Didea alneti*	a hoverfly				●			
Fly	*Ernoneura argus*	a dung fly				●			
Fly	*Oxycera dives*	a soldier fly				●			
Dragonfly	*Sympetrum sangiuneum*	ruddy darter	●						
Spider	*Diplocephalus connatus*					●			
Spider	*Maro lepidus*					●			
Sea mat	*Bugula purpurotincta*	a bryozoan				●			
Worm	*Baldia johnstoni*	a polychaete worm				●			
Worm	*Molgula oculata*	a tunicate				●			
Vascular plant	***Alchemilla actiloba***	**a lady's mantle**		●		●	●	●	
Vascular plant	***Alchemilla glomerulans***	**a lady's mantle**	●	●					
Vascular plant	***Alchemilla micans***	**a lady's mantle**	●	●		●	●	●	
Vascular plant	***Alchemilla monticola***	**a lady's mantle**		●		●	●	●	
Vascular plant	***Alchemilla subcreanata***	**a lady's mantle**	●	●		●	●	●	
Vascular plant	***Andromeda polifolia***	**bog rosemary**		●		●		●	
Vascular plant	*Arctostaphylos uva-ursi*	bearberry				●			
Vascular plant	*Asplenium trichomanes subsp. pachyrachis*	a fern		●					
Vascular plant	*Astragalus danicus*	purple milk-vetch						●	
Vascular plant	*Atriplex longipes*	long-stalked orache				●			
Vascular plant	***Bartsia alpina***	**alpine bartsia**	●			●			
Vascular plant	*Betula nana*	dwarf birch					●		
Vascular plant	*Carex aquatilis*	water sedge	●						
Vascular plant	*Carex magellanica subsp. irrigua*	tall bog sedge		●					
Vascular plant	*Carex pauciflora*	few-flowered sedge				●			
Vascular plant	*Crepis mollis*	northern hawk's-beard		●			●		
Vascular plant	*Dactylorhiza incarnata*	early marsh orchid				●			
Vascular plant	*Dactylorhiza traunsteineri*	narrow-leaved marsh-orchid				●			
Vascular plant	*Diaphasiastrum complanatum*	yellow cypress clubmoss				●			
Vascular plant	*Dianthus deltoides*	maiden pink		●					
Vascular plant	***Dryas octopetala***	**mountain avens**				●			
Vascular plant	*Eleocharis austricata*	northern spike-rush		●					
Vascular plant	***Epipactis leptochila***	**narrow-lipped helleborine**		●		●		●	
Vascular plant	***Epipactis leptochila var dunesis***	**dune helleborine**		●		●			
Vascular plant	***Gentiana verna***	**spring gentian**				●		●	●
Vascular plant	***Geranium sanguinium***	**bloody cranes's-bill**						●	
Vascular plant	*Gnaphalium sylvaticum*	heath cudweed				●			

Selection criteria			1	2	3	4	5	6	7
Vascular plant	*Hammarbya paludosa*	bog orchid	●			●			
Vascular plant	***Helianthemum canum subsp. laevigatum***	**Teesdale rockrose**				●			
Vascular plant	*Hieracium bakeranum*			●					
Vascular plant	*Hordelymus europaeus*	wood barley				●			
Vascular plant	*Hyacinthiodes non-scripta*	bluebell				●			●
Vascular plant	*Hymenophyllum wilsonii*	Wilson's filmy fern				●			
Vascular plant	*Hymenophyllum tunbridgense*	Tumbridge filmy fern				●			
Vascular plant	*Juncus filiformis*	thread rush				●			
Vascular plant	***Kobresia simplicuiscula***	**false sedge**				●			
Vascular plant	*Linum perenne*	perennial flax	●	●					
Vascular plant	*Maianthemum bifolium*	may lilly		●		●			
Vascular plant	*Melampryum sylvaticum*	small cow-wheat				●			
Vascular plant	***Minuartia stricta***	**Teesdale sandwort**				●		●	
Vascular plant	***Minuartia verna***	**spring sandwort**		●		●		●	
Vascular plant	***Myosotis alpestris***	**alpine forget-me-not**		●		●			
Vascular plant	*Myosotis stolonifera*	pale forget-me-not		●					
Vascular plant	*Neottia nidus-avis*	bird's-nest orchid				●			
Vascular plant	*Ophyrs apifera*	bee orchid				●			●
Vascular plant	*Orchis ustulata*	burnt-tip orchid	●			●			
Vascular plant	*Orobanche rapum-genistae*	greater broomrape	●			●			
Vascular plant	*Osmunda regalis*	royal fern	●						
Vascular plant	*Polemonium caeruleum*	Jacob's ladder		●		●	●		
Vascular plant	***Polygala amarella***	**dwarf milkwort**				●		●	
Vascular plant	*Polystrichum lonchitis*	holly fern				●			
Vascular plant	***Potentilla fruticosa***	**shrubby cinquefoil**				●		●	
Vascular plant	*Ranunculus arvensis*	corn buttercup				●			
Vascular plant	*Ranunculus fluitans*	river water-crowfoot			●	●			
Vascular plant	*Ranunculus hederacea*	Ivy-leaved water-crowfoot			●	●			
Vascular plant	*Ranunculus penicillatus*	stream water-crowfoot			●	●			
Vascular plant	*Ribes spicatum*	downy currant		●					
Vascular plant	*Scrophularia umbrosa*	green figwort		●					
Vascular plant	***Thlaspi caerulescens***	**alpine pennycress**		●				●	
Vascular plant	*Tricophorum cespitosum subsp. cespitosum*	deergrass		●					
Vascular plant	*Tricophorum cespitosum subsp. foersteri*	deergrass		●					
Vascular plant	*Trollius europaeus*	globeflower				●		●	
Vascular plant	*Ulex galli*	western gorse				●			
Vascular plant	*Valerianella dentata*	narrow-fruited cornsalad				●			
Vascular plant	***Viola rupestris***	**Teesdale violet**				●		●	
Vascular plant	*Zostera marina*	eelgrass				●			
Liverwort	*Fossombronia fimbriata*					●			
Liverwort	*Gymnomitrium crenulatum*					●			
Liverwort	*Halplomitrium hookeri*					●			

Table 45 continued

Selection criteria		1	2	3	4	5	6	7
Liverwort	*Lejeunea lamacerina*				●			
Liverwort	*Lepidozia pearsonii*				●			
Liverwort	*Lophozia personii*				●			
Liverwort	*Pallavicinia lyellii*				●			
Liverwort	*Plagiochilba spinulosa*				●			
Liverwort	*Plagiochilba britannica*				●			
Liverwort	*Riccia huebeneriana*				●			
Moss	*Anomodon longifolius*	●			●			
Moss	*Aplodon wormskjoldii*				●			
Moss	*Brachydontium trichodes*				●			
Moss	*Bryum knowltonii*				●			
Moss	*Bryum stirtonii*				●			
Moss	*Bryum uliginosum*	●			●			
Moss	*Campylopus setifolius*				●			
Moss	*Campylostelium saxicola*				●			
Moss	*Ephemerum sessile*				●			
Moss	*Homomallium incurvatum*				●			
Moss	*Orthotrichum pallens*	●			●			
Moss	*Schistidium agassizii*				●			
Moss	*Sphagnum fibriatum*				●			
Moss	*Sphagnum majus*	●			●			
Moss	*Tortula freibergii*				●			
Lichen	*Alectoria sarmentosa*		●					
Lichen	*Bacidia subfuscula*		●					
Lichen	*Bacidia subincompta*				●			
Lichen	*Bacidia subfuscula*		●					
Lichen	***Bryoria navordnikiana***		●		●			
Lichen	*Caloplaca flavorubescens*	●			●			
Lichen	*Gyalidia lecideoptis*		●					
Lichen	*Gyalidia subscutellaris*		●		●			
Lichen	*Mycocalcium subtile*		●					
Lichen	*Peltigera neckeri*		●					
Lichen	*Peltigera venosa*	●			●			
Fungus	*Boletinus cavipes*				●			

1. The species is threatened or declining within the Region or the species is stable within the Region but declining or threatened within the UK or international context.
2. The Region has, or has recently had, a significant proportion of the UK population of the species.
3. The species is not adequately covered by a Habitat Action Plan.
4. The species occurs on the UK BAP list of Species of Conservation Concern.
5. A real difference can be made to the status of the species through effective local action within the Region.
6. The species is a 'keystone' or indicator species.
7. The species has popular appeal and can be used to promote wider biodiversity issues in the Region.

ANNEX 2

Harmful species introductions into the North East Region

Over the last hundred or so years many non-native species have been introduced into the wild. While the result of some of these has sometimes been benign, other introductions have had a devastating effect on native wildlife and threaten some of our most precious species such as the water vole. Table 46 below highlights some of these introductions and the problems that they have caused.

Table 46: Harmful species introductions into the North East Region

Name	Species	Associated problems
giant hogweed	*Heracleum mantegazzianum*	Shades out other native plants, particularly on riparian land. Also poses health risk to humans.
Himalayan balsam	*Impatiens glandulifera*	Form dense stands which eliminate ground flora. Can be problematic in woodlands and riparian land.
Japanese knotweed	*Fallopia japonica*	
Australian swamp stonecrop	*Crassula helmsii*	Invasive aquatic plants, all of which grow rapidly and have a tendency to monoculture. Introduction often results in the complete loss of more diverse, native plant assemblages.
water fern	*Azolla filiculoides*	
Canadian pondweed	*Elodea canadensis*	
Nuttall's pondweed	*Elodea nuttalli*	
curly water thyme	*Lagarosiphon major*	
Parrot's feather	*Myriophyllum aquaticum*	
snowberry	*Symphoricarpos spp.*	Often planted as game cover. Dense stands in woodland reduce light penetration and the growth of ground flora.
pirri-pirri bur	*Acaena novae-zelandiae*	Spreading on important sand dune habitats and displacing native flora.
Chinese mitten crab	*Eriochier sinensis*	Principally a problem due to burrowing and undermining of banks. Potential affects on native species unknown.
signal crayfish	*Pacifastacus leniusculus*	Present on the Tees catchment, aggressive species out competes native crayfish species and introduces plague, which wipes out native populations. Large populations can damage bankside habitats via burrowing.
Ide/Orfe	*Leuciscus idus*	Slowly spreading on Tees catchment, unknown affects on native species.
mink	*Mustela vison*	Of concern in relation to a range of species including waterfowl and water vole in particular. Key factor in the rapid, recent decline of water vole in the region.
muntjac deer	*Muntiacus reevesi*	Browsing in broadleaved woodland removes ground flora. This is a particular problem in ancient semi-natural woodlands where the ground flora may be particularly rich.
grey squirrel	*Sciurus carolensis*	Significant factor in the decline of the native red squirrel. Expanding range reduces availability of marginal habitat for red utilisation. May spread parapox virus to red squirrels.
New Zealand flatworm	*Artioposthiatia angulata*	Fierce predator of earthworms
bee mite	*Varroa jacobsonii*	Infestation by Varroa prevents breeding in bees, particularly the wild honeybee

GLOSSARY

Acidification: This can be caused by nitrous and sulphurous pollution, for example from car exhausts, power stations and waste incinerators. This pollutes the air and forms acids which fall as acid rain.

Agenda 21: The environmental action plan for the 21st century, from the Earth Summit in Rio de Janeiro in 1992.

Agri-Environment Schemes: Schemes offered to farmers to promote environment-friendly farming practices and so maintain the biodiversity of the countryside. Schemes applicable to England include Environmentally Sensitive areas (ESA's) and Countryside Stewardship.

Areas of Outstanding Natural Beauty: Areas of particular landscape beauty designated by the Countryside Commission.

BAP: Biodiversity Action Plan.

Berne Convention: Convention on the Conservation of European Wildlife and Natural Habitats. This imposes obligations to conserve wild plants, birds and other animals, with particular emphasis on endangered and vulnerable species and their habitats. The provisions of the Convention underlie the EC Habitats and Species Directive as well as the UK's wildlife legislation.

Biodiversity: The total variety of life, including all genes, species and habitats.

Biodiversity Convention: The Convention on the Biological Diversity. This was signed by the Prime Minister and 150 other Heads of State or Governments at the Earth Summit in Rio in 1992.

Biotope: Particular habitat with a specific, related community.

Birds Directive: The Council Directive 79/409/EEC of 2 April 1979 on the Conservation of Wild Birds. This directive aims to protect bird species within the EU through the conservation of populations of certain birds and the habitats used by these species.

Bonn Convention: Convention on the Conservation of Migratory Species of Wild **Animals**: This requires the protection of listed endangered migratory species, and encourages separate international agreements covering these and other threatened species.

Bycatch: Animals caught whilst targeting other species. Usually relates to fishing.

Calcifuge: Not normally found on soils rich in calcium.

Coarse fish: Freshwater fish other than salmon or trout.

Common Bird Census: Annual census of birds at sites scattered around the country, organised by the British Trust for Ornithology.

Convention on International Trade in Endangered Species (CITES): This prohibits or regulates international trade in species which are threatened with extinction or likely to become so and are subject to significant trade.

Coppice: The harvesting of trees, leaving stools (stumps) from which to grow the poles for the next harvest.

Ecology: The relationships between species.

Endemic species/sub-species: A species or sub-species confined to a particular area and having, as far as known, originated there, eg a UK endemic is a species not found outside of the UK.

Epiphyte: Plant attached to another plant for support, but not parasitic.

Eutrophic: Having a high concentration of nutrients.

Gall: A growth on a plant, caused by another species, such as an insect or fungus.

Habitat: The place in which a species of animal or plant lives, providing a particular set of environmental conditions. Used in a wider sense to refer to major assemblages or communities of plants and animals found together.

Habitat fragmentation: The separation of sites of particular habitat into disparate, smaller sites. This isolate small populations in restricted areas of habitat, resulting in the loss of species that require large areas for their survival, and a reduction in the ability of the remaining populations to survive threats such as disease, flooding or storm damage.

Habitats and Species Directive: The Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora. This Directive aims to promote the conservation of certain habitats and species within the EU.

Improved land: Land where man has modified the natural conditions, through the artificial addition of fertilisers and pesticides, the clearance of natural vegetation and the introduction and cultivation of selected species. This allows more intensive agriculture, but results in a great reduction in the diversity of natural species.

International importance: Those species or habitats for which the UK, at least at some times of the year, holds a high proportion of the European or World total. For waterfowl, a site is defined as being internationally important if it regularly supports over 20,000 waterfowl, or 1% of the biogeographical population of species. Habitat types and/or species which are rare or threatened within a European context are identified in Annexes I and II of the EC Habitats Directive, requiring the designation of Special Areas of Conservation (SACs).

International Union for the Conservation of Nature (IUCN): Co-ordinates many global conservation efforts on behalf of other conservation groups, national governments, and international agencies.

Local Nature Reserve (LNR): Designated by local authorities, in consultation with the relevant statutory nature conservation body, under Section 21 of the National Parks and Access to the Countryside Act 1949. These often have local names such as Site of Local Biological Interest, Biological Heritage Site, Site of Community Wildlife Interest or Site of Importance for Nature Conservation.

Mesotrophic: Neither rich, nor deficient in nutrients.

Migrant: An animal that moves sites between seasons.

National Park: Designated in England and Wales under the National Parks and Access to the Countryside Act 1949 for the purpose of preserving and enhancing natural beauty of areas specified by reason of their natural beauty and the opportunity they afford for open-air recreation.

National importance: A site defined as being nationally important if it regularly supports over 1% of the UK population of a species. This criterion is most usually applied to bird populations. A site is also nationally important if it is designated as an SSSI.

National Nature Reserve (NNR): Sites of national or international importance for conservation which are primarily used and managed for nature conservation. NNRs are designated by English Nature and are best examples of their habitat types.

Natural Area (NA): Biogeographic zones identified by English Nature which reflect the geographical foundation, the natural systems and processes, and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation.

Palaearctic: Of the arctic and temperate parts of the old world. The Palaearctic region covers Europe, north Africa and Asia south to the Himalayas and the Red Sea.

PCB: Polychlorinated biphenyl. Persistent and toxic compounds. A waste product of some industrial processes. Appear to interfere with body biochemistry.

Peat: Partly decomposed plant matter forming a fibrous mass. Decomposition and oxidation are slowed by wet, acidic conditions.

Protected species: Species specially protected by law, primarily under Schedules 1 (birds), 5 (amphibians, reptiles and mammals) and 8 (plants) of the Wildlife and Countryside Act 1981.

Quarry species: Species designated as huntable at particular times of the year and traditionally killed for sustenance or sport.

Ramsar sites: Wetland sites are designated under the Ramsar Convention on the Conservation of Wetlands of International Importance.

Red Data Book: A list of species which are rare or in danger of becoming extinct within a particular area. Levels of threat and some information on their ecology and conservation are usually provided. These species require specific conservation measures to prevent their decline.

Resident: Of birds, a non-migratory species.

Safe biological limit: A population level at which a species is considered to be safe from catastrophic decline. Below this level there is increased risk of extinction and there may be effects on other species, linked in the food web. The assessment is based on a range of biological reference points.

Special Area of Conservation (SAC): A site of EC importance for particular habitats and/or species, designated by a member state under the Habitat Directive. A cSAC is a candidate SAC which has not yet been officially designated but is afforded the same protection.

Special Protection Area (SPA): A site designated under the Birds Directive. Together SACs and SPAs form a network of European sites known as 'Natura 2000'. A pSPA is a proposed SPA which has not yet been officially designated but is afforded the same protection.

Site of Special Scientific Interest (SSSI): An area of land or water notified under the Wildlife and Countryside Act 1981 as being of special nature, geographical or conservation importance. These are best examples of natural heritage. In England they are notified by English Nature.

Succession: A natural change in habitat and the species present, on land often to woodland, allowed by stability and a lack of intervention management.

Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Thalloid: Without vascular tissue and differentiated into root, stem and leaves. Usually flattened and ribbon-shaped.

Vagrant: An individual found outside of the normal range of a species.

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front cover
narrow-bordered bee hawk-moth
common scoter
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sea anemone
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back cover
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NORTH
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