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THE URBAN MERSEY BASIN NATURAL AREA

A Nature Conservation Profile



**Prepared for English Nature
by Ralph Tomlinson**

March 1997

Foreword

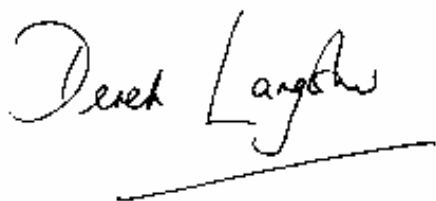
One of the key components of English Nature's *Strategy for the 1990s* has been the Natural Areas approach. We examined the local distinctiveness of each part of England, to identify their characteristic wildlife and natural features, and used this to define a comprehensive series of Natural Areas. Their boundaries are based on the distribution of wildlife and natural features, and on the land use pattern and human history of each area, and thus offer a more effective framework for the planning and achievement of nature conservation objectives than do administrative boundaries. They are **not** designations.

Wildlife is not restricted to designated and protected sites such as nature reserves or SSSIs; it occurs throughout the countryside, coast and built up areas of England. No part of the country is without some wildlife interest. The Natural Areas approach gives us a way of determining priorities for nature conservation areas with ecological and landscape integrity, and to set objectives which reflect these priorities. Together, all Natural Areas provide a powerful vision for nature conservation right across England.

The achievement of the objectives described for each Natural Area will be a key part of our new strategy *Beyond 2000*. The objectives will guide our work over the coming years, and we hope Natural Areas will allow us to help others in achieving what is best for nature conservation locally.

This Natural Area profile is one of a series of 120, one for each Natural Area. In it we describe the wildlife and natural features of the area, and what makes it special and distinctive. Each Natural Area profile is different, since it describes and reflects the local distinctiveness of the area, and therefore includes nature conservation objectives which are particular to that area. The profiles have been written after a wide range of local consultations, both on the boundaries of the Natural Areas themselves and on these profiles.

We hope you will find this document useful, and look forward to working with you to maintain and enhance the wildlife and natural features of England.

A handwritten signature in black ink that reads "Derek Langslow". The signature is written in a cursive style and is positioned above a horizontal line.

Dr Derek Langslow
Chief Executive

Summary

The development of the natural area concept is a key part of English Nature's strategy for conserving nature into the 21st Century. A Natural Area is not a formal designation, but a part of England which is characterised by a unique combination of physical features, wildlife habitats, land use patterns and culture. Natural Areas therefore provide a logical context for addressing conservation issues.

We believe that through organising nature conservation in areas within which the issues are clearly defined, we can secure greater public support and participation and increase our effectiveness in dealing with matters which are now so widely acknowledged as being of prime importance.

The production of a profile for each of the 126 Natural Areas is a first step towards securing local agreement on what the priorities for action should be.

The Urban Mersey Basin encompasses within an area of approximately 2360 square kilometres, some of the most densely-populated urban areas in Britain. Manufacturing and service industries are the main economic activity, but agriculture remains the most widespread use of land. Recreation is also a land use of major importance in both extent and intensity.

Nature conservation embraces geological as well as biological features. The Natural Area owes much of its present character to the underlying rocks, which furnished the raw materials for the first industries. It is our intention to widen the appreciation of geological features and to protect important geological sites.

The most natural wildlife habitats characteristic of the Urban Mersey Basin Natural Area include peat mosslands, wooded cloughs and, on the coast, saltmarshes and sand dunes. Other important habitats, such as wood-pasture, hay meadows and field ponds, were created by agricultural practices which have largely been discontinued. A further range of habitats were created by industry. Reservoirs, canals, mining subsidence lakes and even some kinds of industrial spoil have added to the variety of habitats and species of the Urban Mersey Basin.

There are many rare plant and animal species, particularly on the coastal sand dunes, which themselves represent a significant proportion of this type of habitat in Britain. Coastal mudflats and marshes support internationally-important wintering bird populations and most other habitats have unique species in need of conservation.

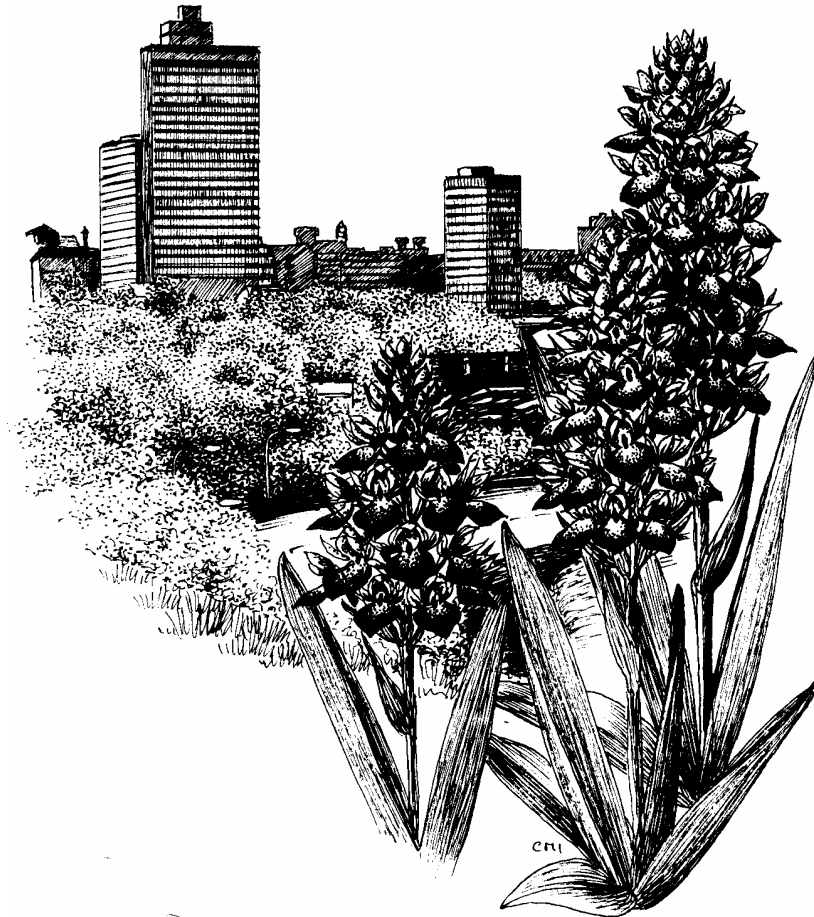
The profile outlines the salient characteristics of all the major types of habitat, identifies the most important problems to be addressed and the aims for conserving them.

Species which are most in need of conservation effort are listed, with an indication of their current status.

Key wildlife conservation goals for the whole of the Natural Area are presented.

The Natural Area profile is intended as a basis for the formulation of Local Biodiversity Action Plans. This is a task which English Nature will undertake in partnership with local authorities and voluntary conservation bodies on behalf of everyone.

The profile is fully consistent with the 1994 UK Biodiversity Action Plan and the Steering Group Report presented to Government in 1995.



The Urban Mersey Basin

A vision for the future

The Natural Area contains a considerable variety of habitats and species which it is important to conserve. Because the Urban Mersey Basin is so densely populated there can be no doubt that pressure on habitats and species populations will continue and will, in all probability, appear in new forms in the future. If national conservation policy is to succeed and international conservation obligations are to be met, it is important for nature conservation effort to have clarity of purpose and to be pursued with determination.

English Nature believes that it is possible to retain all the best habitats which presently exist, to halt the decline in quality to which some of them have been subject and to restore a range of important habitats to a more acceptable condition which can be maintained in future.

We want to ensure that no species which is native to the Urban Mersey Basin Natural Area is lost and, to this end, the decline of some species populations will need to be stopped and reversed.

Patterns of land use will continue to reflect industrial and agricultural priorities and the growing demand for outdoor recreation. It is important that all these should be reconciled with the need to conserve nature and natural resources.

Nature conservation must not only react to events governed by other spheres of activity. With foresight and planning we intend to ensure that its needs are taken into account whenever change of land use is being considered. There will be opportunities to create new habitats, particularly in urban areas, building on pioneer work which has already been done.

The vision of a dynamic and effective nature conservation programme can only come to fruition if we share our aims and involve other people in its realisation. We want to widen and deepen the appreciation and understanding of nature in all its forms and to foster a sense of stewardship and pride in the features, habitats and wild species of the Natural Area.

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1. The Natural Area Concept

The development of the Natural Area concept is a key part of English Nature's drive to conserve nature in England. We believe that Natural Areas provide an improved framework for securing public support for wildlife and geological conservation, and that they will greatly improve our ability to work together with others to promote effective action.

A Natural Area is not a designation, but an area of countryside with a clear identity compounded of its physical attributes, wildlife, land use and culture. These features give a Natural Area a "sense of place" and a distinctive natural character which we can seek to sustain. To make the concept fulfil its intended purpose we need to ensure wide participation and to "think globally, but act locally".

We hope that Natural Areas will provide a useful context in which we can not only ensure adequate representation of important habitats and species within special protected sites such as Sites of Special Scientific Interest and nature reserves, but also promote care for animals, plants and geological features throughout the entire countryside. We want to interest people in looking after wildlife, whether rare or common. The Urban Mersey Basin is one of 126 Natural Areas into which England, and the seas around it, have been divided.

2. The Role of this Profile

This profile is intended to describe and evaluate the main geological and wildlife features within the Urban Mersey Basin Natural Area, and to identify the main tasks to be undertaken in order to conserve them for the foreseeable future. The document has been prepared by English Nature, but it is intended for much wider use. The intention is to draw together conservation organisations, local authorities and the people of the Urban Mersey Basin in working towards the fulfilment of shared objectives which address the most important conservation issues within the Natural Area.

This profile is consistent with the UK commitment to the conservation of biodiversity, which was initiated in Rio de Janeiro in 1992 when the Prime Minister and over 150 other world leaders signed the Biodiversity Convention. This was followed by the publication of *Biodiversity: The UK Action Plan* in 1994. Several of the prime objectives of the Action Plan have since been developed in *Biodiversity: The UK Steering Group Report*, which was published in 1995 and to which the profile closely relates. The Steering Group Report includes lists of species of conservation concern in the UK and presents costed action plans for some 14 key habitats and 116 key species. Action plans for other habitats and species are being prepared.

The report also addresses the important issue of Local Biodiversity Action Plans as a means of implementing national plans at local level. The format of the profile should make it useful as a basis for Biodiversity Action Planning within the Urban Mersey Basin.

3. The boundary of the Natural Area

The most obvious characteristics of the Natural Area are that it is one of Europe's most densely populated areas and that it contains two of the largest conurbations in the country. The growth of these towns and cities was founded on local natural resources.

Coal deposits supplied the energy essential to industrial development and the rivers, later supplemented by a network of canals, made possible the bulk transport of raw materials and products.

The Natural Area includes most of the catchment of the Rivers Mersey and Irwell which, with their tributaries, represent a unifying element.

The northern and north-eastern boundary of the Natural Area, roughly between St Helens and Stalybridge, corresponds with the edge of the Lancashire Coal Measures. These underlie a landscape of gentle hills and valleys which rise abruptly in the West from the Lancashire coastal plain. Past industrial activity has modified the natural landscape of the coal measures through the formation of spoil heaps (now mostly vegetated), subsidence flashes and of course the towns themselves.

The Pennine fringe, which lies between the Manchester Conurbation and the moorlands of the Pennines, is incised by steep-sided valleys with fast-flowing rivers, around which factory-based industries and towns developed. Mineral extraction continues today on a modest scale, but most of the land between the towns is farmland and used as permanent pasture.

The southern boundary of the Natural Area between Stockport and Ellesmere Port takes in the open landscape of the Mersey Valley with its own towns and industries. Large-scale arable farming is prevalent though areas of peat mossland remain uncultivated.

The Natural Area has a lengthy coastline extending from the River Dee to the mouth of the River Ribble. It includes the estuaries of the Dee, Mersey and Alt and part of the Ribble estuary.

Most of the Wirral peninsula has its own distinctive landscape pattern of small towns, lowland mixed farming country estates and wooded sandstone ridges.

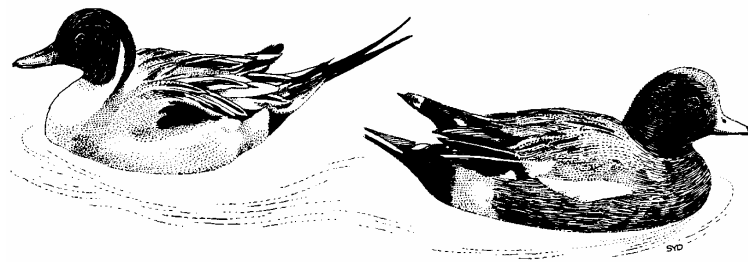
The Merseyside conurbation, centred on Birkenhead and Liverpool, surrounds much of the Mersey Estuary and extends northwards towards the towns of the Sefton Coast. These developed mainly as holiday resorts following drainage of coastal wetlands. Between the coastal towns natural features are still prominent in the landscape and the dunes and sandy heaths constitute an ecological asset of major significance in the Natural Area.

The Urban Mersey Basin incorporates most of the Metropolitan Counties of Greater Manchester and Merseyside, with the exception of some fringe areas of each which have natural affinities with the Southern Pennines and the Lancashire Plain respectively. The Cheshire Boroughs of Warrington, Halton and Ellesmere Port and Neston are included, as well as, from Lancashire, parts of Chorley and West Lancashire Boroughs and, from Derbyshire, a small part of the Borough of High Peak around Glossop.

The total area of the Urban Mersey Basin Natural Area is approximately 2361 square kilometres.

O.S.1:50000 scale maps which cover the area are Nos. 108,109,110 & 117.

NOTE: The Liverpool Bay Natural Area The coastal habitats of the Urban Mersey Basin are also of importance in the context of the marine Natural Area of Liverpool Bay. Accounts of them can also be found in the profile which relates to that area. The Urban Mersey Basin profile takes account only of those habitats which occur above mid-tide level. Permanently submerged marine habitats, which include parts of the estuaries, coastal lagoons and docks and key species which occur offshore are not described here.



4. Geology and Landforms

The close relationship between the ecology of Natural Areas, underlying geology and geomorphological processes provides an excellent opportunity for developing closer links between Earth Heritage conservation and wildlife conservation.

Geological sites have their own intrinsic interest and value, but they also contribute to an understanding of the manner in which soils and vegetation have developed in particular ways and show how natural physical processes continue to shape the land.

4.1 The Carboniferous Period

Within the Urban Mersey Basin, the highest ground corresponds with the oldest rocks. These are the Lancashire Coal Measures which consist of a succession of sandstones, siltstones and coal seams. Fossils from different strata indicate periods of inundation in both marine and freshwater conditions. The coal formed from the accumulated debris of plants which grew in tropical swamp conditions.

The Coal Measures were laid down between 318 and 303 million years ago - the Upper Carboniferous Westphalian Period. They were subsequently folded and faulted as a result of earth movements towards the end of the Carboniferous.

Today the Coal Measures underlie a plateau which varies between about 50 and 150 m altitude. In places coal is close enough to the surface to permit opencast extraction. To the west and south the coal measures are too deeply buried to have any direct influence on the landscape.

4.2 Permian and Triassic rocks

No further deposition of sediments occurred in the Natural Area until the Upper Permian, an interval of some 48 million years. Isolated outcrops of Permian rocks occur on the western fringes of the Lancashire Coalfield. Other examples, which include sandstones, mudstones and thin bands of limestone, underlie parts of the Manchester area and, at Stockport, a buried Permian ridge feature steepens the bed of the River Mersey, the increased flow rate once being important for early industry.

The western part of the Natural Area is underlain by Triassic sandstones and siltstones. Dry desert conditions prevailed throughout most of the Permo-Triassic and, in consequence, fossils are scarce. However recent discoveries of reptilian footprints in sandstone on Hilbre Island confirm that potential exists for further such finds.

The sandstones were formed in a variety of circumstances; the Sherwood Sandstone series being deposited in riverine conditions; the Mercia Mudstone Group probably in a tidal, brackish environment, not unlike the Dee Estuary today.

The harder coarse red Triassic sandstones outcrop along the Mersey Valley between Lymm and Runcorn and again in many parts of Wirral. They also underlie Edge Hill and Everton in Liverpool and form prominent cuesta features which overlook the Cheshire towns of Frodsham and Helsby.

No rocks more recent than Triassic are known and it is assumed that terrestrial conditions have prevailed throughout the Natural Area ever since that time.

4.3 Pleistocene and later events

The glaciations of the Pleistocene caused extreme denudation of the Triassic sequence as a result of ice sheets extending southwards down what is now the Irish Sea. The glaciation led to most of the low-lying land being covered with ice-transported boulder clay. Many boulders and pebbles found in the Urban Mersey Basin are readily identifiable as having originated in the Lake District and Southern Uplands of Scotland.

Many pre-glacial river channels became dammed by ice movement forcing rivers to cut new routes through the glacial deposits. Sands and gravels which accumulated in ice-dammed lakes occur in several places - one large deposit of this type underlies much of the land between Rochdale, Oldham, Manchester and Bury.

In the post-glacial period, with a warming climate and increasing vegetation cover, many glacially-formed lakes became swamp and fen and a succession of vegetation types which culminated in woodland progressed over much of the Natural Area. Wetter conditions following climatic change led to localised waterlogging which impeded the trend to woodland and, in some areas, reversed it. Bogs expanded and peat accumulated where trees had previously grown. Evidence of all these and other changes can be found today in the Mersey Valley mosslands.

The melting of vast ice sheets led to a rise in sea level which flooded what is now the Sefton Coast. Evidence of this is seen in the Hill House Coastline, a cliff feature in boulder clay which is today about 7km inland.

Isostatic uplift of the land, relieved of its burden of ice, took effect more slowly than the rise in sea level, but eventually overtook the sea level rise and elevated the coastline to its present level.

Accretion of mud and sand continues today. Formed from material brought down the rivers of the region, the present salt marshes and sand dunes today provide a natural barrier against marine flooding of the low-lying agricultural land of Merseyside and West Lancashire.

Representative Sites

The Natural Area contains 9 sites which have been identified in the Geological Conservation Review (GCR) as incorporating the range of key geological and landform features set out in Appendix 3.

These are all represented in the series of Sites of Special Scientific Interest (SSSI) listed in Table 4.1

4.4 The Key Geological and Landform Features

- The Carboniferous Westphalian sequence of rocks (the Coal Measures), including fossil assemblages which characterise particular events.
- Isolated outcrops of Upper Permian strata.
- Sequence of Triassic sandstones and siltstones.
- Triassic reptile remains.
- Pleistocene sediment sequences and landforms.
- Post glacial sediments, including basin peat deposits.
- Currently active land forming processes, particularly on the coast.

Table 4.1 - Representation of important geological features in SSSI in the Natural Area

SSSI Name	Main interest
Ainsdale Sand Dunes, Sefton*	Coastal geomorphology
Ashclough, Bolton	Westphalian
Dee Cliffs, Wirral*	Glacial deposits
Formby Sand Dunes and Foreshore, Sefton*	Coastal geomorphology
Lowside Brickworks, Oldham	Westphalian
Ravenhead Brickworks, Lancashire	Westphalian

SSSI Name	Main interest
Red Brow Cutting, Wirral	Triassic: Mercia Mudstone
Southport Sand Dunes and Foreshore, Sefton*	Coastal geomorphology
The Dungeon, Wirral	Triassic: Mercia Mudstone
Thurstaston Common, Wirral*	Triassic: Sherwood Sandstone
Tonge River Section, Bolton	Westphalian

*SSSI with strong biological as well as geological interest

Key geological management issues

- Threats to sites from development.
- Threats to coastal sites from sea defence works.
- Recreational impact on soft sites including dunes and soft cliffs.
- Erosion of exposures, including fossil collecting.
- Coverage of exposures as a result of re-contouring and tipping, or by vegetation.



Key geological objectives

1. Maintain and where possible enhance all the existing rock exposures and natural landforms which make important contributions to an understanding of the origin and geological development of the Natural Area.
2. Allow the natural evolution of the landscape to continue, especially in the coastal region, and to this end ensure the incorporation of geological policies in shoreline management plans.
3. Ensure that full consideration is given to protection of the geological interest wherever mineral extraction, dredging, landfill, coastal defence and built development of all kinds are being considered.
4. Ensure that all significant geological and landform features outside SSSI are adequately documented and registered as Regionally Important Geological Sites (RIGS), that their significance and status are recognised and that they are afforded adequate protection.
5. Deepen appreciation among landowners, industry and the public, of the links between geology, landscape and wildlife habitat and their relevance to conserving biodiversity and to sustainable development.
6. Promote the geological interest of the Urban Mersey Basin Natural Area as an educational resource for use by as wide a section of the public as possible.

5. Key species for conservation attention

5.1 Key species objective

Maintain and, where appropriate, enhance the population size and distribution within the Natural Area of nationally and internationally important species and of other species populations and assemblages which are particularly important within the Natural Area. Increase populations of those species which have become seriously reduced, and where feasible, seek to re-establish viable populations of species which have been eliminated from the Urban Mersey Basin.

5.2 The selection of key species

The Urban Mersey Basin contains many species which are highly valued, by wildlife conservation bodies and the general public alike. Many species are in need of conservation attention, because their numbers have diminished or their distribution has been narrowed as a result of human activity. Others may be naturally rare because their habitat requirements only occur in a limited number of places.

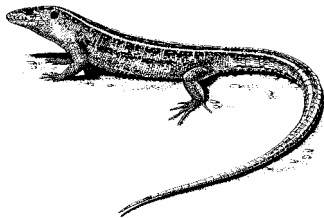
Given the limitations on human and financial resources that exist, it is not possible to focus conservation action on all of them at the same time and those species in greatest need have to

be given priority. This is not to say that species cannot also be protected through conservation of their habitats. Indeed for many of the more widely-distributed species this is the only viable option.

The coastal area is of outstanding ornithological significance as it includes three estuaries and part of a fourth, which all serve as important staging posts for migrating birds in Spring and Autumn. In addition these estuaries support large numbers of migratory wildfowl and wading birds throughout winter. Inland there are notable wetlands which support important assemblages of breeding birds, including species of conservation concern.

There are nationally-important populations of amphibia and reptiles in the coastal dunes and the Red Squirrel retains an English stronghold in woods near the coast.

Sites of Special Scientific Interest, and other protected sites throughout the Natural Area contain populations of Nationally-Scarce plants and invertebrate animals. Knowledge of some groups, particularly of invertebrate animals, is far from complete and other species will be recognised as in need of conservation as survey and research progress.



Sand Lizard

5.3 Selection criteria for key species

The list of key species is presented in Appendix 1.

The following categories provide an indication of the importance of the species in relation to the level of threat which they face both within the Natural Area and elsewhere.

- A. Species which are threatened on a global or European scale and which have significant populations in the Urban Mersey Basin Natural Area at present. Also included are several species which have been lost from the Natural Area relatively recently and might reasonably be expected to re-establish following habitat improvement.
- B. Species which are at risk nationally (in the case of plants and invertebrates categorised as Nationally Rare or Nationally Scarce because of their limited range or numbers) and which are represented in the Urban Mersey Basin Natural Area. (Species which occur only in the UK are indicated by an asterisk.)
- C. Other species occurring in the Natural Area which have undergone recent rapid decline in numbers or range throughout Britain (e.g. birds which have decreased by 50% or more in the last 25 years and/or which have unfavourable conservation status in Europe).
- D. Species which have declined in the Urban Mersey Basin and/or which are characteristic of habitats of particular concern in the Natural Area.

Some account has been taken of the desirability of ensuring that all major groups of plants and animals are represented and that the key species are spread across the range of key habitats.

Knowledge of some groups is far from complete and other priorities for listing will emerge as survey and research progress.

Many of the species are protected under National and EC legislation based on various international conventions. These are outlined in Appendix 2.

The species in categories A, B and C in Appendix 1 are listed in relevant Red Data Books or other authoritative documents.

6. Key wildlife habitats

6.1 Key wildlife habitats objective

Maintain all semi-natural habitats which are characteristic of the Natural Area and, where necessary enhance the extent, distribution and quality of the most important types. In appropriate locations, redevelop natural transitions between related communities. Seek to arrest the fragmentation of valuable habitats and to restore continuity where possible. Promote the recovery of degraded habitats to a more optimal level.

Rationale

The aim is to maintain, enhance and expand the most important habitat types by promoting sympathetic and sustainable management practices. Highest priority is to be given to nationally and internationally important habitats present in the Natural Area.

6.2 Comparative importance and extent of key habitats in the Natural Area

The ranking accords with current thinking on the importance of particular habitats in international, national and regional contexts.

Internationally important

Estuaries
Coastal dune systems

Nationally important

Saltmarsh
Soft cliffs
Lowland heath
Ancient wood-pasture
Peat mossland (Raised mire)

Regionally important

Unimproved lowland grassland
 Semi-improved wet grassland
 Ancient semi-natural woodland
 Lakes, reservoirs and canals
 Swamp and fen
 Ponds

Other habitats important within the Natural Area

Rivers and streams
 Recent and plantation woodland
 Traditionally-managed arable farmland
 Urban land with semi-natural plant communities
 Industrial tips with calcicole vegetation

Table 6.1 The approximate area of each major habitat within the Urban Mersey Basin Natural Area

Habitat	Approximate area or length
Estuarine flats & foreshore	15000 ha
Saltmarsh	5100 ha
Coastal dune systems	2100 ha
Soft cliffs	20 ha
Lowland heath	250 ha
Lowland raised mire (peat mossland)	350 ha
Unimproved grassland	Data incomplete
Wet semi-improved grassland	Data incomplete
Ancient semi-natural woodland	900 ha
Ancient wood-pasture	80 ha
Lakes, reservoirs and canals	Unknown
Swamp and fen	Unknown
Rivers and streams	Unknown
Recent and plantation woodland	3600 ha
Traditionally-managed arable farmland	Unknown
Urban land with semi-natural vegetation	Unknown
Industrial tips with calcicole vegetation	40 ha

6.3 Habitat descriptions, and specific conservation objectives

The status, characteristic wildlife and special species of each habitat are described in the sections which follow.

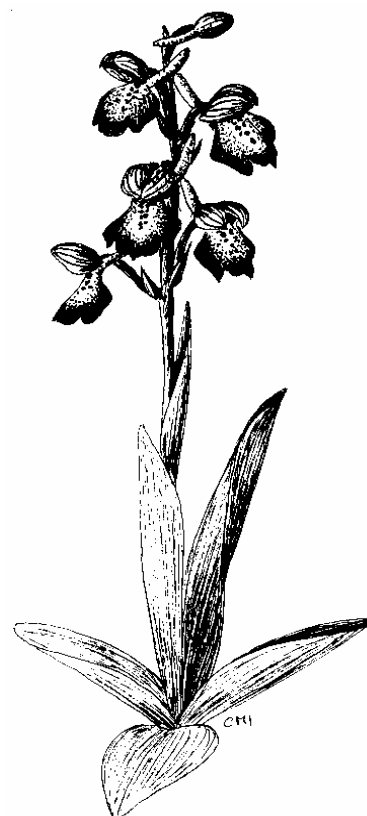
The main factors currently affecting each habitat are also given, together with nature conservation objectives.

The objectives are visionary and relatively unconstrained but are seen as realistic in the long term. They deliberately do not include targets as these will be provided in Local Biodiversity Action Plans.

The objectives for the different habitats are amalgamated in Section 6.5, which gives eight key goals for nature conservation in the Natural Area.

Classifications of the types of geological feature and types of vegetation which are represented in the Urban Mersey Basin Natural Area are listed in Appendix 3.

The scientific names of species mentioned in the text are given in Appendix 4.



6.3.1 Estuaries

Status

Three estuaries open into Liverpool Bay from the Urban Mersey Basin and a fourth has influence on the Natural Area.

The Dee estuary, which is one of the largest in England, includes large areas of intertidal sand and mud, extensive salt marshes and the small rocky islands of Hilbre. The Mersey estuary is deeper, with about one third permanently below low tide level, but here too there are extensive intertidal flats and fringing salt marshes. The River Alt is comparatively small but associated with it there is a large expanse of estuarine habitat, with extensive sand flats stretching along the Sefton coast and providing a major source of material for coastal dune formation. Within the Natural Area to the north of Southport there are other mud flats and salt marshes associated with the Ribble estuary.

All these estuarine habitats are of major importance as staging posts for migratory birds in Spring and Autumn. In Winter they provide essential feeding and roosting areas for large populations of wading birds and wildfowl. The estuaries sustain significant proportions of the world population of several species and their international importance is recognised in their status as Special Protection Areas (SPA) under the EC Birds Directive.

Mud and sand flats which are exposed at low tide are listed as priority habitats for conservation under the EC Habitats Directive.

Characteristic wildlife

Intertidal flats appear barren, but they provide habitat for immense numbers of burrowing worms, crustacea and shellfish, each of which has a particular preference for depth and texture of substrate. The birds which feed on these invertebrates are equally selective and, in consequence, many species can feed together without damaging competition taking place between them. There is a considerable level of movement of birds between the estuaries and different species also tend not to utilise the same parts of one estuary at the same time.

Special species

13 overwintering bird species have populations in the Natural Area recognised as being internationally important. These are:-

Pink-footed Goose	Dunlin
Shelduck	Bar-tailed Godwit
Oystercatcher	Ringed plover
Grey Plover	Redshank
Knot	Curlew
Sanderling	Lapwing
Turnstone	

The wintering population of Bewicks Swan is also important, but numbers fall short of international significance within the Natural Area, the larger part of the population occurring on adjacent parts of the Ribble Estuary (in the Lancashire Plains and Valleys Natural Area).

The majority of these species feed primarily on muddy substrates, but Sanderling and Ringed Plover prefer sandy shores and Turnstone is a specialised feeder on rocky areas.

Protected Sites

Dee Estuary	SSSI / RAMSAR / SPA
Mersey Estuary	SSSI / RAMSAR / SPA
Alt Estuary	SSSI / RAMSAR / SPA
Ribble Estuary (part)	SSSI / RAMSAR / SPA



Current factors affecting the habitat

- Disposal of waste into enclosed estuarine waters has potential to lessen water quality.
- Dredging to maintain deep water channels for shipping and to create deep areas for recreational purposes can affect many estuarine habitats.
- Sand-winning operations affect sediment accumulation and can alter patterns of deposition.
- Coastal defence measures and land reclamation in estuaries reduce the extent of estuarine habitat.
- Shellfisheries reduce the food supply available to birds.
- Estuaries are subject to recreational use which can disturb feeding and roosting birds.

Key nature conservation objectives

1. Implement management plans for all estuaries in the Urban Mersey Basin Natural Area.
2. Ensure that conditions remain suitable for maintaining, and where appropriate, expanding the populations of wintering and passage wildfowl and waders and of breeding birds.
3. Improve water quality by implementation of appropriate water quality objectives.
4. Assess the environmental effects of all proposals to extend dredging and sand winning.
5. Monitor the effect of shellfisheries on bird populations and ensure that harvesting is kept within sustainable limits.
6. Develop codes of conduct for water sports in estuarine areas which minimise impacts on important populations and habitats with due regard to nature conservation.

6.3.2 Saltmarsh

Status

Saltmarshes develop on soft substrates which are exposed between tides for sufficient time to permit establishment of specialised salt-tolerant plants. The growth of these plants traps more sediment, thus raising the substrate level and gradually reducing salinity. This in turn enables other plants to colonise until a more or less continuous cover of salt marsh develops. In natural conditions the vegetation succession may culminate in freshwater marsh, grassland or scrub, depending on local conditions. More usually agricultural practices control the nature of the vegetation adjacent to a saltmarsh.

The Dee and Ribble saltmarshes have spread considerably since Common Cord Grass was introduced to the area prior to World War 2. Three saltmarsh vegetation types occurring in the Natural Area are listed as priority habitats for conservation in the Habitats Directive.

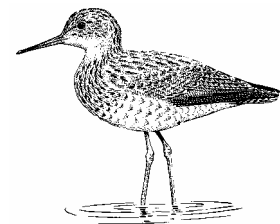
Characteristic wildlife

The typical saltmarsh zonation of vegetation in the Natural Area begins with a pioneer zone of Glasswort and Common Cord Grass on the seaward edge of the marsh which is replaced by a sward of Common Saltmarsh Grass at middle level. Red Fescue and other plants characterise the higher and less saline parts of the saltmarsh. Saltmarshes support a range of invertebrates which is most diverse in the upper zones where pools, seepages, drift line debris and tall vegetation provide a variety of habitat.

Saltmarshes provide roosting sites for waders at high tide, grazing for wildfowl and feeding and breeding sites for a wide range of birds.

Special species

Breeding birds using local saltmarshes include Shelduck, Oystercatcher, Redshank and Skylark. Additional species feeding on the marshes in winter are Pintail, Teal, Wigeon, Black-tailed Godwit and Bewicks Swan, the first three occurring in internationally-important numbers. Sharp Club-rush is an internationally-threatened plant which occurs in local saltmarshes.



Redshank

Protected Sites

Salt marshes within the Natural Area form part of the SSSI, RAMSAR and SPA sites which cover the Dee, Mersey, Alt and the relevant part of the Ribble Estuary. Part of the latter is also a designated National Nature Reserve.

Smaller areas of saltmarsh occur within the North Wirral Foreshore SSSI and Red Rocks SSSI.

Current factors affecting the habitat

- Construction of hard coastal defences can have direct impact on saltmarshes and there is also the possibility of alteration of sediment deposition which can influence saltmarsh development indirectly.
- Sand winning in the intertidal zone can also affect sediment accretion with similar potential consequences.
- Spread of Common Cord Grass on bare mud reduces feeding habitat for wildfowl and waders.
- Recreational activities can disturb breeding birds and high tide roosting sites at which large bird populations concentrate.

- Oil pollution, mainly from marine sources, damages both vegetation and animals.
- Some areas of saltmarsh have poor water quality resulting from eutrophication of streams on-shore.
- Overgrazing of upper levels of saltmarsh reduces the protective cover afforded by tall vegetation to breeding birds.

Key nature conservation objectives

1. Ameliorate past losses to reclamation and coastal defence through encouragement of natural saltmarsh development.
2. Encourage the adoption of an appropriate management regimes to retain the full complement of saltmarsh vegetation types native to the area.
3. Ensure the implementation of estuary management plans.
4. Minimise recreational disturbance of birds by appropriate zoning.
5. Improve water quality by implementation of appropriate Water Quality Objectives.
6. Maintain a balance between grazed marsh which is favourable to wintering wildfowl and ungrazed marsh for its botanical interest.

6.3.3 Sand dune systems

Status

Sand dunes are terrestrial habitats which depend on maritime conditions to provide the substrate for their formation. Three conditions must be met if sand dunes are to occur: (i) a supply of sand, (ii) a gently-shelving beach, exposed between tides long enough for the sand to dry and (iii) the wind to move it. Dune building then depends on the ability of specific plants (mostly grass species) to colonise bare sand and to grow up through it as it accumulates around them. The shelter provided by a line of dunes ameliorates the local climate sufficiently to allow a range of other plants to establish and to stabilise the sand surface. New dunes form in front of the older ones and eventually a complex system is formed, including dunes with varying extent and type of plant cover separated by hollows ("slacks") which may be dry, damp or even inundated. This complex topography is matched by a variety of plant communities which support a considerable range of animal life.



The dune complex on the Sefton Coast extends for more than 17 km with an average width of about 1.5 km. It represents approximately 23% of the sand dune resource in England and is

the finest example of a calcareous dune system on the north-west coast. Four categories of dune vegetation which occur on the Sefton Coast have priority listing in the Habitats Directive.

Characteristic wildlife

Marram Grass is the main dune-forming plant, but Sea Couch and Sea Lyme Grass make their own special contribution. Lime-loving plants such as Kidney Vetch, Carline Thistle, Yellow Wort and Pyramidal Orchid are frequent. The damper slacks, which are mostly dominated by Creeping Willow, contain, among many others, Flat Sedge, Marsh Helleborine and Variegated Horsetail, all of which are very localised species in the North West. Many areas of stable dune are presently dominated by Sea Buckthorn, native in eastern England but introduced on the west coast. In places, the leaching of calcareous shell material has resulted in soil acidic enough for the establishment of heathland vegetation. There are also extensive conifer woods, established in the Formby area early in the 20th Century.

Special species

The dunes support several Nationally Scarce and many uncommon plants. The Dune Helleborine, Spanish Catchfly and Grey Hair-grass command special attention as Red Data Book species but Seaside Centaury, Round-leaved Wintergreen and others are also important. There are unusual hybrids between different willow and rush species and a particularly rare liverwort, Petalwort.

The Sefton dunes sustain isolated populations of the Natterjack Toad and Sand Lizard, both of which were once more widely distributed than today. The former requires shallow open pools in which to spawn; the lizard favours dry dune grassland. The Great Crested Newt is also well-represented in the dune systems. The native Red Squirrel occupies the pine plantations which now represent a significant refuge for this declining species. The dunes are also known to support at least 21 uncommon invertebrate species.

Protected sites

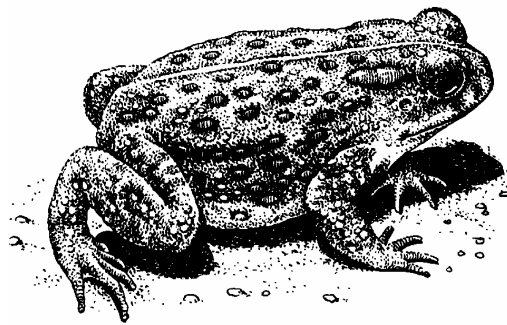
Ainsdale Sand Dunes and Foreshore SSSI, including Ainsdale Sand Dunes NNR
Altcar Sand Dunes and Foreshore SSSI, RAMSAR site and SPA, including Cabin Hill NNR
Formby Sand Dunes and Foreshore SSSI
Southport Sand Dunes and Foreshore SSSI
Ainsdale and Birkdale Hills LNR
Raven Meols LNR
Red Rocks SSSI (on the Wirral coast)

The Sefton Coast dune complex has been identified as a candidate Special Area of Conservation under the Habitats Directive.



Current factors affecting the habitat

- Conservation is dependent on natural coastal processes being sustained. Coastal defence schemes can influence the movement of sediment both on and off shore and thus interfere with the supply of sand necessary for dune development.
- The dune systems have been affected by transport routes and other developments which have separated plant communities and isolated important animal populations.
- Recreational pressures, which include vehicle traffic on foreshores and trampling on dunes, have led to severe local erosion of both vegetation and substrate.
- The spread of introduced plants, notably Sea Buckthorn, White Poplar, Balsam Poplar and Corsican Pine, reduces the extent of natural dune vegetation. It is partly a consequence of the rabbit population having been much reduced by myxomatosis. Both factors have increased the necessity for vegetation management.



Natterjack Toad

Key nature conservation objectives

1. Retain the present extent of sand dunes and where opportunity exists, allow further natural spread to take place.
2. Ensure that the conservation of dune systems is fully considered whenever coastal engineering works are being planned.
3. Prevent further fragmentation of dune systems and the important habitat types within them. Re-establish habitat continuity wherever possible and control damaging erosion by appropriate stabilisation techniques.
4. Ensure that tourism and recreational activities do not diminish habitat sustainability. Prevent ecological damage from the use of vehicles.
5. Control the spread of introduced plant species to prevent adverse impacts on species and communities of greater importance.
6. Continue research into the habitat requirements of key species with the intention of targeting habitat management most effectively.
7. Implement the Biodiversity Action Plans for the nationally important populations of

Sand Lizard and Natterjack Toad, as outlined in the relevant UK Biodiversity Species Action Plans in the context of existing proposals for the Sefton Coast populations. Maintain the locally-important population of Great Crested Newt, by appropriate habitat management.

8. Maintain the population of Red Squirrels by appropriate management of their woodland habitat and implementation of the UK Biodiversity Action Plan for this species.
9. Promote sustainable educational use of the resource and wider appreciation of its special features.
10. Ensure the implementation of an integrated management system for all the dune systems on the Sefton Coast. (The existing Sefton Coast Management Plan (1997 revision) includes provision for monitoring and managing habitats, for species conservation, education and recreation).

6.3.4 Soft cliffs

Status

The eastern shore of the Dee estuary is backed by a stretch of boulder clay cliffs between Heswall and Hoylake. Other examples of soft cliff occur on the south-western shore of the Mersey estuary, but the total resource is very limited in extent.

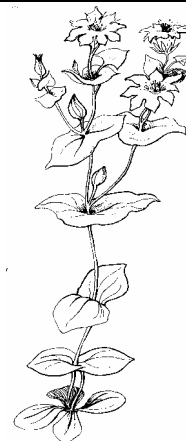
The cliffs are of geological and geomorphological importance for their sedimentary record and display of natural erosive processes. They are also of biological importance, particularly for their plant communities.

Characteristic wildlife

The vegetation is predominantly grassland with a sward kept open by landslip. The Dee Cliffs in particular have a herb-rich flora which includes lime-loving species such as Yellow Wort and Bristly Ox-tongue which, in this area, are both close to their northern limit of distribution.

Protected sites

Dee Cliffs SSSI
The Dungeon SSSI
Mersey Estuary SSSI



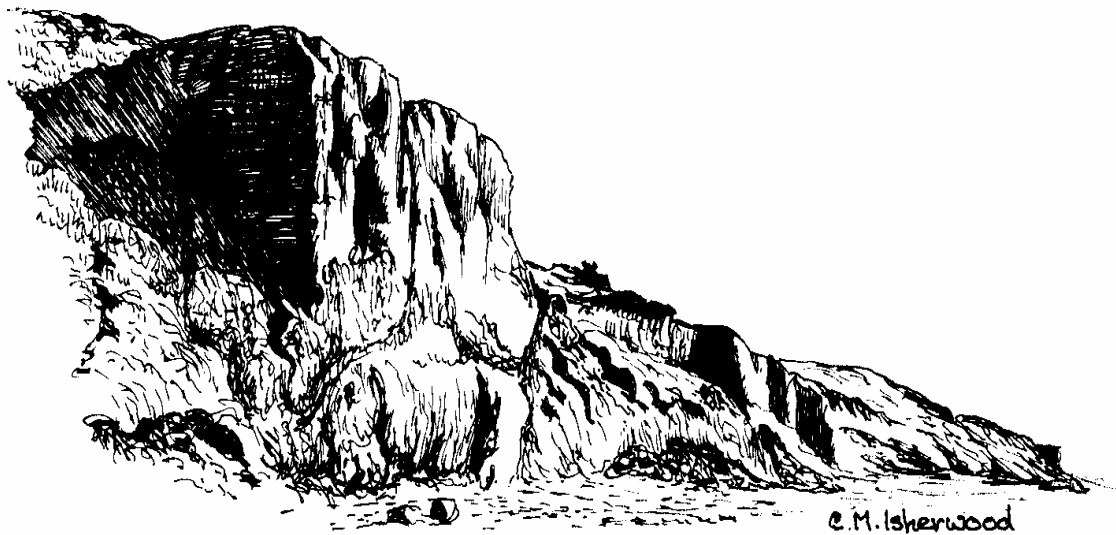
Yellow Wort

Current factors affecting the habitat

- Urban development in the vicinity of soft cliffs can lead to a demands for coastal reinforcement and can thus have an indirect effect on the habitat.
- The natural instability of soft cliffs results in frequent slumping which is essential to maintain the open character of the habitat. Works designed to prevent landslip and possible loss of property are therefore likely to be at variance with conservation aims.

Key nature conservation objectives

1. Ensure that natural erosive processes can continue to operate and/or undertake habitat-re-creation by managing erosion in appropriate locations.
2. Confine new development to stable areas or those with coastal protection measures already in place.
3. Implement shoreline management plans to ensure a holistic approach to coastal protection.



6.3.5 Lowland heath

Status

The UK holds about 20% of all the remaining lowland heathland in Europe. The habitat continues to decline rapidly across the continent and its conservation is regarded as a priority under the Habitats Directive.

Lowland heathland no longer forms a part of any agricultural system in England and this, together with good site drainage and the generally pleasant appearance of the vegetation, makes heathland sites desirable for housing as well as other kinds of development.

The largest tracts in the Natural Area occur on sandy hills, particularly in Wirral and on the landward side of the Sefton Coast dune systems where a high proportion of the remaining heaths are now to be found within the confines of golf courses. Dune heath constitutes a special category which is of particular conservation importance.

The total extent of lowland heath in the Urban Mersey Basin Natural Area amounts to less than 250 ha. of dry heath (including dune heath) and under 20 ha. of wet heath, the majority of the latter being confined within one site.

Characteristic wildlife

The most characteristic plant species of lowland heaths in the Natural Area is Heather, which generally occurs with other shrubs and a fairly narrow range of grasses, mosses and lichens. On dry heaths these plants are likely to occur patchily with intervening areas of bare ground which have particular importance for certain types of invertebrate animals.

Dune heath vegetation usually includes Sand Sedge and a variety of other typical dune plants in association with Heather, Gorse and heathland grasses. Western Gorse is a significant component of heaths on well drained coastal sites. Wavy Hair Grass and Bilberry are more prevalent on cooler and damper inland sites.



Wet heath, which develops on and contributes to peaty substrates, is likely to include Cross-leaved Heath and Purple Moor Grass as associates of Heather.

Where soils are not too wet or shallow, Bracken and trees (most commonly Birch and Oak), are frequently present and, if conditions favour their increase, these are liable to suppress the more light-demanding plants.

Special species

Heather is a key species for conservation on heathland. The Marsh Gentian, a wet heath species, is nationally scarce and now confined to only a few sites in the North West. Two of these are within the Urban Mersey Basin. The Nightjar has almost disappeared from the

North of England, but is still occasionally recorded on dry heaths on which it used to breed in the Natural Area. The Black Darter dragonfly breeds in pools on wet heath. The Silver-studded Blue butterfly has been re-introduced to heathland in Wirral as a conservation measure.

Protected sites

Freshfield Dune Heath SSSI, Sefton
Formby Sand Dunes and Foreshore SSSI, Sefton
Heswall Dales SSSI, Wirral
Highfield Moss SSSI, Wigan
Runcorn Hill LNR, Halton
Thurstaston Common SSSI, Wirral



Heather

Current factors affecting the habitat

- Fragmentation of many heaths as a consequence of development makes each smaller portion more vulnerable to damage and loss of species.
- Absence of traditional management by controlled burning or grazing can lead to woodland expansion on heaths and suppression of the important heathland plant communities.
- Recreational pressure often leads to erosion of vegetation and soil and to localised eutrophication favouring the establishment and intrusion of other types of vegetation.
- Unmanaged heathland with dense woody Heather is at risk from uncontrolled burning.

Key nature conservation objectives

1. Prevent any reduction in the extent of lowland heath.
2. Where feasible, re-establish habitat links between adjacent heathland sites.
3. Introduce appropriate management to sustain heathland communities, giving due regard to individual habitat features such as patches of bare ground which are required by some species.
4. Disseminate management advice to golf clubs and others responsible for management of heathland sites.

6.3.6 Lowland peat mossland

Status

NA 26 The Urban Mersey Basin

The Central Mersey Valley once contained large tracts of lowland peat bog which had developed through infill of shallow lakes, initially by swamp and fen vegetation, then followed by a woodland phase and finally, resulting from climatic changes, the establishment of peat bog vegetation.

When it became technically feasible to drain the bogs, peat cutting was carried out on a large scale for fuel and other uses and, with the addition of manure or fertiliser, conversion to arable farmland became a viable option. By the early part of the 20th Century very little peat bog in the Mersey Basin remained unaltered. Some of the best agricultural land in the Natural Area is now found on former mossland.

The remnant mosslands which survived until the post war period attracted attention as potential sources of horticultural peat and, despite wider recognition of their special character and nature conservation interest, the extent of the peatland continues to decrease because of long-standing planning permissions for mineral extraction.



The mosslands belong to a category of peatland known as raised bog, so-called because the most active growth occurs in the middle where the specialised plants can draw up and retain sufficient water to raise the water table to a higher level than occurs at the margins. The bog thus acquires a domed profile. Raised bog is an internationally rare habitat and both actively-growing and degraded types are listed as requiring special conservation measures under the Habitats Directive.

All peat mosslands are valuable for their subfossil remains which collectively constitute a detailed record of post-glacial climatic, biological and land use changes, about which they furnish the principal source of information.

Characteristic Wildlife

Actively-growing raised bogs are dominated by Bog Mosses (*Sphagnum* spp.) which provide the essential matrix and hydrological conditions for many specialised plants. Cross-leaved Heath, Cranberry, Marsh Andromeda, the Sundews, Bog Myrtle, and Cotton "grasses" were all common at one time in the Mersey Basin mosslands. On drier areas, Purple Moor Grass, Heather and Birch are prevalent and, in such places the habitat resembles heathland in general appearance. The specialised vegetation of mossland is complemented by a range of specialised invertebrate animals.

The drained mosslands in the Natural Area are now largely dominated by Purple Moor Grass and Birch with the species which require a constant high water table being restricted to the edges of pools and the ditches which were dug to drain the peat. The more sensitive species are either scarce or no longer present in the Urban Mersey Basin.



Sphagnum

Special species

The presence of actively-growing Sphagnum mosses is crucial. Without this, other plants such as the Sundews, Cranberry, Marsh Andromeda and several species of sedge will not thrive. Snipe, and, very rarely, Nightjar occur, the latter no longer recorded as breeding in the Natural Area.

Protected sites

Acornfield LNR, Knowsley
Astley and Bedford Mosses SSSI, Wigan/Salford
Highfield Moss SSSI, Wigan (also listed under lowland heath)
Holcroft Moss SSSI, Warrington
Red Moss SSSI, Bolton
Risley Moss SSSI, Warrington

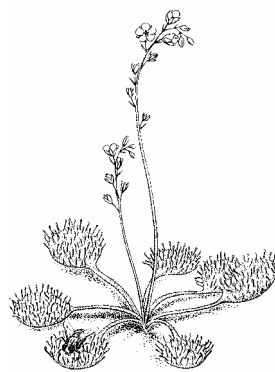
Current factors affecting the habitat

- Drainage of adjacent agricultural land lowers mossland water tables.
- Landfill and other tipping still affects mossland sites.
- Peat extraction, by surface milling or systematic cutting, has resulted in vegetation being stripped from mossland sites other than SSSI.
- Scrub encroachment is usual on areas of drier peat and if not controlled, dense woodland develops, shading out the residual mossland plants.

- Eutrophication, especially as a result of unsuccessful attempts to convert mossland to arable use is likely to make restoration of bog growth especially difficult.
- Uncontrolled fire may lead to slow burning of the peat itself in addition to destruction of the plant cover.
- Recreational uses, resulting in localised vegetation change and disturbance of animal life, include paintball games and claypigeon shooting.

Key nature conservation objectives

1. Adopt a policy of vigorous opposition to any development proposal which threatens to damage a surviving mossland site.
2. Prevent any further damage to mossland habitat by minimising the effects of agricultural drainage, by negotiating for nature conservation after-use following peat extraction on sites with extant planning permission and by restoration of water tables to peat-surface level on protected sites.
3. Carry out trials to inform measures for re-establishing peat-forming vegetation on a large scale.
4. Control the growth of Birch scrub, and prevent the spread of Rhododendron on mossland sites.
5. Develop a strategy for re-creation and management for nature conservation of a large complex of mossland sites capable of sustaining the full range of mossland habitats, with emphasis on pools, actively growing bog, wet heath and fen.
6. Encourage the use of alternatives to peat in horticulture.



Sundew

6.3.7 Lowland grassland

Status

Lowland grassland occupies a considerable proportion of the Urban Mersey Basin, but most of it has undergone agricultural improvement to the detriment of its value for nature conservation.

The most prevalent types of grassland are re-sown pasture, temporary leys and, in urban areas, amenity grasslands, which have very limited plant and animal diversity, and permanent pastures which have a flora and fauna with reduced species diversity as a consequence of fertiliser, slurry and/or herbicide treatment.

Of greater value for nature conservation are the following:-

(i) *Unimproved permanent grassland* which typically occurs on marginal farmland or urban fringe sites. Usually this contains a proportion of coarse plants such as Yorkshire Fog, Tufted Hair Grass and Soft Rush (NVC MG9, MG10, M23).

(ii) *Hay meadows*. These were traditionally managed by grazing for part of the year then closed to livestock to allow the hay crop to develop through spring and summer. Fertility was maintained by winter applications of farmyard manure to supplement the manuring by the grazing livestock. Meadows are rarely managed in this way now and the examples which remain are mostly found in the upland fringes of the Natural Area where slope and small field size, often in combination, have made improvement less worthwhile. The best of the remaining hay meadows contain diverse and colourful assemblages of plants which support a wide variety of insects and other invertebrates. (NVC MG5 and occasionally MG4).



Lowland hay meadows receive special mention in the Habitats Directive as a priority habitat for conservation.

Grasslands in the next two categories have mostly undergone a greater degree of agricultural improvement, but the impact of this has been limited by permanent or seasonal high water table. (NVC MG13 is most common, with MG10 on more neglected sites and occasional representation of MG11.)

(iii) *Flood meadows and inundation grasslands*, mostly associated with river flood plains, are equally (or often more) important as feeding and breeding sites for wetland birds as for their botanical interest.

(iv) *Coastal grazing marshes*, are distinctive for their networks of freshwater or brackish ditches which support a number of uncommon plants. The marshes bordering the Dee and Mersey estuaries attract wetland birds in large numbers and represent important refuges for estuarine species at times of severe weather.

The aforementioned are commonly referred to as mesotrophic (or neutral) grasslands, that is to say they occur on soils of moderate fertility which are neither strongly acidic or basic.

(v) *Acid grassland* is extensive in the uplands bordering the Natural Area, but is quite restricted in the lowlands, where it is mainly confined to sand deposits, shallow soils over sandstone or acidic industrial wastes. Characteristic plants of acid grassland (which also commonly occur as components of lowland heath vegetation) include Wavy Hair Grass (in NVC U2), Common Bent Grass, Sheep's Sorrel and Heath Bedstraw (in NVC U1,U4).

The Urban Mersey Basin Natural Area has no limestone rocks and calcareous grassland (which contains a different spectrum of plants from other grasslands) is found only in special situations. Lime-loving plants occur on sand dunes which contain high proportions of shell material and also on a few inland sites where alkaline wastes have been deposited or where lime-rich clay subsoils have been uncovered, for example in brick clay extraction sites.

(NVC references are the grassland communities most likely to be encountered in the Natural Area. A full listing is presented in Appendix 3.)

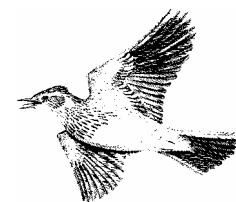
With very few exceptions grasslands in Britain are dependent on continuance of agricultural regimes involving either cutting or grazing or a combination of the two. Grassland conservation must therefore incorporate some form of agricultural management or provide a workable substitute for it.

Characteristic species

Differences between grassland communities can be quite subtle because of the number of plant species present and the fact that the same plants can occur as components of more than one type of grassland community. Differentiation between grassland types depends as much on the proportional abundance of the constituent species as on the simple presence or absence of particular plant "indicators" of particular soil types or past management activities.

Some fairly common species which are abundant only on the less-improved permanent grasslands are Black Knapweed, Greater Birds-foot Trefoil, Marsh Thistle, Sneezewort, Devils-bit Scabious and Ladies Smock.

Hay meadows may also contain some of the above species, but they are also likely to have frequent occurrences of some or all of:- Meadow Buttercup, Ribwort Plantain, clovers, vetches, Yarrow, Meadow Vetchling, and Yellow Rattle. Great Burnet and Ragged Robin are two species which are now of quite restricted occurrence in the Natural Area.



Skylark

The grass sward in flood meadows, inundation grassland and coastal grazing marsh will usually include Marsh Foxtail, Creeping Bent Grass, Soft Rush and Creeping Buttercup.

The most frequent breeding birds of the wet grasslands are Skylark, Yellow Wagtail, Reed Bunting, Lapwing, Snipe and Redshank, Meadow Pipit, Sedge Warbler and Moorhen, with some differences in species between coastal and inland sites. The first six of those listed, have all declined in recent years.

Special species

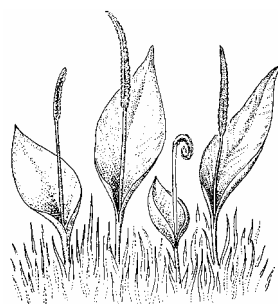
Several of the characteristic birds mentioned above are candidate Red Data Book species. Others for which grasslands in the Urban Mersey Basin are seasonally important are Bewicks Swan, Wigeon, Teal, Pintail, Garganey, Shoveler, Pochard, Golden Plover, Black-tailed Godwit, Short-eared Owl and Barn Owl.

Old grassland often provides good foraging habitat for bats feeding on the flying insects emerging from grassland.

Among scarcer grassland plants are Adderstongue fern, Dyers Greenweed, Green-winged Orchid and Spiked Sedge.

Protected sites

Charnock Richard Pasture SSSI, Chorley
Meols Meadow SSSI, Wirral
Stanley Bank Meadow SSSI, St Helens
Wrightington Bar Pasture SSSI, West Lancashire



Adderstongue

Current factors affecting the habitat

- Agricultural intensification, which involves increased use of fertilisers, pesticides and slurry, all of which can reduce the variety of grassland species, and discontinuance of traditional agricultural practices, for example in the shift from haymaking to silage. The earlier cutting in silage making lessens the production of ripe seed and shortens the season thus reducing breeding success among grassland birds.
- Intensive livestock grazing on pastures, which is made possible by supplementary feedstock provision, damages the vegetation and may destroy much of it. Overgrazing by horses is common in urban fringe areas.

- Development of all kinds, most commonly suburban expansion, business and industrial parks, waste disposal operations and opencast coal mining.
- Scrub encroachment, where agricultural management has been discontinued.
- Tree planting on grassland sites is detrimental wherever the grassland has nature conservation value.
- Recreational interference reduces the effectiveness of pasture management.
- The use of certain antiparasitic drugs for livestock. This may have a detrimental effect on invertebrates associated with animal dung which, in turn, can lead to declines in insect-feeding bat populations.

Key nature conservation objectives

1. Maintain all significant remaining tracts of old grassland, that is all unimproved and all traditionally-managed semi-improved grassland, and ensure continuity of appropriate management.
2. Carry out a grassland audit within the Natural Area to clarify the extent, location and types of grassland with significant nature conservation value.
3. Support continued investigation of the best practicable means of grassland management to combine nature conservation and amenity interest.
4. Seek to restore important examples of grassland from sub-optimal to optimal conditions.
5. Ensure that grassland conservation is accorded adequate recognition in development plans.

6.3.8 Ancient semi-natural woodland

Status

About one fifth of the woodland in the Urban Mersey Basin (ie approximately 900 ha) is identifiable as ancient semi-natural woodland. To qualify, the site must have supported woodland continuously since 1600 AD or earlier and the present woodland should be characterised by plants native to the area.

Ancient semi-natural woodland can be expected to include a substantial proportion of species which seldom occur in woodland of recent or secondary origin. Most ancient woods will contain a proportion of planted trees and these may include species not native to the area (common examples are, Beech, Sweet Chestnut, Sycamore and European Larch).

Ancient woodland is unevenly distributed in the Urban Mersey Basin Natural Area, with the largest concentrations in the south-eastern part of Greater Manchester and parts of Wirral.

By contrast, the rest of Merseyside and the mid - Mersey Valley have relatively little ancient woodland.

The most distinctive ancient woods of the Urban Mersey Basin are associated with narrow valleys - cloughs - formed by streams cutting deeply into the underlying strata. Cloughs are most concentrated in the Manchester Pennine Fringe, but others occur along lower reaches of several of the principal rivers.

Some of the wider cloughs were exploited for their water power potential in the early period of industrial development and many of cloughs still do contain factories. In many instances the introduction of industry had remarkably little effect on the steeper wooded slopes.

The majority of ancient woods in the Natural Area are small. More than half occupy less than 5ha and only three exceed 50ha.

Characteristic wildlife

The most widespread type of woodland is dominated by Pedunculate Oak, often accompanied by Sycamore and with a ground cover consisting mainly of Bramble, Broad Buckler Fern and Creeping Soft Grass. Bluebell and Red Campion are usually present though not in great abundance (NVC W10).

On rocky terrain with shallow acid soil, woodland dominated by Sessile Oak and Birch is prevalent, with Wavy Hair-grass and Bilberry frequently the main ground cover species. Heather often occurs, though this grows poorly in shade (NVC W16).

On lower and more fertile ground, particularly towards the southern part of the Natural Area, Ash is a more abundant woodland constituent, usually in association with Oak and Wych Elm (though most large elms have now been lost through disease). The field layer vegetation in this type of woodland is richer in species and is likely to include abundant Bluebell, Ramsons, Dogs Mercury, Yellow Archangel and others (NVC W8, W9).

Alder is locally dominant in wetter parts of many ancient woods and distinctive Alder woodland occurs, most often in small stands, in river valleys and around ponds and small lakes. The field layer may include fen species such as Yellow Flag. The non-native Himalayan Balsam is often present together with Stinging Nettle, Great Willow Herb and other species typical of rich damp soils (NVC W6, W7).

Beech occurs in some ancient woodlands, where it was probably first planted as a replacement for Oak. When mature its dense canopy and shallow root system combine to make it difficult for other trees to compete and the ground cover vegetation under a beech stand is typically thin among the slow-decomposing leaf litter (NVC W14, W15).

Birch now dominates much dried-out mossland, on which it sometimes forms dense woodland, but where it more often occurs as a savannah-like formation with the trees well-spaced out in a sward dominated by Purple Moor Grass. Mossland woods are not ancient but their formation, following drainage, has been natural (NVC W4).

Special species

Woodlands contain a large number of specialised plants and animals, but few of those in the Urban Mersey Basin are especially rare.

Thin-spiked Wood Sedge, Wood Fescue and Wood Barley are scarce species with local representation. Ancient woodland which contains a variety of subsidiary habitats such as glades, steep banks, wet hollows, dead standing trees and fallen timber is likely to be of importance for its invertebrate fauna.

Protected sites

Brookheys Covert SSSI, Trafford
Borsdane Wood LNR, Wigan / Bolton
Compstall Nature Reserve SSSI, Stockport
Cotteril Clough SSSI, Manchester
Dibbinsdale SSSI and Brotherton Park and Dibbinsdale LNR, Wirral
Flood Brook Clough SSSI, Halton
Gale Clough and Shooterslee Wood, Bolton (part)
Healey Dell LNR, Rochdale
Hopwood Woods LNR, Rochdale
Stanley Bank LNR, St. Helens
Mull Wood LNR, Liverpool

Woodlands are particularly well represented in the series of non-statutory wildlife sites within the Natural Area and most ancient semi-natural woods are listed as such.

Current factors affecting the habitat

- The presence of non-native trees, particularly Sycamore, in significant proportion, is regarded as detrimental in ancient woodland.
- Invasion by Rhododendron and Himalayan Balsam is detrimental to ground flora diversity.
- Heavy recreational pressure, resulting in trampling and disturbance to animal life, affects some sites.
- Illegal tipping, fires and casual vandalism affect most woods close to urban areas.
- Development can lead to loss of woodland edge habitat and increase disturbance to vegetation and animal life if no open land is left around the woodland margin.
- Floristic diversity is likely to be reduced where positive management operations such as thinning, coppicing and replanting are carried out too infrequently.

Key objectives for nature conservation

1. Maintain, and where possible enhance, all ancient semi-natural woodland, through measures such as progressive removal of non-native tree species, diversification of the age structure of tree populations and retention of veteran trees and fallen timber.
2. Where appropriate increase the extent and continuity of semi-natural woodland particularly through enlarging and linking existing sites, giving due regard to species assemblages native to the area and to local site characteristics.
3. Maintain and enhance the populations of scarce or declining native woodland species through appropriate management of their habitats.

6.3.9 Ancient wood-pasture and rare trees

Status

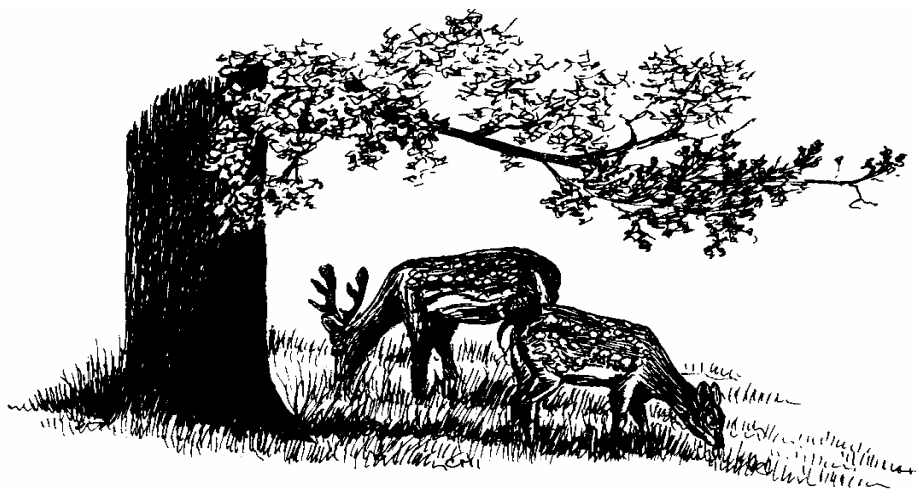
Dunham Park, Trafford, a site owned and managed by the National Trust, is an example of ancient wood-pasture of national importance.

The majority of Dunham Park is pasture woodland or park woodland and has been managed as such since mediaeval times. The large number of very old Oak and Beech trees to be found here exceeds that on any other site in north-west England.

The management of pasture woodland is a compromise between the retention of tree cover and the provision of grazing for livestock. Grazing inhibits tree regeneration, but mature trees are little affected.

Characteristic wildlife

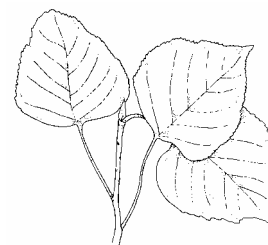
Apart from the large old trees, which include species other than those mentioned, there is a herd of Fallow Deer and a considerable expanse of unimproved grassland which is rich in invertebrates.



Special species

The beetle fauna associated with dead wood is exceptionally rich with 181 species recorded, including 27 with no other known site in the region. The fly fauna has over 350 recorded species.

A rare native tree with representation in the Urban Mersey Basin is the native Black Poplar. Historically this species has been much used in hybridisation or propagated to produce, among others, the Manchester Poplar, which was widely planted in the Urban Mersey Basin and elsewhere for its tolerance of air pollution and is still very abundant in the Natural Area. The true native species, a plant of lowland flood plains, has declined through progressive clearance of habitat and surviving specimens are often isolated.



Black poplar

The site listed below contains three trees, and includes both sexes.

Protected sites

Dunham Park SSSI, Trafford

Hallwood Farm Marl Pits SSSI, Ellesmere Port and Neston District

Current factors affecting the habitats

Little or no seed is produced once the distance between remaining individual male and female Black Poplars has become too great.

Key objectives for nature conservation

1. Maintain and perpetuate the wood-pasture management system at Dunham Park.
2. Make provision for eventual replacement of trees, by additional planting, while retaining moribund and dead standing timber.
3. Ensure that recreational use of the site is consistent with the need to maintain its special features.
4. Determine the number and location of all surviving Black Poplar trees and devise a strategy for increasing the size and sustainability of the population.
5. Increase the population of native Black Poplar by propagation and new planting in appropriate locations.

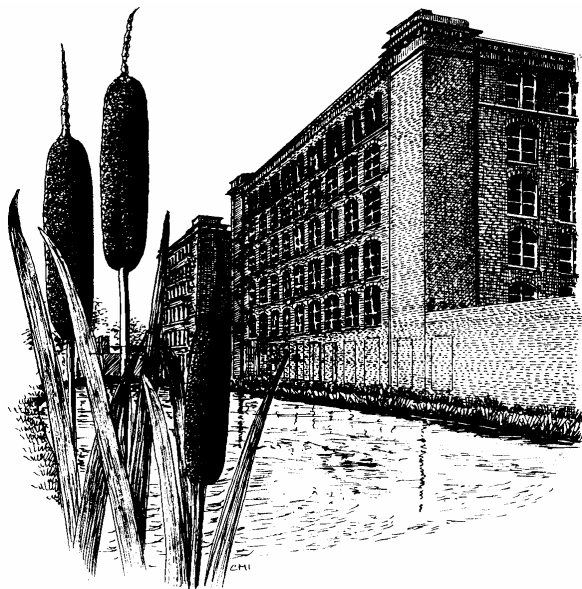
6.3.10 Freshwater wetlands

Status

In the context of this Profile the term Freshwater Wetland includes all running water habitats and standing water bodies, whether natural or man-made, (with the exception of ponds which are given separate consideration). Swamp is included, but mire, wet grassland, wet habitats in dune systems and brackish wetlands associated with estuaries are treated in other sections.

The River Mersey and the majority of its tributaries became notorious examples of industrially- polluted rivers. The legacy of pollution persists though major efforts have been, and continue to be made, to restore these watercourses to an acceptable level.

A considerable measure of success has been achieved and there is every reason to suppose that most of the rivers in the Natural Area will regain a more diverse aquatic flora and fauna.



In marked contrast to the rivers, the canal system, created to serve industry, has gained a reputation as a significant nature conservation resource. Several canals have developed rich and varied communities of aquatic plants and animals, including nationally scarce species.

The Urban Mersey Basin contains no large natural lakes, but there are many reservoirs, most of which are situated around the Pennine fringe. The series of subsidence "flashes" in the Wigan area is particularly significant for its variety and quality of habitats which include reedswamp, fen, bog, and woodland as well as open waters of varied trophic status.

Elsewhere, lakes have been created in borrow pits which were excavated to provide material for motorway construction. There are major examples at Sale and Chorlton Water Parks and Clifton Marina, all of which are close to the centre of the Manchester Conurbation. Land set aside to receive dredgings from the Manchester Ship Canal has also developed into important wetland habitat in the Mersey Valley near Warrington.

Characteristic wildlife

The deeper lakes attract diving birds such as great crested and little grebe, coot, tufted duck, pochard and goldeneye, the last two in considerable numbers as winter visitors. Shallow waters are preferred by surface feeders such as mallard, shoveler, teal, ruddy duck and moorhen. The margins of many water bodies provide habitat for mute swan, Canada goose, reed, sedge and grasshopper warblers, whitethroat, and yellow, grey and pied wagtails.

Waders which breed regularly in inland wetlands include little ringed plover, redshank and snipe.

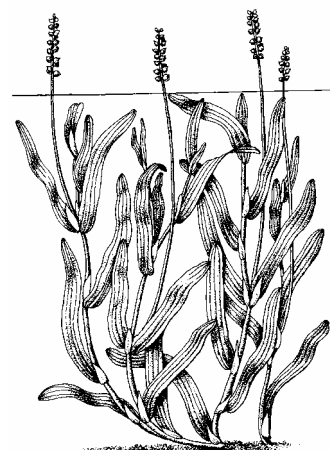
Some sandy river banks provide good sand martin and kingfisher breeding sites. Dipper is a characteristic species of clean rivers, especially in the Pennine fringes of the Natural Area

Special species

The rare plants of canals include several pondweeds: grass-wrack, hairlike, long-stalked and American pondweeds (the last-named being a rare newcomer), floating-leaved water plantain, fringed water lily, water soldier and whorled water milfoil. Some of these aquatic plants have strong local populations, others have decreased in recent years.

Among aquatic animals in the canals, freshwater sponge and banded demoiselle dragonfly are particularly noteworthy.

Black-necked grebe and garganey are scarce birds breeding in modest numbers on some lakes. Bittern is a regular seasonal visitor to the Wigan Flashes.



Long-stalked pondweed

Protected sites

Abram Flashes SSSI, Wigan
Alkrington Woods and Rhodes Lodges LNR, Rochdale
Bryn Marsh and Ince Moss SSSI, Wigan
Doffcocker Lodge LNR, Bolton
Hollinwood Branch Canal SSSI, Tameside
Huddersfield Narrow Canal SSSI, Tameside /Oldham
Woolston Eyes SSSI, Warrington

Current factors affecting the habitats

- Poor water quality continues to be the major obstacle to re-establishing natural communities in both major rivers and many tributaries.
- Progressive restoration of navigation on canals poses problems for conservation of scarce aquatic plants and invertebrates.
- Loss of reservoirs which are surplus to water supply requirements represents a potential reduction of aquatic habitat.
- Natural vegetation succession can result in suppression of scarce plant populations, especially in canals.
- Canal dredging leads to problems of spoil disposal which may impact on waterside habitats.

- Development close to water bodies can lead to increased disturbance of birds.
- Recreational pressures, especially from angling and power boating interests, affect many water bodies in the Natural Area.
- Introduction of non-native plants and animals to waterbodies can cause problems of competition with native species.

Key objectives for nature conservation

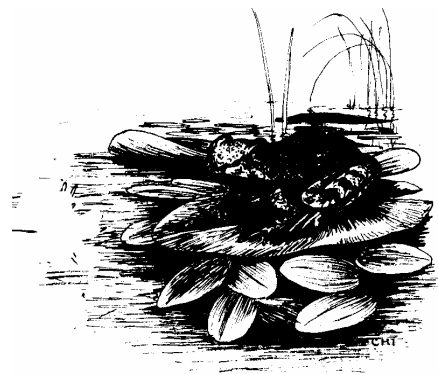
1. Maintain at least the current extent and variety of wetland habitats.
2. Support initiatives to reduce pollution of the major watercourses, for example by improvements in control of run-off from roads and other hard surfaces.
3. Retain riverside corridors of sufficient width to provide or develop wildlife habitats and facilitate wildlife movements.
4. Improve the quality of water margin habitats which are currently in sub-optimal condition by appropriate management.
5. Seek opportunities for the creation of new wetland habitats particularly those which may enhance the populations of scarce or declining species.
6. Develop systems for managing water-based recreation which are compatible with the maintenance and increase of biodiversity.

6.3.11 Ponds

Status

The lowlands of north-west England are rich in field ponds. Two particularly dense pond concentrations occur in the Natural Area - in Wirral and in the western part of Greater Manchester. The majority of these ponds are former marl pits, excavated to provide material to improve soil fertility. In other places ponds now occur in clay and gravel pits and close to mills where they were created as reservoirs for industrial purposes.

Many ponds have a fringe of swamp, rough grassland, scrub or trees to supplement the aquatic habitat. These marginal and terrestrial habitats are of particular importance in providing cover for birds and amphibia, especially where surrounding land is not congenial to wildlife. In such circumstances ponds may serve as habitat "stepping stones" assisting local wildlife migrations and increasing the variety of species on farmland and in urban areas.



Characteristic wildlife

Ponds are of major importance as breeding sites for amphibia and sustain a wide range of aquatic invertebrates including scarce species.

Special species

The Great Crested Newt is quite common in the Urban Mersey Basin, but is threatened nationally and in Europe.

The distinctive open ponds in the dune systems of the Sefton Coast provide essential breeding requirements for natterjack toad.

Protected sites

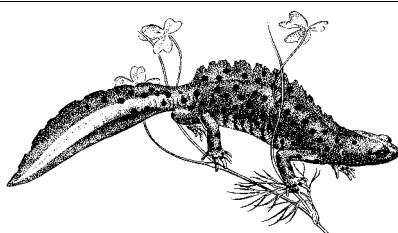
Several SSSI and Local Nature Reserves mentioned in other sections of this Profile include ponds and, outside these, a large number of ponds have local conservation designations.

Current factors affecting the habitat

- Ponds continue to be lost through natural vegetation succession, use as rubbish tips and infill to satisfy agricultural or development priorities.
- Heavy shading by surrounding trees or buildings can reduce the value of ponds as a habitat for many species.
- Excessive enrichment from fertiliser or slurry run-off is damaging to all but the most tolerant organisms.
- Loss of adjacent terrestrial habitat adversely affects amphibian populations.
- Stocking with fish and intensive angling usage, reduces the value of many ponds as wildlife habitat as a result of disturbance of bankside habitats and predation by fish.

Key objectives for nature conservation

1. Wherever possible ensure that ponds are retained and given adequate protection. Where loss or deterioration are inevitable, excavate new ponds of appropriate size and in favourable locations.
2. Ensure that the total pond habitat resource is sufficient in quantity and quality to meet nature conservation requirements as well as recreational demand by creating new ponds where necessary.



Great crested newt

6.3.12 Secondary and plantation woodland

Status

Four fifths of all woodland in the Natural Area fall within this broad category.

The value of secondary woodland for nature conservation varies a great deal according to the degree of naturalness, the variety and age-structure of tree species populations and the variety and type of the associated flora and fauna, the terrain and other factors. The best examples approach the value of some ancient woodlands, but, at the other end of the spectrum, uniform, species-poor plantations are unlikely to acquire much conservation significance for many years.

The woodland resource in total is of major importance as wildlife habitat and since the proportional extent of woodland in the Urban Mersey Basin is still modest, an increase in the area occupied by woodland is generally to be welcomed.

Characteristic wildlife

The majority of the plants, invertebrates and birds of recent secondary woodland also frequent larger gardens, hedgerows and other secondary habitats which contain trees and shrubs. Some species are likely to occur in higher densities in secondary woodland than in ancient semi-natural woodland, but the overall species diversity is likely to be less and secondary habitats usually lack the woodland species with the most specific habitat requirements.

Protected sites

Many locally-designated wildlife sites and nature reserves include secondary woodland, which, in most cases is associated with other habitats. Site designation is frequently based on the combination of habitats.



Corsican pine

Current factors affecting the habitat

- Older secondary woodland is subject to a similar range of factors to those listed under ancient semi-natural woodland. Some problems such as those associated with invasive non-native plant species are more prevalent in secondary woodland.
- All attributes which differentiate plantations from semi-natural woods can be regarded as adverse factors in a nature conservation context. Examples include tree

populations of uniform age structure, planting in uniform monospecific blocks, a general scarcity of special habitats such as wet areas, dead wood, glades and undeveloped woodland soil profiles.

- Two current major initiatives are intended to increase woodland cover in the Urban Mersey Basin - the Mersey Forest and Red Rose Forest. These involve new planting in existing woodland and the creation of new woodland on open sites. Nature conservation aims form part of the plan for these new forests, together with landscape enhancement, timber growing and recreational objectives.

Key objectives for nature conservation

1. Manage existing secondary woodland to improve its habitat value for wildlife.
2. Support initiatives to increase the extent of woodland in the Natural Area where these do not impinge on sites of high nature conservation value and where new woodland can improve the habitat mosaic.
3. Ensure that wherever possible, and in all situations in which planting is intended to assist nature conservation, that locally-native planting stock is selected and that natural woodland assemblages of species are used as a model for planting schemes.
4. As far as possible ensure that the establishment of new woodland will not assist the spread of those species which might threaten native species populations. A relevant example is the increase of habitat which favours the Grey Squirrel habitat close to remaining Red Squirrel populations.
5. Monitor the development wildlife populations in new forests to inform future woodland creation initiatives.

6.3.13 Traditionally managed arable farmland

Status

The open habitat of periodically-ploughed land is of importance to a range of plants which require bare areas to avoid competition from longer-lived species. Crop residues the principal food source for a range of birds and other animals which are now largely dependent on this type of habitat. Comparatively little arable farming still relies on traditional management practice and this puts at risk many species which were once common.

Special species



Partridge

Examples of once-common species which have undergone major population declines in recent years both within the Natural Area and in other parts of the country are Brown Hare, Grey Partridge, Corn Bunting and Skylark.

Protected sites

None.

Current factors affecting the habitat

- Modern agricultural techniques have led to cleaner (i.e. more weed-free) crops to the detriment of many plants once regarded as weeds. The rate of extinction among farmland ruderals is higher than that in most other habitats.
- Autumn sowing of cereals, which is now the norm in many areas, reduces the fallow period in which animals can forage among crop residues. Early removal of such residues after harvest, by ploughing, chemical treatment or burning, deprives some animals of an important source of food.
- Set-aside of surplus arable land can assist nature conservation, but is not a substitute for sustained but, less-intensive agriculture.

Key objectives for nature conservation

1. Retain an adequate of arable land managed by traditional farming methods to help sustain populations of species which have declined.
2. Encourage the adoption of schemes such as Countryside Stewardship to assist farmers to perpetuate traditional management techniques.
3. Support initiatives to develop mixed agricultural systems which are economically and environmentally sustainable.



6.3.14 Habitats associated with urban areas

The large human population of the Urban Mersey Basin represents an asset of immense potential for the future of nature conservation in the UK. It is important that nature conservation aims and objectives should be understood and appreciated by as wide a section of this population as possible. The improvement and conservation of habitats close to the homes of the majority of people can make an important contribution to the appreciation of nature as well as being of direct benefit to wildlife.



Urban wildlife habitats have received considerable recognition and publicity in recent years and a few urban sites have been accorded SSSI status in recognition of their special features.

Urban habitats include features of industrial origin such as spoil heaps and former railway land, which can be of interest for their unusual soil characteristics and vegetation.

Unused land is a permanent feature of all urban areas and, although individual sites are likely to find new uses eventually, others will replace them. Colonisation of "waste land" by plants and animals sometimes results in communities which are distinctive in their species make up and characteristic of particular urban areas. Urban vegetation can be different from types found in the surrounding countryside.

Large town parks can be important refuges for wildlife, especially in the larger cities where open land is limited.

Most towns contain at least a few examples of isolated "countryside" - semi-natural habitats which have become surrounded by urban development. Where such "islands" retain habitats of significance it is important that these should retain their value and one way to assist this is through maintaining, or re-establishing, habitat connections with other sites.

There are also many opportunities for creating habitats similar to ones which are declining in the countryside as a result of agricultural intensification.

Urban wildlife sites are a useful educational resource and contribute to a greener, more congenial environment for all.

Characteristic wildlife

Urban Commons This term has been applied to open urban land which has remained unused for long enough to have been colonised by vegetation. Urban commons are often used (and sometimes abused) as informal recreational space. The time scale and process of vegetation development on such sites varies with substrate and locality and may produce distinctive

local or regional variants of grassland communities, tall herb assemblages, scrub and woodland. A growing number of ecological investigations has revealed that there exists a complementary and distinctive fauna.

Former industrial sites The deposition of calcareous wastes from alkali industries, glass making, and blast furnace slag in an area which lacks calcareous soils has provided a habitat for a range of species which would not otherwise occur in the Natural Area. Examples of lime-loving plants on such sites are Canadian fleabane, Purging flax, Harts-tongue Fern, Common Centaury and Yellow Wort. These usually occur in conjunction with a range of widespread ruderal and grassland species.

Railway land and colliery spoil are typically acidic and, on these, characteristic assemblages of heathland and ruderal plants occur, often with non-natives such as Lupin and Yellow Toadflax.

Managed greenspace This includes town parks, street and garden plantings and amenity grassland.

The larger urban parks provide significant wildlife habitats in places where little open space is available. Mature trees common to many such parks are important refuges for invertebrates, birds and, in some places, bats.

Techniques have been developed, with conspicuous success in Greater Manchester, Liverpool, Knowsley and the former New Towns of Warrington and Runcorn, for the creation of new woodland, wetland and species-rich grassland. The emphasis has been on using natural communities as models, and applying ecological principles to create vegetation which is naturalistic in appearance and supportive of wildlife. There is undoubtedly much more to be learned about the most appropriate means of "greening cities", but results to date have been encouraging.

Special species

A number of conspicuous species have colonised the urban areas in the Natural Area in quite recent time. Fox, badger, peregrine falcon, black redstart and marsh orchids are among the best-publicised examples.

Protected sites

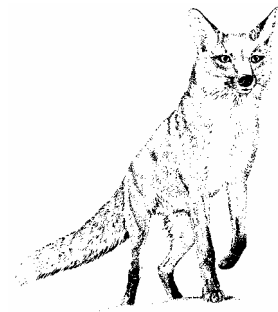
Nob End SSSI, Bolton
Pickerings Pasture LNR, Halton
Rixton Clay Pits SSSI, Warrington

Other ex-industrial features have been identified as non-statutory wildlife sites.

Current factors affecting urban habitats

Many urban sites are, paradoxically, quite well protected by planning policy from development. The main factors which threaten sites are:-

- Recreational pressure, especially when motorcycles and mountain bikes are involved.
- Scrub encroachment on grassland sites.
- Lack of management, for example of small woods.
- Vandalism, including fire.
- Illicit tipping.



Key nature conservation objectives

1. Encourage the identification and protection of "Green Networks" to provide a network of semi- natural habitat within the urban fabric.
2. Encourage scientific investigation of urban wildlife populations as a basis for future wildlife conservation measures.
3. Incorporate conservation and enhancement of wildlife in the management of urban greenspace
4. Increase appreciation of the nature conservation and educational value of urban "wildspace" as a means of involving people in the conservation of the wider environment.

6.4 Site protection in the Urban Mersey Basin Natural Area

6.4.1 Sites with statutory protection

There are 36 designated Sites of Special Scientific Interest. Eleven of these include important geological features, sometimes in conjunction with major biological interest. Two SSSIs encompass National Nature Reserves on the coastal dunes and a third National Nature Reserve - the Ribble Marshes NNR - is partly within the Natural Area.

Much of the coast also has protected status under International Conventions and Directives. Designations include Special Protection Areas under the EC Birds Directive and Ramsar sites. Much of the sand dune complex has been identified as a candidate site for Special Area of Conservation status under the EC Habitats Directive.

There are 16 Local Nature Reserves designated under the National Parks and Access to the Countryside Act of 1949 and managed by, or on behalf of, local authorities.

6.4.2 Non-statutory sites

Every Metropolitan Borough and County Council within the Urban Mersey Basin operates a system for identifying and registering sites of importance for nature conservation. The title given to such sites varies, but all registered sites enjoy a measure of protection from damaging development under policies of Unitary Development and Local Plans. Some

administrations have a policy of grading sites and according stronger protection to the higher grades; others apply equal protection to all. The responsibility for survey and recommendation of sites for registration is assigned to professional ecologists employed by the local authorities or to specialists in the County Wildlife Trusts. The total number of sites in the Natural Area is approximately 750.

A complementary system for Regionally Important Geological Sites (RIGS) is being developed locally and nationally by geological specialists.

The whole of the Urban Mersey Basin Natural Area has been covered by Phase 1 Habitat Surveys. This has enabled the production of maps showing the types of habitat in some detail and identification of sites meriting further investigation. Many habitats are highly fragmented and a consequence of this is that much remains to be done before the total extent of each habitat type can be accurately quantified for the Natural Area, though the base data already exist.

Clearly-defined habitats such as woodland, heath, mossland and open water habitats are well-represented in the lists of protected sites. The representation of unimproved grassland and some other habitats is much less comprehensive.

The titles used to identify non-statutory nature conservation sites in the Urban Mersey Basin Natural Area are as follows:-

County Biological Heritage Site:	Lancashire Boroughs of Chorley and West Lancashire.
Site of Biological Importance:	Cities of Manchester and Salford. Metropolitan Boroughs of Bolton, Bury, Knowsley, Oldham, Rochdale, Stockport, Tameside, Trafford, Wigan and Wirral. Cheshire Boroughs of Ellesmere Port and Neston, Halton and Warrington.
Site of Community Wildlife Interest:	Metropolitan Borough of St. Helens.
Site of Importance for Nature Conservation:	Derbyshire Borough of High Peak.
Site of Local Biological Importance:	Metropolitan Borough of Sefton.
Site of Nature Conservation Value:	City of Liverpool.



6.5 Key nature conservation goals

The list below summarises the major goals for nature conservation in the Natural Area, combining objectives listed for each of the habitats described in Section 6.3 above.

1. To retain, or to restore where necessary, the full range of geological features, landforms and semi-natural wildlife habitats which are characteristic of the Urban Mersey Basin.
2. To allow the formation of intertidal flats, saltmarshes and sand dunes to proceed by natural processes thereby maintaining the coastal habitats and visiting bird populations of international importance.
3. To halt and where possible to reverse the decline of nationally and internationally-important species populations by protection of their habitats, assisted where necessary by management of their local populations.
4. To protect all remaining examples of lowland heath, ancient semi-natural woodland and ancient wood-pasture and to ensure that their management is appropriate for the long-term sustainability of these important habitats.
5. To pursue a programme to restore degraded peat mossland sites to a more suitable condition for the characteristic plants and animals of this habitat which have declined or been lost from the Natural Area.
6. To perpetuate the biodiversity of hay meadows and other farmland habitats important for nature conservation by encouraging the continuance of traditional management practices.
7. To support measures to reduce water pollution and to improve the quality and extent of habitats associated with rivers, canals, ditches and ponds.
8. To increase the extent of woodland and of urban wildlife habitats on land with low nature conservation value.

7. The Sefton Coast - A Prime Biodiversity Area?

Prime biodiversity areas are areas of maximum opportunity for wildlife conservation, where resources may be targeted with greatest effect to achieve objectives. The term Prime Biodiversity Area does not imply special status, nor is it a formal designation.

From the descriptions of habitats in this profile it will be apparent that the Sefton Coast and its hinterland holds the largest and most dense concentration of important nature conservation sites of any in the Urban Mersey Basin Natural Area. The sand dune habitat complex represents 23% of the total resource in England and the foreshore and dune systems have been recommended as a possible Special Area of Conservation under the Habitats Directive. The Sefton Coast also holds the most concentrated assemblage of rare species in the Urban Mersey Basin Natural Area.



Red squirrel

Three animal species and several plants which occur on the Sefton Coast have been prioritised for conservation action in the UK Biodiversity Steering Group Report.

Measures to protect and enhance the populations of Natterjack Toad and Sand Lizard are already under way as part of English Nature's Species Recovery Programme.

The Sefton Coast has a large human population and is also of prime importance for recreational activities, some of which can conflict with nature conservation objectives. It is important that such conflicts are avoided by foresight and planning.

No attempt has been made in this profile to define boundaries of the possible Prime Biodiversity Area - this will be a matter for English Nature to pursue in close collaboration with partner organisations.

Some important habitats and species which occur within the proposed Prime Biodiversity Area

Habitats:

Foreshores
Mobile sand dunes
Fixed dunes
Dune slacks and pools
Dune heath
Plantation woodland

Species:

Sanderling
Sand Lizard
Natterjack Toad
Great Crested Newt
Red Squirrel
Dune Helleborine
Spanish Catchfly
Seaside Centaury
Petalwort

8. Acknowledgements

This profile was compiled and written by Ralph Tomlinson (Greenspace Ecological Consultancy) for English Nature North-West Team. Illustrations are by Christine Isherwood and from the English Nature Line Drawing Catalogue.

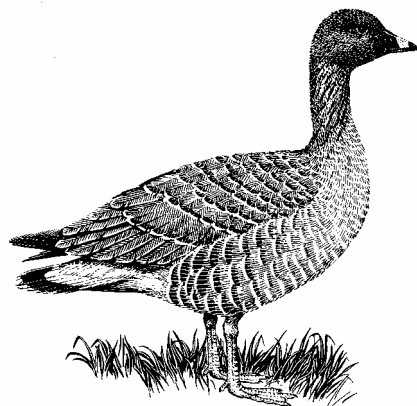
Thanks are due to Heather Bingley, Mike Bradburn, Bernard Fleming, Nicola George and other members of the English Nature North West Team for helpful assistance and also to the following representatives of partner organisations for additional guidance:- Cathy Beeching, (Environment Agency), Christine Bennett, (Joint Countryside Advisory Service), Dr. Anne GreatRex (Greater Manchester Ecology Unit), Tim Melling (RSPB) and Steve White (Lancashire Wildlife Trust).

Guidance provided by the authors of the Natural Area profile for Dartmoor is also acknowledged.

9. Glossary

acidic (grassland)	Grassland on soil of low pH which reflects particular mineral deficiency which influences the species present.
Bern Convention	Convention on the Conservation of European Wildlife and natural Habitats -see Appendix 2.
biodiversity	The total spectrum of life forms in a particular place.
Bonn Convention	Convention on the Conservation of Migratory Species of Wild Animals - see Appendix 2.
calcareous (soil/grassland)	Lime-rich - refers to soils (usually of high pH) which have a discriminating effect on plant growth and influence the composition of vegetation.
calcicole	A lime-loving species (c.f. calcifuge).
cuesta	A hill with a steep front (scarp) slope and a shallow back(dip) slope.
Birds Directive	EC Council Directive on the Conservation of Wild Birds (79/409/EEC) - see Appendix 2.
eutrophication	A process of nutrient enrichment - most often used to imply over-enrichment, (e.g. of waterbodies) to the detriment of quality.
Geological Conservation Review (GCR)	An authoritative description of the important geological sites throughout Britain.
geomorphology	The study of landforms and land - forming processes.
habitat	A place where species live, either singly or collectively, and to which they are adapted.
habitat- type	One of a series of habitats which share similar conditions and have a similar appearance.
Habitats Directive	EC Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) -see Appendix 2.
isostatic	A rise of land relative to sea level, most often referring to the changes following glaciation.
Local Nature Reserve (LNR)	A reserve designated under law and managed by a local authority.
National Nature Reserve (NNR)	A reserve designated under law and managed by, or on behalf of, English Nature.
National Vegetation Classification (NVC)	A new classification of all types of vegetation occurring in Britain which explains the characteristics and occurrence of each type.

Phase 1 habitat survey	A basic level of survey which results in mapping and measurement of readily-visible habitats, usually over broad areas.
plant (or animal) community	An assemblage of species which regularly occur together.
population	An assemblage of individuals of a particular species (or group of related species) in a defined area.
RAMSAR site	The "Ramsar" Convention on Wetlands of International Importance, especially as Waterfowl Habitat-see Appendix 2.
Red Data Book	A listing of species which are rare or threatened with extinction in a particular country compiled for the International Union for the Conservation of Nature (IUCN) sometimes by national authorities.
Regionally Important Geological Site (RIGS)	A non-statutory designation for geological or landform features.
secondary (woodland)	One which has replaced a former, different type of community or habitat.
semi-natural	A term which recognises that many natural-looking habitats have been influenced by mans activities.
Site of special Scientific Interest (SSSI)	An area of land notified under the Wildlife and Countryside Act as being of special interest for nature conservation.
Special Area of Protection (SPA)	A designation under the EC Birds Directive (see Appendix2).
Special Area of Conservation (SAC)	A designation under the EC Habitats Directive (see Appendix 2).
succession (vegetation)	The progressive replacement over time of one plant community by another.
wildlife corridor	A more-or less linear strip of semi-natural habitat which is likely to allow wildlife movement through an otherwise inhospitable area.



Pink-footed goose

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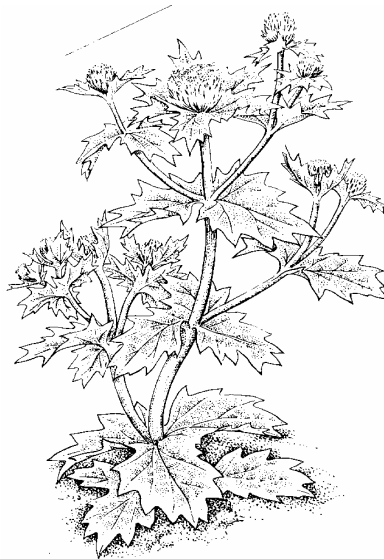
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Sea holly

Appendix 1 - Key Species in the Urban Mersey Basin Natural Area

The species are arranged in major classificatory groups. The species in the more-familiar animal groups are listed in alphabetical order of their common names. The less-familiar animal groups and all plants are listed alphabetically by their scientific names.

- + indicates a species not known to occur at present in the Natural Area.
- ++ represents are-introduced species.

Key to categories used in the table

- A. Species which are threatened on a global or European scale and which either have significant populations in the Urban Mersey Basin Natural Area at present. Also included are several species which have been lost from the Natural Area relatively recently and might reasonably be expected to re-establish following habitat improvement.
- B. Species which are at risk nationally (in the case of plants and invertebrates categorised as Nationally Rare or Nationally Scarce because of their limited range or numbers) and which are represented in the Urban Mersey Basin Natural Area. Species which occur only in the UK are indicated by an asterisk.
- C. Other species occurring in the Natural Area which have undergone recent rapid decline in numbers or range throughout Britain (e.g. birds which have decreased by 50% or more in the last 25 years and / or which have unfavourable conservation status in Europe).
- D. Species which have declined in the Urban Mersey Basin and /or those which are characteristic of habitats of particular concern in the Natural Area.

Common name	Latin name	Primary habitat in urban Mersey Basin N.A.	Reasons for selection
Birds			
Bar-tailed Godwit	<i>Limosa lapponica</i>	Estuaries	A
Barn Owl	<i>Tyto alba</i>	Farmland	B
Bewicks Swan	<i>Cygnus columbianus</i>	Estuaries, coastal marshes (winter)	A
Bittern	<i>Botaurus stellaris</i>	Reedbeds	A
Black-necked Grebe	<i>Podiceps nigricollis</i>	Lakes	A
Black-tailed Godwit	<i>Limosa limosa</i>	Estuaries, coastal marshes (winter)	A
Bullfinch	<i>Pyrrhula pyrrhula</i>	Thickets, hedgerows	C
Corn bunting	<i>Melospiza calandra</i>	Farmland	C
Curlew	<i>Numenius arquata</i>	Estuaries	A
Dunlin	<i>Calidris alpina</i>	Estuaries (winter)	A
Garganey	<i>Anas querquedula</i>	Lakes (summer)	A
Golden Plover	<i>Pluvialis apricaria</i>	Estuaries	A
Grey Partridge	<i>Perdix perdix</i>	Farmland	B
Grey Plover	<i>Pluvialis squatarola</i>	Estuaries	A
Kingfisher	<i>Alcedo atthis</i>	Waterside	C
Knot	<i>Calidris canutus</i>	Estuaries (winter)	A
Lapwing	<i>Vanellus vanellus</i>	Estuaries, marshes, farmland	A
Linnet	<i>Carduelis cannabina</i>	Open scrub	C
Little Ringed Plover	<i>Charadrius dubius</i>	Open stony ground	C
Nightjar +	<i>Caprimulgus europaeus</i>	Lowland heath	A
Oystercatcher	<i>Haematopus ostralegus</i>	Estuaries, wet grassland	A
Peregrine	<i>Falco peregrinus</i>	Cliffs, high buildings	A
Pink-footed Goose	<i>Anser brachyrhynchus</i>	Estuaries, lowland grassland (winter)	A
Pintail	<i>Anas acuta</i>	Estuaries, saltmarshes, lakes	A
Pochard	<i>Athya ferina</i>	Lakes	A
Quail+	<i>Coturnix coturnix</i>	Crops, rough pasture	A
Redshank	<i>Tringa totanus</i>	Estuaries, wet grassland	A
Reed Bunting	<i>Emberiza schoeniclus</i>	Swamps, reedbeds	C
Ringed Plover	<i>Charadrius hiaticula</i>	Estuaries	A
Sanderling	<i>Calidris alba</i>	Estuaries (winter)	A
Sand Martin	<i>Riparia riparia</i>	Sand cliffs & banks	C
Shelduck	<i>Tadorna tadorna</i>	Estuaries, lowland grassland	A
Short-eared Owl	<i>Asio flammeus</i>	Rough grassland	C

Common name	Latin name	Primary habitat in urban Mersey Basin N.A.	Reasons for selection
Shoveler	<i>Anas clypeata</i>	Lakes	A
Skylark	<i>Alaudia arvensis</i>	Grassland, saltmarsh	C
Snipe	<i>Gallinago gallinago</i>	Wet grassland	C
Song Thrush	<i>Turdus philomelos</i>	Farmland, woodland	C
Spotted Flycatcher	<i>Muscicapa striata</i>	Woodland	C
Swallow		Buildings	C
Teal	<i>Anas crecca</i>	Estuaries, marshes, lakes	A
Tree Sparrow	<i>Passer montanus</i>	Open woodland	C
Turnstone	<i>Arenaria interpres</i>	Rocky shores	A
Yellow Wagtail	<i>Motacilla flava</i>	Wet grassland	C
Wigeon		Estuaries, saltmarsh	A

Mammals, Reptiles & Amphibia

Badger	<i>Meles meles</i>	Woodland	D
Brandt's Bat	<i>Myotis brandtii</i>	Trees, buildings	A
Brown Hare	<i>Lepus europaeus</i>	Grassland	C
Brown Long-eared bat	<i>Plecotus auritus</i>	Buildings, trees	A
Daubenton's Bat	<i>Myotis daubentonii</i>	Trees, buildings near water	A
Great Crested Newt	<i>Triturus cristatus</i>	Ponds	A
Lesser Horseshoe Bat	<i>Rhinolopus hipposideros</i>	Buildings, caves, wooded areas	A
Natterjack Toad	<i>Bufo calamita</i>	Damp dune slacks	A
Noctule bat	<i>Nyctalus noctula</i>	Trees, bridges	A
Pipistrelle bat	<i>Pipistrellus pipistrellus</i>	Close to trees - rural and urban	A
Red Squirrel	<i>Sciurus vulgaris</i>	Woodland	B
Sand Lizard	<i>Lacerta agilis</i>	Coastal sand dunes	A
Water Vole	<i>Arvicola terrestris</i>	Freshwater habitats	C
Whiskered Bat	<i>Myotis mystacinus</i>	Buildings, caves, trees	A

Butterflies & Moths

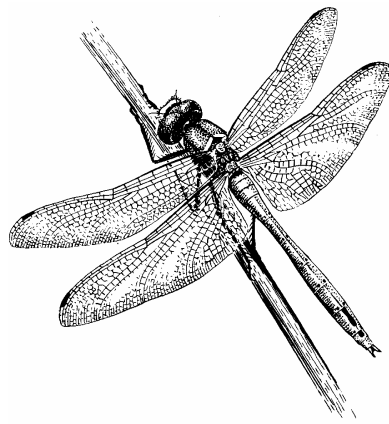
Belted Beauty moth	<i>Lycia zonaria</i>	Dune slacks	C
Dark Green Fritillary	<i>Argynnis aglaia</i>	Dunes & other habitats with violets	C
Grayling	<i>Hipparchia semele</i>	Rough dry grassland on dunes & soft cliffs	C
Large Heath + (Manchester Argus)	<i>Coenonympha tullia</i>	Peat mossland	D
Sandhill Rustic moth	<i>Luperina nickerlii</i>	Open dunes	C
Silver-studded Blue++	<i>Plebeius argus</i>	Lowland heath	C
White Letter Hairstreak	<i>Strymonidia w-album</i>	Habitats with Elm trees	C
White Satin Moth	<i>Leucoma salicis</i>	Mature Willow or Poplar trees	C

Common name	Latin name	Primary habitat in urban Mersey Basin N.A.	Reasons for selection
Dragonflies			
Black Darter dragonfly	<i>Sympetrum danae</i>	Wet heath	D
Four- spotted Chaser dragonfly	<i>Libellula quadrimaculata</i>	Pools with acidic water	D
Broad-bodied Chaser	<i>Libellula depressa</i>	Small sheltered ponds	D
Ruddy Darter	<i>Sympetrum sanguineum</i>	Ponds, ditches with emergent vegetation	C
Emperor	<i>Anax imperator</i>	Sheltered, vegetated pools	D
Banded demoiselle	<i>Calopteryx splendens</i>	Canals, slow streams	D
Other Insects			
Wood-inhabiting beetles	(27 species)	Ancient wood pasture	B
A dung beetle	<i>Aphodius zencheri</i>	Wood pasture with Fallow Deer	B
A beetle	<i>Dropephylla grandiloqua</i>	Wood - pasture	B
A caddis fly	<i>Tricholeiochiton tagori</i>	Ponds	B
Spiders			
	<i>Miniarialoides trifrons</i>	Wet meadow	B
Freshwater Molluscs			
Mud Pond Snail	<i>Limnaea glabra</i>	Ditches, ponds	B
False Orb pea Mussel	<i>Pisidium pseudospharicum</i>	Ditches, ponds	B
Nut Orb Shell	<i>Sphaerium rivicola</i>	Slow rivers	B
Other Invertebrates			
A freshwater sponge	<i>Spongilla lacustris</i>	Canals	D
Flowering Plants			
Marsh Andromeda	<i>Andromeda polifolia</i>	Wet mossland	D
Saltmarsh Flat Sedge	<i>Blysmus rufus</i>	Saltmarshes	D
Green-ribbed Sedge	<i>Carex binervis</i>	Wet heath	D
Distant Sedge	<i>Carex distans</i>	Dune slacks	D
Long-bracted Sedge	<i>Carex extensa</i>	Dune slacks	D
Thin-spiked Wood Sedge	<i>Carex strigosa</i>	Woodland	D

Common name	Latin name	Primary habitat in urban Mersey Basin N.A.	Reasons for selection
Seaside Centaury	<i>Centaureum littorale</i>	Dune slacks	B
Isle of Man Cabbage	<i>Coincya monensis</i> <i>ssp monensis</i>	Dunes	B*
Grey Hair-grass	<i>Corynephorus</i> <i>canescens</i>	Fixed dunes	B
Autumn Crocus	<i>Crocus purpureus</i>	Grassland	D
Genista tinctoria	<i>Dyers greenweed</i>	Old grassland	D
Six-stamened Waterwort	<i>Elatine hexandra</i>	Ponds	B
Many-stalked Spike Rush	<i>Eleocharis multicaulis</i>	Wet heath	D
Few-flowered Spike Rush	<i>Eleocharis quinqueflora</i>	Dune slacks	D
Dune Helleborine	<i>Epipactis leptochila</i> <i>var. dunensis</i>	Stabilised dunes	A
Marsh Helleborine	<i>Epipactis palustris</i>	Damp dune slacks, marshes	D
Green-flowered Helleborine	<i>Epipactis phyllanthes</i>	Dune scrub & woodland	D
Portland Spurge	<i>Euphorbia portlandica</i>	Dunes	B
Wood Fescue	<i>Festuca altissima</i>	Woodland	B
Purple Ramping fumitory	<i>Fumaria purpurea</i>	Arable & waste land	B
Petty Whin	<i>Genista anglica</i>	Wet heath	D
Marsh Gentian	<i>Gentiana pneumonanthe</i>	Wet heath	B
Wood Barley	<i>Hordelymus europaeus</i>	Woodland	B
Coral Necklace	<i>Illecebrum verticillatum</i>	Dunes	B
Baltic Rush	<i>Juncus balticus</i>	Dune slacks	D
Fen Orchid	<i>Liparis loeslii</i>	Dune slacks	B
Floating-leaved Water Plantain	<i>Luronium natans</i>	Canals	A
Tufted Loosetrife	<i>Lysimachia thyrsiflora</i>	Marshes	B
White horehound	<i>Marrubium vulgare</i>	Open habitats	B
Whorled Water Milfoil	<i>Myriophyllum verticillatum</i>	Ponds, canals	B
Fringed Water-lily	<i>Nymphoides peltata</i>	Canals	B
Green-winged Orchid	<i>Orchis morio</i>	Meadows	D
Royal Fern	<i>Osmunda regalis</i>	Damp woods, mossland	D
Grass of Parnassus	<i>Parnassia palustris</i>	Damp dune slacks	D
Ray's knotgrass	<i>Polygonum oxyspermum</i>	Soft cliffs	C

Common name	Latin name	Primary habitat in urban Mersey Basin N.A.	Reasons for selection
Grass-wrack Pondweed	<i>Potamogeton compressus</i>	Canals	B
American Pondweed	<i>Potamogeton epihydrus</i>	Canals	D
Various-leaved Pondweed	<i>Potamogeton gramineus</i>	Dune wetland	D
Long-stalked Pondweed +	<i>Potamogeton praelongus</i>	Canals	D
Hair-like Pondweed	<i>Potamogeton trichoides</i>	Canals	B
Fumaria purpurea	<i>Purple Ramping Fumitory</i>	Arable land, open habitats	B
Round-leaved Wintergreen	<i>Pyrola rotundifolia ssp. maritima</i>	Damp dune slacks	B
Greater Yellow-rattle	<i>Rhinanthus angustifolius</i>	Dry grassland	B
Sharp -flowered Clubrush ++	<i>Schoenoplectus pungens</i>	Dune slacks	B
Spanish Catchfly	<i>Silene otites</i>	Dune heath	B
Water Soldier	<i>Stratiotes aloides</i>	Canals, ponds	A
Cranberry	<i>Vaccinium oxycoccus</i>	Wet mossland	D
White Mullein	<i>Verbascum lychnitis</i>	Dry, open habitats	B
Twiggy Mullein	<i>Verbascum virgatum</i>	Dry, open habitats	B
Dune Fescue	<i>Vulpia fasciculata</i>	Dunes	B
Flowerless Plants			
Moss	<i>Amblyodon dealbatus</i>	Dune slacks	B
	<i>Brachythecium mildeanum</i>	Dune slacks	B
Moss	<i>Bryum knowltonii</i>	Dune slacks	B
Moss	<i>Bryum neodamense</i>	Dune slacks	B
Moss	<i>Bryum pallescens</i>	Dune slacks	B
Liverwort	<i>Calypogeia integristipula</i>	Heathland	B
Moss	<i>Campylium elodes</i>	Dune slacks	B
Stonewort	<i>Chara aspera var. curta</i>	Freshwater	B
Moss	<i>Dicranum polysetum</i>	Heathland	B
Moss	<i>Distichium inclinatum</i>	Dune slacks	B
Moss	<i>Drepanocladus lycopodioides</i>	Dune & heath pools	B
Moss	<i>Drepanocladus sendtneri</i>	Dune pools	B

Common name	Latin name	Primary habitat in urban Mersey Basin N.A.	Reasons for selection
Variigated Horsetail	<i>Equisetum variegatum</i>	Dune slacks	B
Mackays Horsetail	<i>Equisetum x trachyodon</i>	Dune slacks	B
Moss	<i>Meesia uliginosa</i>	Dune slacks	B
Petalwort (a liverwort)	<i>Petalophyllum ralfsii</i>	Dune slacks	A
Bog mosses	<i>Sphagnum spp.</i>	Wet mossland	D
Moss	<i>Tortula freibergii</i>	Sandstone outcrops	B



Ruddy darter

Appendix 2 - Major international obligations, legislation and references on species conservation

The "Bern" Convention on the Conservation of European Wildlife and Natural Habitats imposes obligations to conserve plants and animals with emphasis on endangered and vulnerable species and their habitats.

(The provisions of this Convention underlie the EC Habitats Directive).

EC Council Directive on the Conservation of Wild Birds - the Birds Directive (79/409/EEC) provides for the protection of all naturally-occurring wild birds in the European territory of member states and requires member states to take measures to preserve a sufficient diversity of habitats for all species of naturally-occurring wild birds to maintain their populations at ecologically sound levels and to conserve the habitats of specific rare and migratory species.

EC Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora - the Habitats and Species Directive (92/43/EEC) requires member states to take measures to maintain or restore natural habitats and wild species to favourable conservation status in the Community. Sites to be designated as Special Areas of Conservation require agreement by the EC Commission by June 1998.

The "Ramsar" Convention on Wetlands of International Importance especially as Waterfowl Habitat requires the protection of wetlands of international importance, to promote wetlands generally and to foster their wise use.

The "Bonn" Convention on the conservation of Migratory Species of Wild Animals requires the protection of listed endangered migratory species and encourages separate international agreements to cover them. Bird and Bat species are among those included to date.

In the UK the most relevant legislation is the **Wildlife and Countryside Act (1981)** with subsequent amendments. This lists species of plants, birds and other animals afforded special protection. The lists are amended from time to time to reflect new knowledge of the status of species and new international obligations for their protection.

All of the above have been taken into consideration in the **UK Biodiversity Action Plan** and the **UK Steering Group Report** which presents three lists of species requiring action in the UK. These lists are also informed by listings in **Red Data Books** which are compiled by authoritative bodies for individual groups of plants or animals. Red Data listings adopt categories such as Nationally Rare or Nationally Scarce - (the category nomenclature varies to some extent between different groups of organisms) to indicate degrees of threat. These take account of geographic range and, where known, species population size.



Kingfisher

Appendix 3 - Geological feature and vegetation classifications in the Urban Mersey Basin Natural Area

Geological features of major significance in the Urban Mersey Basin Natural Area as classified in the Geological Conservation Review

*Category	Feature Classification	Representation
GCR 1C GCR 11B	Active Process Sites: coastal Permo - Trias stratigraphy	Dunes and soft cliffs
GCR 10E	Sections, cuttings, outcrops Carboniferous stratig.: Westphalian Coal measures exposures	
GCR 15P	Quaternary stratigraphy: sea level	Dune systems, cliffs

* A publication of the Joint Nature Conservation Committee which summarises the current state of knowledge of key earth science sites in Britain.

The plant communities of semi-natural habitats in the Urban Mersey Basin Natural Area categorised according to the National Vegetation Classification

The National Vegetation Classification is based on detailed analyses of a large number of standardised vegetation samples from all parts of Britain. It gives descriptive accounts of the features and occurrence of each community-type in relation to climate, topography, substrate and management.

Full details are given in RODWELL, J.S. 1991-1995. *British Plant Communities Vols 1-4* Cambridge (Volume 5 in press).

Habitat	NVC communities represented
Saltmarshes and associated habitats	SM6 <i>Spartina anglica</i> saltmarsh
	SM7 <i>Arthrocnemum perenne</i> community
	SM8 Annual <i>Salicornia</i> saltmarsh
	SM9 <i>Suaeda maritima</i> saltmarsh
	SM10 Transitional low marsh vegetation
	SM11 <i>Aster tripolium</i> var. <i>discoideum</i> saltmarsh
	SM12 <i>Aster tripolium</i> (rayed) on saltmarsh
	SM13 <i>Puccinellia maritima</i> saltmarsh
	SM14 <i>Halimione portulacoides</i> saltmarsh
	SM15 <i>Juncus maritimus</i> - <i>Triglochin maritima</i> saltmarsh
	SM16 <i>Festuca rubra</i> saltmarsh
	SM18 <i>Juncus maritimus</i> saltmarsh
	SM19 <i>Blysmus rufus</i> saltmarsh

Habitat	NVC communities represented	
	SM20	<i>Eleocharis unigulumis</i> saltmarsh
	SM21	<i>Suaeda vera</i> - <i>Limonium binervosum</i> saltmarsh
	SM23	<i>Spergularia marina</i> - <i>Puccinellia distans</i> saltmarsh
	SM24	<i>Elymus pycnanthus</i> saltmarsh
	SM25	<i>Suaeda vera</i> saltmarsh
	SM28	<i>Elymus repens</i> saltmarsh
	SD2	<i>Honkenya peploides</i> - <i>Cakile maritima</i> strandline
	SD3	<i>Matricaria maritima</i> - <i>Galium aparine</i> strandline
	SD4	<i>Elymus farctus</i> ssp. <i>boreali-atlanticus</i> foredune
	S4	<i>Phragmites australis</i> swamp and reedbeds
	S12	<i>Typha latifolia</i> swamp
	S26	<i>Phragmites australis</i> - <i>Urtica dioica</i> tall-herb fen
Coastal Dune Systems, including open dune, dune grasslands, dune slack, dune scrub, dune heath and soft cliffs	SD2	<i>Honkenya peploides</i> - <i>Cakile maritima</i> strandline
	SD3	<i>Matricaria maritima</i> - <i>Galium aparine</i> strandline
	SD4	<i>Elymus farctus</i> ssp. <i>boreali-atlanticus</i> foredune
	SD5a,b.	<i>Leymus arenarius</i> mobile dune community
	SD6a-g	<i>Ammophila arenaria</i> mobile dune community
	SD7a-d	<i>Ammophila arenaria</i> - <i>Festuca rubra</i> semi-fixed dune community
	SD8,*a	<i>Festuca rubra</i> - <i>Galium verum</i> fixed dune grassland
	SD9a,b	<i>Ammophila arenaria</i> - <i>Arrhenathrum elatius</i> dune gld.
	SD10a,b	<i>Carex arenaria</i> dune community
	SD11	<i>Carex arenaria</i> - <i>Cornicularia aculeata</i> dune com.
	SD12	<i>Carex arenaria</i> - <i>Festuca ovina</i> - <i>Agrostis capillaris</i> dune grassland
	SD13	<i>Salix repens</i> - <i>Bryum pseudotriquetrum</i>

Habitat	NVC communities represented
	dune-slack community
SD14	<i>Salix repens-Campylium stellatum</i> dune slack community
SD15a,d	<i>Salix repens-Calligeron cuspidatum</i> dune-slack community
SD16b,d	<i>Salix repens-Holcus lanatus</i> dune-slack com.
SD17	<i>Potentilla anserina-Carex nigra</i> dune-slack community
SD18b	<i>Hippophae rhamnoides</i> dune scrub
MC6	<i>Atriplex hastata-Beta vulgaris</i> sea bird cliff community
H11	<i>Calluna vulgaris-Carex arenaria</i> heath
U2a	<i>Deschampsia flexuosa</i> grassland
U4a	<i>Festuca ovina-Agrostis capillaris-Galium saxatile</i> grassland
U5a,b	<i>Nardus stricta-Galium saxatile</i> grassland
MG1	<i>Arrhenathrum elatius</i> grassland
MG6	<i>Lolium perenne-Cynosurus cristatus</i> grassland
MG7	<i>Lolium perenne</i> leys and related grasslands
MG12a	<i>Festuca arundinacea</i> grassland
S4	<i>Phragmites australis</i> swamp and reedbeds
Lowland heath	
H8	<i>Calluna vulgaris-Ulex gallii</i> heath
H9	<i>Calluna vulgaris-Deschampsia flexuosa</i> heath
M16	<i>Erica tetralix-Sphagnum compactum</i> wet heath
M25	<i>Molinia caerulea-Potentilla erecta</i> mire
W16	<i>Quercus spp.-Betula spp. Deschampsia flexuosa</i> woodland
Peat mossland	
M2	<i>Sphagnum cuspidatum/recurvum</i> bog pool community
M3	<i>Eriophorum angustifolium</i> bog pool community
M16	<i>Erica tetralix-Sphagnum compactum</i> wet heath

Habitat	NVC communities represented	
	M20	<i>Eriophorum vaginatum</i> blanket and raised mire
	M25	<i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire
	W4	<i>Betula pubescens</i> - <i>Molinia caerulea</i> woodland
	S4	<i>Phragmites australis</i> swamp and reedbeds
	S10	<i>Equisetum fluviatile</i> swamp
Unimproved and semi-improved lowland grassland	MG1a,b,e	<i>Arrhenathrum elatius</i> grassland
	MG5a	<i>Cynosurus cristatus</i> - <i>Centaurea nigra</i> grassland
	MG9	<i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> g/land
	MG10	<i>Holcus lanatus</i> - <i>Juncus effusus</i> rush pasture
	MG 11	<i>Festuca rubra</i> - <i>Agrostis stolonifera</i> - <i>Potentilla anserina</i> grassland
	MG13	<i>Agrostis stolonifera</i> - <i>Alopecurus geniculatus</i> grassland
	M23	<i>Juncus effusus</i> / <i>acutiflorus</i> rush pasture
	U1	<i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Rumex acetosella</i> grassland
	U2	<i>Deschampsia flexuosa</i> grassland
	U4b	<i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland
Ancient semi-natural woodland	W6b,d	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland
	W7a-c	<i>Alnus glutinosa</i> - <i>Fraxinus excelsior</i> - <i>Lysimachia nemorum</i> woodland
	W8c-f	<i>Fraxinus excelsior</i> - <i>Acer campestre</i> - <i>Mercurialis perennis</i> woodland
	W9a	<i>Fraxinus excelsior</i> - <i>Sorbus aucuparia</i> - <i>Mercurialis perennis</i> woodland
	W10a,c,e	<i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland
	W16a,b	<i>Quercus</i> spp.- <i>Betula</i> spp.- <i>Deschampsia flexuosa</i> woodland
Open water, canal, swamp and fen	A2	<i>Lemna minor</i> community
	A9	<i>Potamogeton natans</i> community
	A12	<i>Potamogeton pectinatus</i> community

Habitat

NVC communities represented

A16	<i>Callitriche stagnalis</i> community
S4	<i>Phragmites australis</i> swamp and reedbeds
S5	<i>Glyceria maxima</i> swamp
S10	<i>Equisetum fluviatile</i> swamp
S12	<i>Typha latifolia</i> swamp
S13	<i>Typha angustifolia</i> swamp
S14	<i>Sparganium erectum</i> swamp
S19	<i>Eleocharis lacustris</i> swamp
S20	<i>Scirpus lacustris</i> ssp. <i>tabernaemontani</i> swamp
S21	<i>Scirpus maritimus</i> swamp
S22	<i>Glyceria fluitans</i> water margin vegetation
S26	<i>Phragmites australis-Urtica dioica</i> tall-herb fen
S28	<i>Phalaris arundinacea</i> tall herb fen
W6	<i>Alnus glutinosa-Urtica dioica</i> woodland



Alder

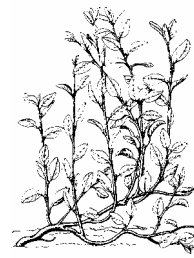
Appendix 4 - Scientific names of species mentioned in the text

Name used in text	Scientific name
Adderstongue fern	<i>Ophioglossum vulgatum</i>
Alder	<i>Alnus glutinosa</i>
American Pondweed	<i>Potamogeton epihydrus</i>
Ash	<i>Fraxinus excelsior</i>
Badger	<i>Meles meles</i>
Balsam poplar	<i>Populus trichocarpa</i>
Banded Demoiselle dragonfly	<i>Calopteryx splendens</i>
Bar-tailed Godwit	<i>Limosa lapponica</i>
Barn Owl	<i>Tyto alba</i>
Beech	<i>Fagus sylvatica</i>
Bewicks Swan	<i>Cygnus columbianus</i>
Bilberry	<i>Vaccinium myrtillus</i>
Birch	<i>Betula spp.</i>
Bittern	<i>Botaurus stellaris</i>
Black Darter dragonfly	<i>Sympetrum danae</i>
Black Knapweed	<i>Centaurea nigra</i>
Black Poplar	<i>Populus nigra ssp. betulifolia</i>
Black Redstart	<i>Phoenicurus ochruros</i>
Black-necked Grebe	<i>Podiceps nigricollis</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Bog Mosses	<i>Sphagnum spp.</i>
Bog Myrtle	<i>Myrica gale</i>
Bracken	<i>Pteridium aquilinum</i>
Bramble	<i>Rubus fruticosus</i>
Bristly Oxtongue	<i>Picris echioides</i>
Broad Buckler Fern	<i>Dryopteris dilatata</i>
Brown Hare	<i>Lepus europaeus</i>
Canada Goose	<i>Branta canadensis</i>
Canadian Fleabane	<i>Erigeron acer</i>
Carline Thistle	<i>Carlina vulgaris</i>
Clovers	<i>Trifolium spp.</i>
Common Centaury	<i>Centaurium erythraea</i>
Common Cord Grass	<i>Spartina anglica</i>
Common Saltmarsh Grass	<i>Puccinellia maritima</i>
Common Toadflax	<i>Linaria vulgaris</i>
Coot	<i>Fulica atra</i>
Corn Bunting	<i>Melospiza calandra</i>
Corsican pine	<i>Pinus nigra var. maritima</i>



Badger

Name used in text	Scientific name
Cotton grasses	<i>Eriophorum spp.</i>
Cranberry	<i>Vaccinium oxycoccos</i>
Creeping Bent Grass	<i>Agrostis stolonifera</i>
Creeping Buttercup	<i>Ranunculus repens</i>
Creeping Soft Grass	<i>Holcus mollis</i>
Creeping Willow	<i>Salix repens</i>
Cross-leaved Heath	<i>Erica tetralix</i>
Curlew	<i>Numenius arquata</i>
Devils-bit Scabious	<i>Succisa pratensis</i>
Dipper	<i>Cinclus cinclus</i>
Dogs Mercury	<i>Mercurialis perennis</i>
Dune Helleborine	<i>Epipactis leptochila var dunensis</i>
Dunlin	<i>Calidris alpina</i>
Dyers Greenweed	<i>Genista tinctoria</i>
European Larch	<i>Larix decidua</i>
Fallow Deer	<i>Dama dama</i>
Floating-leaved Water Plantain	<i>Luronium natans</i>
Fox	<i>Vulpes vulpes</i>
Freshwater Sponge	<i>Spongilla lacustris</i>
Fringed Water Lily	<i>Nymphoides peltata</i>
Garganey	<i>Anas querquedula</i>
Glasswort	<i>Salicornia sp.</i>
Gorse	<i>Ulex europaeus</i>
grass-wrack Pondweed	<i>Potamogeton compressus</i>
Grasshopper Warbler	<i>Locustella naevia</i>
Great Burnet	<i>Sanguisorba officinalis</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Great Crested Newt	<i>Triturus cristatus</i>
Great Willow Herb	<i>Epilobium hirsutum</i>
Greater Birds-foot Trefoil	<i>Lotus pedunculatus</i>
Green-winged Orchid	<i>Orchis morio</i>
Grey Hair-grass	<i>Corynephorus canescens</i>
Grey Partridge	<i>Perdix perdix</i>
Grey Plover	<i>Pluvialis squatarola</i>
Grey Wagtail	<i>Motacilla cinerea</i>
Hair-like Pondweed	<i>Potamogeton trichoides</i>
Harts- tongue Fern	<i>Phyllitis scolopendrium</i>
Heather	<i>Calluna vulgaris</i>
Himalayan Balsam	<i>Impatiens glandulifera</i>
Kidney vetch	<i>Anthyllis vulneraria</i>
Kingfisher	<i>Alcedo atthis</i>
Knot	<i>Calidris canutus</i>
Ladies Smock.	<i>Cardamine pratensis</i>



Creeping willow

Name used in text	Scientific name
Lapwing	<i>Vanellus vanellus</i>
Little Grebe	<i>Podiceps ruficollis</i>
Little Ringed Plover	<i>Charadrius dubius</i>
Long-stalked Pondweed	<i>Potamogeton praelongus</i>
Lupin	<i>Lupinus spp.</i>
Mallard	<i>Anas platyrhynchos</i>
Manchester Poplar	<i>Populus nigra</i>
Marram Grass	<i>Ammophila arenaria</i>
Marsh Andromeda	<i>Andromeda polifolia</i>
Marsh Foxtail	<i>Alopecurus geniculatus</i>
Marsh Gentian	<i>Gentians pneumonanthe</i>
Marsh Helleborine	<i>Epipactis palustris</i>
Marsh Orchids	<i>Dactylorhiza spp.</i>
Marsh Thistle	<i>Cirsium palustre</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Meadow Pipit	<i>Anthus pratensis</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
Moorhen	<i>Gallinula chloropus</i>
Mute Swan	<i>Cygnus olor</i>
Natterjack Toad	<i>Bufo calamita</i>
Nightjar	<i>Caprimulgus europaeus</i>
Oystercatcher	<i>Haematopus ostrlegus</i>
Pedunculate Oak	<i>Quercus robur</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Petalwort	<i>Petalophyllum ralfsii</i>
Pied Wagtail	<i>Motacilla alba</i>
Pink-footed Goose	<i>Anser brachyrhynchus</i>
Pintail	<i>Anas acuta</i>
Purging Flax	<i>Linum catharticum</i>
Purple Moor Grass	<i>Molinia caerulea</i>
Pyramidal Orchid	<i>Anacamptis pyramidalis</i>
Ragged Robin	<i>Lychnis flos-cuculi</i>
Ramsons	<i>Allium ursinum</i>
Red Campion	<i>Silene dioica</i>
Red Fescue	<i>Festuca rubra</i>
Red Squirrel	<i>Sciurus vulgaris</i>
Redshank	<i>Tringa totanus</i>
Reed Bunting	<i>Emberiza scheniculus</i>
Reed Warbler	<i>Acrocephalus scirpaceus</i>
Rhododendron	<i>Rhododendron ponticum</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Ringed plover	<i>Charadrius hiaticula</i>
Round-leaved Wintergreen	<i>Pyrola rotundifolia ssp. maritima</i>



Marsh gentian



Meadow pipits

Name used in text	Scientific name
Ruddy Duck	<i>Oxyura jamaicensis</i>
Sand Lizard	<i>Lacerta agilis</i>
Sand Martin	<i>Riparia riparia</i>
Sand Sedge	<i>Carex arenaria</i>
Sanderling	<i>Calidris alba</i>
Sea Buckthorn	<i>Hippophae rhamnoides</i>
Sea Couch Grass	<i>Elymus farctus</i>
Sea Lyme Grass	<i>Lymus arenarius</i>
Seaside Centaury	<i>Centaureum littorale</i>
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>
Sessile Oak	<i>Quercus petraea</i>
Sharp Club-rush	<i>Schoenoplectus pungens</i>
Shelduck	<i>Tadorna tadorna</i>
Short-eared Owl	<i>Asio flammeus</i>
Shoveler	<i>Anas clypeata</i>
Silver-studded Blue	<i>Plebeius argus</i>
Skylark	<i>Alauda arvensis</i>
Sneezewort	<i>Achillea ptarmica</i>
Snipe	<i>Gallinago gallinago</i>
Soft Rush	<i>Juncus effusus</i>
Spanish Catchfly	<i>Silene otites</i>
Spiked Sedge.	<i>Carex spicata</i>
Stinging Nettle	<i>Urtica dioica</i>
Sundews	<i>Drosera spp.</i>
Sweet Chestnut	<i>Castanea sativa</i>
Sycamore	<i>Acer pseudoplatanus</i>
Teal	<i>Anas crecca</i>
Thin-spiked Wood Sedge	<i>Carex strigosa</i>
Tufted Duck	<i>Aythya fuligula</i>
Tufted Hair Grass	<i>Deschampsia cespitosa</i>
Turnstone	<i>Arenaria interpres</i>
Variiegated Horsetail	<i>Equisetum variegatum</i>
Vetches	<i>Vicia spp.</i>
Water soldier	<i>Stratiotes aloides</i>
Wavy Hair Grass	<i>Deschampsia flexuosa</i>
Western Gorse	<i>Ulex gallii</i>
Whitethroat	<i>Sylvia communis</i>
Whorled Water Milfoil.	<i>Myriophyllum verticillatum</i>
Wigeon	<i>Anas penelope</i>
Wood Barley	<i>Hordelymus europaeus</i>
Wood Fescue	<i>Festuca altissima</i>
Wych Elm	<i>Ulmus glabra</i>
Yarrow	<i>Achillea millefolium</i>

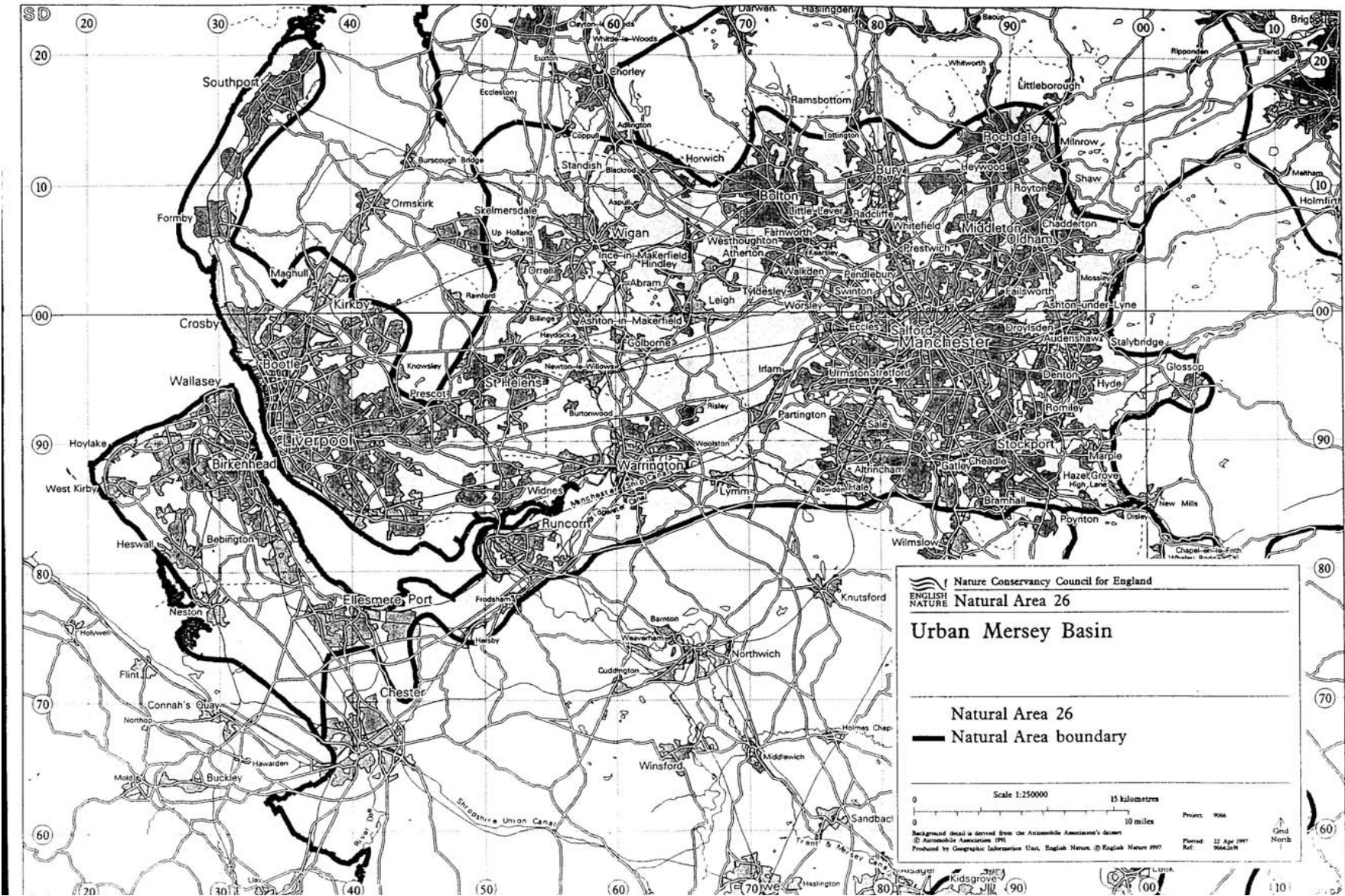


Sand sedge

Name used in text	Scientific name
Yellow Archangel	<i>Lamiastrum galeobdolon</i>
Yellow Flag	<i>Iris pseudacorus</i>
Yellow Rattle	<i>Rhinanthus minor</i>
Yellow Wagtail	<i>Motacilla flava</i>
Yellow Wort	<i>Blackstonia perfoliata</i>
Yorkshire Fog	<i>Holcus lanatus</i>



Yellow flag



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