Somerset Levels and Moors Natural Area

A nature conservation profile

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English Nature (Somerset Team)
Roughmoor
Bishop's Hull
TAUNTON
Somerset TA1 5AA

Foreword

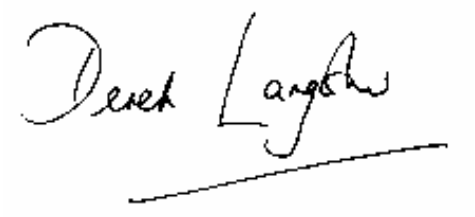
One of the key components of English Nature's *Strategy for the 1990s* has been the Natural Areas approach. We examined the local distinctiveness of each part of England, to identify their characteristic wildlife and natural features, and used this to define a comprehensive series of Natural Areas. Their 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 or 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.



Dr Derek Langslow
Chief Executive

Somerset Levels and Moors Natural Area

A vision for the future

Looking ahead to the next century, what do we want the natural world of the Somerset Levels and Moors to be like?

Our vision is of a thriving landscape, with a wide range of wetland habitats restored to good health, extended and linked together wherever possible.

The first priority must be to bring all the remaining patches of high wildlife and geological interest in the Natural Area into management sympathetic to nature conservation. Such management will provide for the survival of both the common and rare species dependent on these habitats.

If we achieve this we will have gone a long way towards conserving the biodiversity of the Natural Area. However, a strategy based only on "islands" of habitat in a sterile landscape would be doomed to failure in the long term. We must ensure the whole landscape is ecologically sustainable.

Our vision must go further than just retaining what we have now - we must seek some reversal of the recent losses or declines in habitat quality and quantity. For example, species-poor grassland can be restored to species-rich fen meadow or flood pasture through extensive farming practices. The decline in our population of breeding waders can be reversed by the use of raised water tables during spring and early summer.

Where habitats are now in poor condition, we must seek their restoration. Our remnant raised bogs and fens can be restored by appropriate vegetation and water level management. Some of the canalized main rivers provide opportunities to restore rich riverside habitats of greater wildlife value.

The management of water is a key element in the overall health of the wetlands of the Somerset Levels and Moors. Our vision involves the more sensitive management of water levels to meet the needs of the many interests in the Natural Area. Whilst avoiding prolonged and deep flooding, our vision seeks winter and spring splash conditions on the inland Moors, providing habitat for overwintering waterfowl from north west Europe. Channels would no longer run low during the winter months but would be held higher to sustain the important populations of fish, aquatic invertebrates and plants. Summer water supplies would be clean and plentiful, sufficient to water stock and for wet fences, to sustain the health of the peat soils and the rich wildlife interest of the rhynes and ditches, meadows and pastures.

To achieve this vision means ensuring that man's use of the landscape as a whole works with the natural features of the wetlands, not against them. We must learn to adopt the key principle of the "wise use" of our wetland heritage, as set out in the Ramsar Convention. The Natural Area must continue to be managed by people. Farming must remain practical and profitable, and local communities encouraged to take pride in and care for their environment.

Farmers and others whose decisions influence land use and management in the Natural Area need reliable information on the natural environment, so that conflict can be minimized and

opportunities for enhancement taken. We must ensure that such opportunities are compatible with other conservation interests, such as archaeology, and that a reasonable balance is struck with activities which may, at times, conflict with nature conservation, such as recreation and mineral extraction.

The final part of our vision for the future is that all the people of the Somerset Levels and Moors, residents and visitors alike, come to appreciate, understand and value the natural world within it. If this happens, the support for conservation will ensure our environment can sustain us, and continues to enrich our quality of life.

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1. Introduction

1.1 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 Natural Areas provide an improved framework for securing public support for wildlife and geological conservation, and greatly improve our ability to work together with others to deliver effective action.

A Natural Area is not a designation, but an area of countryside identified by its unique combination of physical attributes, wildlife, land use and culture. These features give a Natural Area a "sense of place" and a distinctive nature conservation character which we can seek to sustain. The concept relies upon wide participation, and enables us to "think globally, act locally".

Through Natural Areas we hope not only to set the context for special sites such as nature reserves and Sites of Special Scientific Interest (SSSIs), but just as importantly to promote action to conserve wildlife and geological features throughout the countryside. We hope to interest people in looking after plants and animals wherever they may be, including those that are still commonplace as well as those that are rare.

Overall, England and the seas around it have been divided up into some 126 Natural Areas: one of these is the Somerset Levels and Moors.

Major land uses in Somerset Levels and Moors Natural Area

Livestock farming (dairy, beef cattle and sheep)
Peat extraction
Arable farming
Withy beds and orchards
Urban development
Tourism and recreation
Floodwater storage
Nature Reserves

1.2 The rôle of this profile

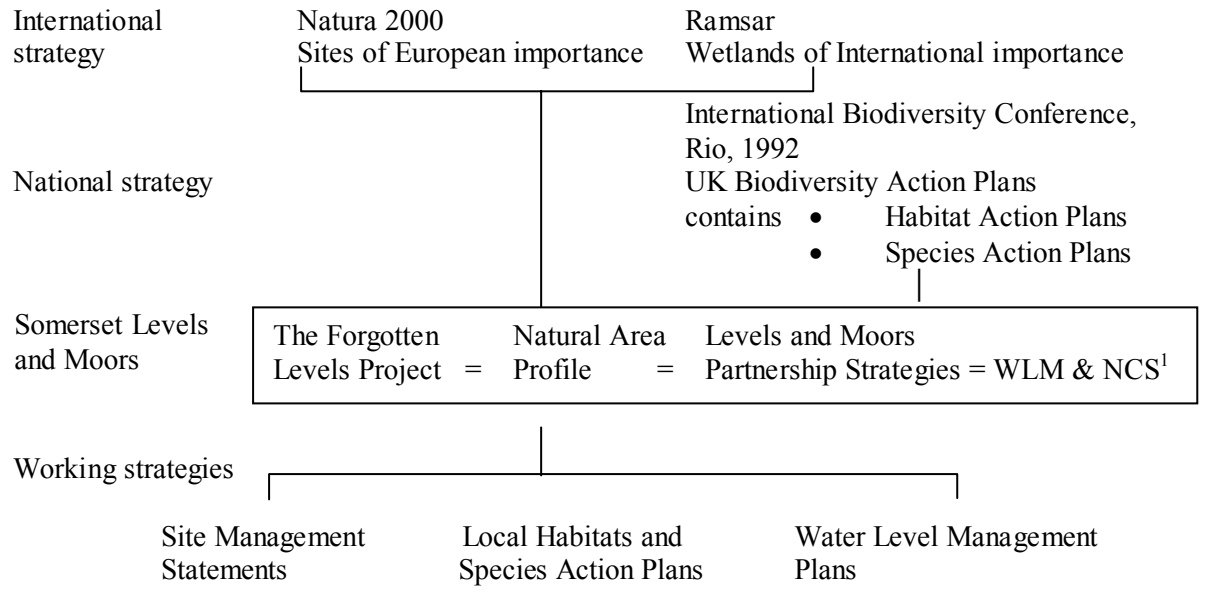
This profile is designed to describe and evaluate the wildlife and geological features of the Somerset Levels and Moors Natural Area, and to identify the priorities for conservation action. Important habitats, species and physical features within the Natural Area are identified and described, and objectives set for their conservation.

This profile is not just written for conservation agencies, but for everyone with an interest in conservation in and around the Somerset Levels and Moors. Hopefully it will serve to pull conservation bodies and local people closer together, towards the achievement of shared objectives that address the top priorities for conservation in the Natural Area.

This document is fully consistent with recent UK thinking on the conservation of biodiversity, a process initiated in Rio in 1992 when the Prime Minister, together with over 150 world leaders, signed the Biodiversity Convention. In particular, the profile draws heavily on *Biodiversity: The UK Steering Group report*, a December 1995 report to Government which develops several of the prime objectives laid out in *Biodiversity: The UK Action Plan* (1994). The Steering Group report includes lists of species of conservation concern within the UK, as well as costed action plans for some 14 key habitats and 116 key species. It also covers the production of Local Biodiversity Action Plans, seen as the means of implementing the UK plans at the local level. The Steering Group report has been fully endorsed by Government (May 1996).

In addition to the UK Biodiversity Action Plan, a number of other strategies, statutory plans and initiatives exist at the international, national and local level which have a direct influence on our conservation efforts. The relationship between this Profile and some of these other initiatives are illustrated in the box below.

Somerset Levels and Moors Natural Area Profile - context



[1] Water level management and nature conservation strategy - Environment Agency

1.3 The Natural Area boundary

The boundary of the Somerset Levels and Moors Natural Area is essentially defined by the 10 metre contour above sea level. Once part of the Severn Estuary it now includes the largest area of lowland wet grassland and natural floodplain remaining in England. It is an area of outstanding importance for our wetland heritage.

The Natural Area extends from Ilchester and Kingsbury Episcopi in south Somerset to Clevedon in north Somerset. From the coast of the Severn Estuary it reaches inland to Nailsea, Congresbury, Glastonbury and Langport (Map 1).

The Somerset Levels and Moors lie in the floodplains of eight major rivers or drains, the Kenn, Yeo, Axe, Brue, Huntspill, King's Sedgemoor Drain, Parrett and Tone (Map 2). The catchment of these rivers is approximately four times the area of the Levels and Moors. At times of high rainfall this can result in large volumes of water moving through the Levels and Moors on their way to the Severn Estuary. The adjacent Natural Areas, therefore, exert a considerable influence on the Somerset Levels and Moors.

The Levels and Moors Natural Area is enclosed by the Quantocks to the south west, the Mid Somerset Hills and Mendips to the east and the Avon Ridges and Valleys to the north. The Severn Estuary forms the western boundary of the Natural Area.

The foreshore and mudflats in Bridgwater Bay and the Severn Estuary lie outside the Natural Area, and are described in the Minehead to Brean Down Natural Area Profile. The grazing marshes on Pawlett Hams and around Stolford and Steart fall within the Somerset Levels and Moors Natural Area.

The Natural Area includes all the Somerset Levels and Moors Environmentally Sensitive Area, and the Peat Production Zones lying to the west of Glastonbury.

The Gordano Valley, which shares many striking similarities with the Somerset Levels and Moors, lies in the Severn Vale Natural Area, to the north-west of the Tickenham Ridge.

2. Geology and landscape

2.1 Underlying geological character

The Somerset Levels and Moors Natural Area is underlain by Triassic rocks which represent a period of mountainous desert conditions which existed around 240 million years ago. The most common of these rocks is the Mercia Mudstone (previously known as Keuper Marl) which is the product of the migration of desert dunes across the area. The Mercia Mudstone is a calcareous clay laid down in ephemeral lakes on the floor of the desert. The original floor of the desert between the Mendip Hills and the Polden Hills lies some 35 metres below the present land surface.

2.2 Surface deposits

Although the Mercia Mudstone forms a thick and extensive deposit, the special character of the Natural Area is given by the post-glacial accumulation of Quaternary alluvium, peats and marine clays which has created the low-lying fenland landscape during the last 10,000 years. The thick blanket of Quaternary deposits is up to 35 metres deep in places. It is only broken by the more resistant rocks, such as the Lias outlier at Brent Knoll, and Mercia Mudstone around Sedgemoor which forms ridges and knolls extending into or arising within the moor, such as Burrow Mump.

The origin of the Quaternary deposits lies in fluctuating climates and sea levels, with marine clays settling out at times of high sea level and peat formation during times of low sea level. Alluvial deposits have filled the extensive valley system, up to mean high water mark (about 6m above OD), but the depth of deposits vary across the Natural Area.

The deepest deposits lie some 7km inland, south west of Brent Knoll. Here the base of the succession lies some 30m below OD. A peat layer is usually found at 20m below OD, often associated with tree stumps in situ. Similar tree stumps are exposed from time to time at low tides along the coast. Radiocarbon dating show this basal peat to be about 8500 years old. As the sea level rose, the forest died and gave way to swamp, now represented by the basal peat, before being finally overwhelmed by the sea. In the thickest alluvial successions, the basal peat is usually followed by sands which are succeeded by intertidal, laminated grey silty clay and fine sand and, finally, up to about Ordnance Datum level, by grey clay or peaty clay representing saltmarsh.

Around the villages of Middlezoy and Kenn occur a series of shelly sands and gravels known as Burtle Beds, which are generally considered to represent littoral or sublittoral deposits formed during a period of high sea level. The fossils present in these beds include common and widely distributed temperate marine shells. Bones and teeth of Elephant, Rhinoceros, Aurochs and other mammals have also been found and are presumed to have been washed in from the surrounding land area. These Burtle Beds are considered to be geological features of national importance.

2.3 Peat

After the last ice age (c.10,000 years ago), the sea level rose and the valleys filled with a soft blue-grey marine clay, deposited in brackish water. The sea had receded from the Moors by 4300 BC and transition to freshwater occurred about 3500 BC. As freshwater accumulated on the almost level clay surface a reed swamp evolved, building up a coarse, loose textured peat varying in thickness between one and three metres. At times, possibly during drier conditions, the reedswamps were invaded by Alder, Birch and Willow, resulting in a layer of wood peat.

From about 2000 BC different vegetation developed in the Brue Valley to the north of the Polden Hills, in comparison to Sedgemoor and Kenn Moor. In the Brue Valley, Bog moss dominated the vegetation, forming a raised bog and a deposit of moss peat, gently domed and rising a metre or so above the surrounding land. The raised bog was totally dependent on rainfall for its water supply, drawing none from the ground water. The raised deposits, being sensitive to changes in climate, moved in dry periods towards vegetation types with abundant Ling, Cotton Grass and trees, producing a peat which is humified, chocolate brown in colour, colloidal, dense and cheese-like in texture. This is the highest grade of peat for fuel and as such was appreciated for many centuries by the local population. In periods of wetness the Bog Mosses grew quickly, giving rise to pale, unhumified fibrous peat of low density. The growth of the raised deposits ceased after a change in climate and a reduction in the annual rainfall in about 400 AD.

Elsewhere in the Natural Area, the raised deposits of peat did not grow so dramatically and the peat was colonized by Ling and Cotton Grass. Successive fluvial floods, and the occasional incursion of the sea, resulted in the modification of the surface peat so that Ling and Cotton Grass were replaced by species more characteristic of reedswamp, such as Reed Mace, Common Reed and Reed Sweet-grass. Sedgemoor appears to have been much wetter due to fluvial floods and the occasional incursion of the sea. This wet environment resulted in the formation of a series of peats with deposits of reed peat underlying sedge fen, fen carr and ultimately fen wood as the land level gradually rose and became drier.

2.4 Soils

The coastal Levels are dominated by soils of the Newchurch 2 association. These soils, deriving from estuarine clay, often exhibit early attempts at drainage in the form of ridge and furrow features.

The largest area of the inland peat moors comprises soils of the Altcar 1 association, in which deep deposits of peat may be overlain by a thin (up to c.230mm) cap of clay or humose clay. Marginal to the Altcar association are soils of the Midelney association in which the peats are overlain by clays approximately 230-760mm thick. Soils derived from the remnant raised bog in the Brue Valley are designated on the soil map as the Turbary Moor Complex. Where the peat deposit is less than 400mm thick and overlies silty clay, such as in parts of the valleys of the Rivers Brue and Axe, a soil known as the Downholland 1 association has formed.

Riverine clay soils of the Fladbury association occur most extensively in the Vale of Ilchester, the easterly extensions of Sedgemoor and the Brue Valley where rivers flow down to moorland level.

2.5 Landscape character

The Somerset Levels and Moors Natural Area is essentially formed from a submerged and reclaimed landscape. The geological scenery visible today is of an extensive area of low-lying flat farmland in a basin between the Tickenham Ridge to the north, the Blackdown Hills to the south west, and the Quantock Hills to the west. Dividing this basin are other ridges of higher ground such as the Mendip Hills and Polden Hills, and islands such as Brent Knoll, Glastonbury Tor and the Isle of Wedmore. At a more intimate scale in the flat landscape, we can find slightly higher ground which has encouraged many generations of human settlement such as the villages of Westhay, Middlezoy and Kenn.

Much of the inland basin, known as the Moors, lies 2-7 metres above Ordnance Datum (OD). It is separated from the Severn Estuary by the coastal Levels, a band of clay soils up to 8 km wide and some 5-10 metres above OD, lying along the coast between Bridgwater and Clevedon. High spring tides at Bridgwater may reach 5.6m OD and many coastal defences along the Severn Estuary have a height of 7-8.5m OD depending on which part of the coast they defend.

These landforms have created a special landscape. Dominated by the natural drainage basin, with many areas lying below the level of high tides, the Somerset Levels and Moors Natural Area has an inherent feeling of wetness. Elevated sea defences and river banks, wide drains and a network of wet rhynes and ditches, together with splashy fields and winter flooding, emphasize the importance of centuries of water control in creating the present landscape from a natural marshland.

2.6 Archaeological features

In Neolithic times people settled in this wetland, at least for part of the year. Evidence of their occupation and lines of communication are provided by many wooden trackways found preserved within the saturated peat. The Sweet Track, the oldest of these, has been dated to almost 6000 years old, and is believed to be the earliest man-made roadway discovered

anywhere in the world. The trackways were made of ash, oak, hazel and birch, sometimes of very robust cut timbers, or woven hurdles laid on the ground.

Later Iron Age lake villages have been discovered near Glastonbury and Meare. Again it is thought that the dwellers were nomadic folk moving down into the wetland during summer, when water levels were low. The practice gave rise to the name Sumersaeta - 'Land of the Summer People' from which Somerset gets its name.

The formation of peat in the Natural Area has had an important rôle in conserving both human artefacts and natural items, such as pollen and wood. As a result, the Brue Valley is considered to be of international significance, and one of the most important areas in prehistoric European archaeology. It has been intensively studied by the Somerset Levels Project based at the Universities of Cambridge and Exeter.

Key features of archaeological interest in the Brue Valley

(i) Timber Trackways: There are at least 30 separate trackways and structures dating from 4000 BC to 500 BC, including the Sweet Track which is believed to be the oldest man-made trackway in the world. The majority connect the higher ground, between Meare and Edington Burtle, with the Polden Hills to the south. A track running north from Westhay to Mudgeley also confirms the presence of these features north of Meare. Parts of Nidons Track, Meare Heath Track, Sweet Track and Honeygor Track are Scheduled Ancient Monuments.

(ii) The Lake Villages: Two Iron Age settlements (c700 BC - 50 AD) at Glastonbury and Meare are of European importance and are Scheduled Ancient Monuments. Both were partially excavated earlier this century and produced a wealth of material. Modern research could recover more information, especially at Meare, although recent work indicates that the site is drying out and deteriorating rapidly.

(iii) Romano-British 'Pottery Mounds': These occur at the boundary of the silt and peat areas west and north of Edington Burtle. They consist of low flat-topped mounds, up to 15 metres in diameter and 2 metres high, and are made of successive layers of debris from salt extraction and pottery-making in the 4th century. At least 50 of these mounds are known and three are Scheduled Ancient Monuments.

(iv) Duck decoys: At least seven lie within the area.

Other areas of the peat moors have not been so intensively studied. However, preliminary archaeological investigations of Sedgemoor confirms the presence of human artefacts, with dryland surface flints, pottery and wetland wooden objects indicating a prehistoric interest in this environment.

A further important element of peat is its ability to store environmental evidence in the form of pollen, macroscopic plant and insect remains. Organic materials allow the evidence to be dated, normally by radiocarbon dating and increasingly, where Oak is present, by dendrochronology. The palaeoenvironmental information contained in the peat forms an important part of the archaeological record, and gives us a unique insight into local changes in climate, land use and vegetation within the Somerset Levels and Moors during the last 10,000 years.

2.7 Key geological sites and features

The key geological features of the Somerset Levels and Moors Natural Area are:

- Quaternary glacial deposits
- Quaternary stratigraphy showing the sequence of marine clays and peat layers
- Archaeological artefacts and the influence of geology on settlement patterns
- Palaeoenvironmental records in the peat formed in the last 10,000 years

Within the Natural Area, key geological sites have been identified to illustrate these features. Four locations are considered to be nationally important in our understanding of Quaternary stratigraphy (Table 1). One of these locations, Greylake was designated as a Site of Special Scientific Interest in 1987, and the other locations are proposed for similar designation.

Temporary exposures at these locations have revealed deposits which provide information about the history of glaciation and environmental change in the area over the last 500,000 years.

Table 1 - Key geological sites in the Somerset Levels and Moors Natural Area

SSSI name:	**Interest**
Greylake	A reserve of the Marine Burtle Beds, which were formed during the high sea levels of the Ipswichian interglacial period.
GCR name:	**Interest**
Kenn Church) Kenn Pier) Yew Tree Farm)	Sediments from these sites provide evidence of early Pleistocene glaciation and record sea level fluctuations during subsequent interglacial cycles. The Kenn Church location also provides a unique opportunity within Britain to correlate freshwater and marine chronology during this period.

GCR is the Geological Conservation Review, a publication of geological sites and features considered to be of national importance to our earth science heritage.

2.8 Key geological management issues

- Lack of geological exposures in the important Quaternary deposits
- Protection and enhancement of key geological localities and "greenfield sites"
- Potential conflict between agriculture, peat extraction and the conservation of the peat deposit
- Water level management which conserves the surface and deep deposits of peat, its archaeological and palaeoenvironmental records

3. Key species for conservation attention

3.1 The selection of key species

The Somerset Levels and Moors Natural Area contains many species that are highly valued by wildlife conservation bodies and by the general public. Given the existing limitations on human and financial resources, we are unlikely to be able to focus conservation action on them all and, therefore must identify those that are priorities for action. The great majority of the remaining species will, however, be conserved by habitat conservation measures.

Selection criteria for key species

Key species for conservation attention in the Natural Area are drawn from:

1. *Species that are endemic to the UK and which have viable populations in the Somerset Levels and Moors Natural Area.*

2. *Species which are threatened on a global or European scale and which have significant populations in the Somerset Levels and Moors.*

3. *Species which are rapidly declining throughout Great Britain and which have a national stronghold in the Somerset Levels and Moors.*

4. *Species which are threatened in Great Britain, being listed in the relevant Red Data Book, and which are on the extreme edge of their normal range in the Somerset Levels and Moors.*

5. *Species which are highly characteristic of the Somerset Levels and Moors, being seldom found in such numbers elsewhere in England, and which are popular with the general public.*

Some account too has been taken of the desirability of ensuring that all the important taxa within the Natural Area are represented, and that the species selected are spread across the key habitats present.

The key species listed in Table 2 are described, in terms of their status and distribution, within the Key Species part of their primary habitat description (see 4.2.2 - 4.2.11).

A list of all the species which occur in the Natural Area and which are, according to the *Biodiversity UK Steering Group Report (1995),* either globally threatened or rapidly declining in the UK is given in Annex 1.

Key geological objectives for the Somerset Levels and Moors Natural Area:

1. Encourage the creation of permanent or temporary exposures in the Natural Area to increase opportunities for study of the underlying Quaternary stratigraphy.

2. Maintain the integrity of existing geological sites through:

- protection of existing geological exposures
- maintaining access to greenfield geological sites
- promoting links between geological, biological and archaeological conservation in the Natural Area.

3. Promote the importance of the peat deposits as an essential record of environmental change and archaeological artefacts relating to the colonization of the marshlands during the last 10,000 years.

Table 2 - Key species for conservation attention in the Somerset Levels and Moors Natural Area

Common name	Latin name	Reason for selection	Primary habitat	Secondary habitats
Cross-leaved Heath	*Erica tetralix*	Widespread in UK, very restricted in NA	Remnant raised bog and wet heath	
Marsh Pea	*Lathyrus palustris*	Restricted 'distribution' in UK. Two populations in NA (?)	Fens	Fen meadows
Green-winged orchid	*Orchis morio*	Declining in UK. Popular	Drier hay meadows	
Mousetail	*Myosurus minimus*	Declining in UK (?) single population in NA	Wet grassland	
Milk Parsley	*Peucedanum palustre*	Declining in UK (?)	Fens	Reedbed
Fen Pondweed	*Potamogeton coloratus*	Restricted distribution in UK	Rivers, rhynes and ditches	
Marsh Fern	*Thelypteris palustris*	Restricted distribution in UK. Two populations in NA (?)	Fens	
Greater water parsnip	*Sium latifolium*	Declining in the UK. Declined within the NA	Fen, Fen meadows and ditches	
Tasteless water pepper	*Persicaria laxiflora*	Declining in the UK. Small populations in the NA	Wet grassland and ditches	
Bog Moss	*Sphagnum spp*	Widespread in UK, very restricted in NA	Remnant raised bogs and wet heath	

Common name	Latin name	Reason for selection	Primary habitat	Secondary habitats
Marsh Fritillary	*Eurodryas aurinia*	Rapidly declining in UK. Single population in NA. Popular	Fen meadows	
White Admiral	*Ladoga camilla*	Restricted to southern England. Several populations in NA	Wet woodland	
Narrow bordered Bee Hawk-moth	*Hemaris tityus*	Rapidly declining in UK. Almost restricted to south west	Fen meadows	
Lesser Silver Diving beetle	*Hydrochara caraboides*	Very restricted in UK. Strongest population in NA	Rivers, rhynes and ditches	
Great Silver Diving beetle	*Hydrophilus piceus*	Restricted distribution in UK	Rivers, rhynes and ditches	
Leaf beetle	*Oulema erichsoni*	Only extant population of this species in Britain in the NA	Fen, peat cuttings	
Hairy click beetle	*Synaptus filiformis*	Confined as a British species to single population in NA	Rivers, rhynes and ditches	
Fen raft spider	*Dolomedes plantarius*	Restricted distribution in UK	Rhynes and ditches	Fen meadows and fens
Weevil	*Hylobius transversovittatus*	Only extant population of the species in Britain in the NA	Peat cuttings	
Weevil	*Bagous nodulosus*	Confined to Somerset as a British species	Ditches	
Hairy Dragonfly	*Brachytron pratense*	Restricted distribution in UK	Rivers, rhynes and ditches	
Variable Damselfly	*Coenagrion pulchellum*	Restricted distribution in UK	Rivers, rhynes and ditches	
A soldier fly	*Odontomyia ornata*	Restricted distribution in UK	Rivers, rhynes and ditches	
A snail	*Valvata macrostoma*	Restricted distribution in UK	Rivers, rhynes and ditches	
Large marsh grasshopper	*Stethophyma grossum*	Very rare and localized. May be extinct	Fens, wet heath	Rhyne and ditch banks
Bittern	*Botaurus stellaris*	Occasional winter visitor but extinct as breeding population	Reedbed	Open water
Mute Swan	*Cygnus olor*	Nationally important numbers breeding in NA. Popular	Wet grassland	Rivers, rhynes and ditches
Bewick's Swan	*Cygnus bewickii*	Internationally important numbers in the NA in winter	Wet grassland	Rivers, rhynes and ditches

Common name	Latin name	Reason for selection	Primary habitat	Secondary habitats
Wigeon	*Anas penelope*	Nationally important numbers in NA in winter	Wet grassland	Fen meadow Open water
Gadwall	*Anas strepera*	Nationally important numbers in NA in winter	Open water	Wet grassland
Teal	*Anas cracca*	Internationally important numbers in the NA in winter	Fen meadow	Wet grassland Open water
Garganey	*Anas querquedula*	Rare breeding summer visitor. Restricted in the NA	Open water	Wet grassland
Shoveler	*Anas clypeata*	Nationally important numbers in the NA in winter	Open water	Wet grassland
Pochard	*Aythya ferina*	Nationally important numbers in NA in winter	Open water	
Marsh Harrier	*Circus aeruginosus*	Rare breeder within NA	Reedbed	Fen meadow
Golden Plover	*Pluvialis apricaria*	Nationally important numbers in the NA in winter	Wet grassland	Fen meadows
Lapwing	*Vanellus vanellus*	Internationally important numbers in the NA in winter. Declined as a breeding species within NA	Wet grassland Fen meadows	
Snipe	*Galinago galinago*	Declined as a breeding species within NA	Fen meadow	Fens
Black-tailed Godwit	*Limosa limosa*	Extinct as breeding population	Fen meadow	Wet grassland
Whimbrel	*Numenius phaeopus*	Nationally important numbers of passage birds in NA	Fen meadow	Wet grassland
Curlew	*Numenius arquata*	Declined as a breeding species within NA	Fen meadow	
Redshank	*Tringo totanus*	Declined as a breeding species within NA	Fen meadow	Wet grassland
Barn Owl	*Tyto alba*	Declining as breeding species in NA. Popular	Fen meadow	Fens, reedbeds
Short-eared Owl	*Asio flammeus*	Important passage/wintering	Fen meadow	
Nightjar	*Caprimulgus europeaus*	Declined within the NA	Remnant raised bogs and wet heath	Wet woodland
Kingfisher	*Alcedo atthis*	Popular	Rivers, rhynes and ditches	Open water
Skylark	*Alanda arvensis*	Declining dramatically in the UK. Popular	Wet grassland and meadows	

Common name	Latin name	Reason for selection	Primary habitat	Secondary habitats
Whinchat	*Saxicola rubetra*	Declining within the NA	Fen meadow	
Yellow Wagtail	*Motacilla flava*	Declining breeding population in NA. Popular	Fen meadow	
Cetti's Warbler	*Cettia cetti*	Threatened in Great Britain. Popular. Population increasing within NA	Reedbed	
Bearded Tit	*Panurus biarmicus*	Rare breeder within NA	Reedbed	
Tree Sparrow	*Passer montanus*	Has declined in NA	Mature trees	
Otter	*Lutra lutra*	Globally threatened. Popular	Open water	Rivers, rhynes and ditches
Water Vole	*Arvicular terrestris*	Rapidly declining in UK. Popular	Rivers, rhynes and ditches	
Eel	*Anguilla anguilla*	Reported to be declining locally. Significant elver run in River Parrett	Rivers, rhynes and ditches	Open water
River Lamprey	*Lampetra fluviatilis*	Threatened in Europe	Rivers	

3.2 Extinct species

A number of species are thought to have become extinct as breeding populations from the Somerset Levels and Moors Natural Area this century (Table 3). The actual number of species is likely to be much higher than this but a lack of recording in the earlier part of the century, especially of invertebrate species, means that many extinctions will have occurred unnoticed. This highlights the need for better recording and for action to be taken to avoid further extinctions.

Table 3 - Examples of species thought to have become extinct within the Somerset Levels and Moors this century.

Common name	Latin name	Date last recorded	Primary habitats	Probable reasons for extinction as breeding population
Common Butterwort	*Pinguicula vulgaris*	1920s	Remnant raised bogs and wet heaths	Loss of habitat by peat extraction
Large Marsh Grasshopper	*Stethophyma grossum*	1990s	Remnant raised bogs and wet heaths	Loss of habitat by drainage and scrub development. May still be present but unrecorded
Swallowtail butterfly	*Papilio machaon 'britannicus'*	1900s	Fens, reedbeds	Loss of habitat
Bittern	*Botaurus stellaris*	1960s	Reedbed, swamp and open water	Loss of habitat extent, disturbance. Overwinters in small numbers, but does not breed in NA

Common name	Latin name	Date last recorded	Primary habitats	Probable reasons for extinction as breeding population
Black-tailed Godwit	Limosa limosa	1990s	Wet grassland Fen meadows	Loss of habitat quality (?) Overwinters in small numbers but does not breed in NA
Corncrake	Crex crex	1950s	Fen meadows	Loss of habitat quality
Spotted Crake	Porzana porzana	1930s	Fen meadows	Loss of habitat quality
Marsh Warbler	Acrocephalus palustris	1960s	Reedbeds, fens	Loss of habitat

4. Key wildlife habitats

4.1 Comparative importance and extent

In comparison with some Natural Areas, the Somerset Levels and Moors does not support a diverse range of habitats. However this is more than compensated for by the outstanding extent of its two primary habitats, lowland wet grassland and species-rich floodplain meadows and pastures.

The key wildlife habitats which occur in the Natural Area are set out in the box below, ranked according to current thinking as to their importance in international, national and regional contexts.

Key wildlife habitats within the Somerset Levels and Moors Natural Area

Habitats in bold are recognized as key habitats in the 1995 UK Steering Group report on Biodiversity

<u>International importance</u>

Species-poor wet grassland
Species-rich fen meadows and flood pastures
Rivers, rhynes and ditches (as part of coastal and floodplain grazing marsh)

<u>National importance</u>

Drier species-rich hay meadows (as unimproved neutral grassland)
Fen
Remnant raised bogs and wet heaths
Open water, swamp and **reedbed**

<u>Regional importance</u>

Wet woodland
Withy beds
Orchards

4.2 Habitat descriptions and specific conservation objectives

The background, characteristic wildlife, key species and, where known, extinct species of each habitat are described in the sections which follow. The representation of key habitats within the SSSIs of the Somerset Levels and Moors Natural Area is illustrated in Table 4.

The main factors currently affecting each habitat are also given, together with appropriate nature conservation objectives. These objectives, although hopefully realistic in the long term, are deliberately visionary and unconstrained. They are not intended to include targets as these will be included in the local Habitat and Species Action Plans. The objectives are amalgamated in Section 4.3, to give key goals for wildlife conservation in the Natural Area.

Annex 2 gives the main plant communities of each of the semi-natural habitats, classified according to the National Vegetation Classification. The Latin names of plants and animals referred to in the text are given in Annex 3. Details of the main features of the SSSIs in the Natural Area are given in Annex 4.

Table 4 - Key habitats represented in biological SSSIs in the Somerset Levels and Moors Natural Area

	s-p wg	s-r fm	s-r hm	fen	rrb,wh	ow,s,r	r,r,d	ww	oh
Biddle Street, Yatton	❍						●		
Bridgwater Bay (part)	●						●		
Catcott, Edington & Chilton Moors	●	●		❍	❍	❍	●	❍	❍
Cheddar Reservoir						●			
Curry & Hay Moor	●						●		❍
Ellenborough Park									●
King's Sedgemoor	●	●					●		❍
Langmead & Weston Level	❍	●	●				●		❍
Puxton Moor	❍						●		
Meare Heath	●					❍	●	❍	❍
Moorlinch	●	●					●		❍
North Moor	●	❍					●		❍
Severn Estuary (part)	●						❍		
Shapwick Heath		●		❍	●	●	●	●	❍
Sharpham Moor Plot					●			❍	
Southlake Moor	●	●					●		❍
Street Heath					●			❍	
Tealham & Tadham Moors	●	●				❍	●	❍	❍
Tickenham, Nailsea & Kenn Moors	❍						●		❍
West Moor	●						●	❍	❍

	s-p wg	s-r fm	s-r hm	fen	rrb,wh	ow,s,r	r,r,d	ww	oh
West Sedgemoor	●	●	●			❍	●		❍
Westhay Heath				❍		●		❍	
Westhay Moor	●	●		❍	●	●	●	❍	❍
Wet Moor	●						●		❍
Yanal Bog				❍			❍		

s-p wg - species-poor wet grassland
s-r fm - species-rich fen meadow and flood pasture
s-r hm - species-rich hay meadow
rrb, wh - remnant raised bog, wet heath
● major feature of site
❍ minor feature of site

ow,s,r - open water, swamp and reedbed
r,r,d - rivers, rhynes and ditches
ww - wet woodland
oh - other habitats

4.2.1 Species-poor wet grassland

Background

Species-poor wet grassland is the term used in this profile to describe the most agriculturally productive and intensively used grassland on the Somerset Levels and Moors. The majority of this grassland has not been cultivated or reseeded in the last 20 years, however the use of inorganic fertilizers and cutting for silage rather than hay, has produced a species-poor grassland. Short term leys occur in places where drainage and access permit more intensive use.

It is a widespread habitat of lowland England but, due to improvements in drainage and the increased demand for agricultural productivity, is now much fragmented and reduced in extent. The Somerset Levels and Moors is the largest area of this habitat remaining in England.

Lowland wet grassland resource of England (1992 estimates)

Total extent	219,410 ha	
Somerset Levels and Moors	46,621 ha	21.25 %

Source: "The distribution of lowland wet grassland in England".
English Nature (1993) Research Report No 49.

This habitat, together with species-rich fen meadows and flood pastures, is considered to be of international importance as it regularly supports over 20,000 waterfowl each winter. It is for this reason that twelve SSSIs on the Somerset Levels and Moors are proposed for designation as a Special Protection Area, and Ramsar Wetland of International Importance. Bridgwater Bay and the Severn Estuary already benefit from these designations. The

Somerset Levels and Moors is a very important part of the UK's resource of coastal and floodplain grazing marshes, a Key Habitat in the UK Biodiversity Action Plan.

Characteristic wildlife

As its name implies, this wet grassland habitat is species poor, typically being dominated by productive grasses such as Perennial Rye-grass and Timothy. This habitat also includes the naturally occurring species-poor floodplain or inundation grasslands dominated by species such as Creeping Bent and Marsh Foxtail.

Common herbs such as Meadow and Creeping Buttercup occur frequently, whilst more typical wetland species such as Cuckoo Flower and Lesser Spearwort can still be found where the grass is cut for hay, rather than silage, and the inorganic fertilizer application is low.

The banks of the rhynes and ditches around species-poor wet grassland often remain as havens for characteristic fen meadow and flood pasture species such as Water Mint, Marsh Marigold and Ragged Robin.

Key species

The key species associated with this habitat are overwintering Bewick's Swan, Wigeon, Golden Plover and Lapwing, and breeding Skylark.

The overwintering species regularly occur in nationally and internationally important numbers in the Natural Area, and whilst not restricted to using this habitat, they will feed on species-poor wet grassland, probably to maximise their intake of the most productive grasses and their associated invertebrates, to maintain their food reserves during the cold winter months.

Extinct species

Species-poor wet grassland is primarily a product of 20th century farming practices, particularly over the last 50-60 years. The improvements to field drainage, access, productivity and mechanization have led to significant reductions in the overall biodiversity of this habitat type. It is not possible to confirm if this has led directly to any extinction of species within the Natural Area. It is clear, however, that the increase of this habitat has been at the expense of species-rich fen meadow and flood pasture, resulting in once widespread species becoming much more restricted in their distribution.

Protected sites

Species-poor wet grassland is well represented in the SSSI series, notably at Wet Moor, North Moor, Curry and Hay Moors, and adjacent to the Severn Estuary at Pawlett Hams and to the south of Clevedon.

The Somerset Levels and Moors Environmentally Sensitive Area contains approximately 17,950 ha of this habitat. It is also well represented on the Tickenham, Nailsea and Kenn Moors, on Puxton Moor, and at Biddle Street, Yatton.

To the north of the Mendip Hills, the Levels and Moors is a target area for the Countryside Stewardship Scheme.

Current factors affecting the habitat

- Agricultural improvement is the major threat to this habitat on the Somerset Levels and Moors. Further improvements in land drainage and increased productivity through the increased applications of inorganic fertilizers or the cutting of silage will lead to further reductions in the wildlife interest. The over-drainage of peat soils can lead to irreversible loss of, or damage to, the soil itself.

- Conversion of permanent grassland to arable results in a direct loss and fragmentation of this habitat. In the mid 1990s maize is rapidly becoming a popular crop in the Natural Area due to its greater value as conserved forage for feeding to livestock in the winter months.

- Loss of habitat to urban development results in a permanent reduction of the extent of this habitat. Conurbations such as Weston-super-Mare, Bridgwater and Clevedon continue to expand over the coastal levels while new development around Yatton and Nailsea lie on the very edge of the Moors.

- Water level management is a critical factor affecting this habitat. Large areas of wet grassland act as the floodplains for the rivers when they flood, providing essential protection for low-lying urban areas such as Taunton and Bridgwater. Slightly higher areas of species-poor grassland are often still below the high tide or fluvial flood level, and so are entirely dependent on the continued maintenance of the existing sea and river defences. Our changing climate may have an increasing rôle to play in this matter.

- Recent work in the Somerset Levels and Moors ESA has shown the real potential to restore the biodiversity interest of species-poor wet grassland through the management of raised water levels.

Key nature conservation objectives for species-poor wet grassland:

1. Protect the full extent of the remaining wet grassland from the direct, and indirect, adverse effects of urban development and its consequences.

2. Secure water level management which sustains or enhances the biodiversity interest of the wet grassland and adjacent watercourses.

3. Encourage the adoption of farming practices sympathetic to the maintenance or enhancement of the biodiversity interest of the wet grassland and adjacent watercourses, in particular those practices which sustain internationally important numbers of overwintering waterfowl, and develop a thriving population of Skylarks.

4. Encourage the restoration of over-drained or damaged wet grassland in line with the UK Biodiversity Action Plan targets.

4.2.2 Species-rich fen meadows and floodpastures

Background

Like species-poor wet grassland, fen meadows and flood pastures are the products of agricultural improvements to fens, swamps and marshes over the last three centuries. Here agricultural improvements have been less intense, often due to poor access or the land being in a particularly low lying part of the moor and defying attempts of drainage. As a result, good examples of this habitat may support 60 plant species in a single meadow, including 10-12 different grasses.

The Somerset Levels and Moors Natural Area contains one of the largest areas of species-rich fen meadow and flood pasture habitat remaining in England, and is of outstanding importance in this respect. Approximately 1,750 ha of this habitat occurs within the Somerset Levels and Moors ESA according to recent estimates.

The extent of this habitat has significantly declined in the last 50-60 years due to agricultural and drainage improvements, leading to the conversion from species-rich fen meadow to species-poor wet grassland. This habitat is fragile and remains vulnerable to new demands for increased agricultural productivity. The Somerset Levels and Moors Natural Area has, therefore, a particularly important rôle to play in the UK Biodiversity Action Plan targets for coastal and floodplain grazing marshes.

Characteristic species

Characteristic plants of these fen meadows and flood pastures include Meadow Thistle, Southern Marsh Orchid, Meadow Rue, Marsh Arrowgrass and Marsh Marigold. Sedges are often abundant, even dominating the sward in some fields. Rushes, notably the Jointed Rush, are often an integral part of these habitats.

Typical butterflies of these meadows and pastures include Meadow Brown and Marbled White.

Kestrels and Buzzards may hunt over the fields and they often provide feeding areas for common species such as Starling and Goldfinch, and winter visitors such as Fieldfare and Redwing.

Key species

Many of the Somerset Levels and Moors key bird species are closely associated with this habitat, in particular breeding waders such as Curlew, Redshank, Snipe and Lapwing. The tussocky nature of the fen meadows may be important in this respect. Whinchat favour the unmanaged field margins of fen meadows, while the Barn Owl and Marsh Harrier will regularly hunt over these areas in addition to the reedbeds.

Marsh Fritillaries can occasionally be found using the nectaring plants in fen meadows but the management of this habitat is often too intense for their successful breeding.

Overwintering Teal, Wigeon and Shoveler roost in fen meadows and flood pastures covered with splash water and free from disturbance, whilst Lapwing will often be found feeding around the edges of the same fields.

Extinct species

Corncrake and Spotted Crake were uncommon breeding birds in these habitats earlier this century, but have not bred locally for many years.

Until the early 1990s Black-tailed Godwit used to breed in small numbers from the fen meadows and flood pastures of West Sedgemoor and Wet Moor.

Site protection

The best known examples of species-rich fen meadows and flood pasture lie within the SSSI series. Of particular importance are the examples of these habitats on West Sedgemoor, Langmead and Weston Level, Tealham and Tadham Moors, Westhay Moor and Catcott, Edington and Chilton Moors.

Significant areas of this habitat are managed as nature reserves by the Somerset Wildlife Trust, RSPB and by English Nature. It is also a priority for protection under ESA Tier 2 agreements.

Current factors influencing the habitat

- Agricultural improvements, including cultivation and re-seeding, use of inorganic fertilizers or herbicides, and changing from mowing for hay to silage, are the major reasons for the loss of this habitat.

- Water level management and surface drainage is again critical in the maintenance of these habitats. Improving surface drainage and lowering ditch water levels may increase the abundance of the more aggressive grass species to the detriment of the more sensitive wetland species. Conversely frequent deep flooding during the late spring and early summer can result in a decrease of species richness, and an increase in plants more typical of swamp vegetation.

- Disturbance to overwintering waterfowl and breeding waders by activities such as intense wildfowling, and more recent recreational pressures such as dog-walking.

Key nature conservation objectives for species-rich fen meadows and floodpastures:

1. Secure water level management which sustains or enhances the biodiversity interest of the fen meadow and flood pasture habitats.
2. Encourage the adoption of farming practices sympathetic to the maintenance and enhancement of the biodiversity interest of the habitat, in particular those practices which sustain the characteristic species-rich vegetation of these meadows, and the tussocky structure favoured by breeding waders.
3. Seek opportunities to extend the area of species-rich fen meadows, through appropriate restoration management of species-poor wet grassland habitat or land previously under arable.

Peat and Clay Moors - a vision

In summer the colourful meadows stretch over the open landscape of the Moor, the air alive with the heady scent of meadowsweet and newly mown watermint. Meadow brown and marbled white butterflies mingle with the many grasses and the purple flowers of knapweed and meadow thistle.

Cattle move gently through the summer pastures, drinking clear water from the edges of rhynes and ditches, trampling the tall stands of emergent plants at the ditch edges. Beneath the surface, water beetles and molluscs feed amongst the aquatic plants. Dragonflies patrol the ditches while many bugs and soldierflies skit amongst the bankside plants. The watchful heron glimpses the movement in the water and strikes to catch another eel. Broods of young redshank and snipe feed at the ditch edges and pools, gaining confidence with the abundance of food and shelter.

Pollarded willows punctuate the landscape, common in rows along the sides of the droves. Small farms rest on the slopes of the low hills in the background, usually clustered in hamlets or around the thriving villages. Orchards, young and old, lie alongside many of the farm buildings, sacks of apples stacked at the base of the trees ready for collection.

Harvest home celebrates a barn full of sweet hay for the winter. The well fed cattle will soon be coming off the moor as the autumn nights draw in and the rhynes and ditches fill with winter rain. The growing population of waterfowl which breed on the moor will soon be joined by many others, migrating from other parts of Europe. The winter light reflects on the silver network of brimming ditches and splash water on the moor. The air fills with the cries of wintering waterfowl and the heavy wing-beat of Bewick's Swans passing overhead. The sky darkens and then flashes white as a vast flock of lapwing cross the river and return to the Moor for their night roost.

4.2.3 Drier species-rich hay meadow

Background

Drier species-rich hay meadows are a very unusual feature of the wetlands of the Somerset Levels and Moors, their occurrence being restricted to the slightly higher ground or "islands" which occur on some of the Moors. Due to their small extent and difficult access, these areas have been farmed less intensively than the higher ground around the edges of the wetlands. As a result, they have retained an assemblage of plants more characteristic of the lowland haymeadows which used to occur more frequently in Mid-Somerset Hills and Avon Ridges and Valleys Natural Areas, than the floodplain grasslands of the Somerset Levels and Moors.

The extent of this habitat has significantly declined throughout England during the second half of the 20th century. In the Somerset Levels and Moors Natural Area it is likely to have been more frequent around the edges of the Moors and on the islands of Meare, Wedmore and Nailsea. The habitat remains very vulnerable to agricultural improvements such as the application of inorganic fertilizers and cutting for silage rather than for hay.

Characteristic species

Characteristic plants of these species-rich hay meadows include Common Knapweed, Cowslip, Bird's-foot Trefoil and Quaking Grass. The best examples of these meadows may contain more than 50 species of plants, including at least 12 grasses and sedges.

Gatekeepers, Meadow Brown and Marbled White butterflies frequent these grasslands due to the high number of nectaring plants present.

Key species

Green-winged Orchid is the only key species directly associated with this habitat.

Extinct species

No species have been directly recorded as becoming extinct from this habitat in the 20th century. However, in view of the small extent of this habitat now remaining it is quite possible that local extinctions have occurred without being recorded.

Site protection

The best examples of drier species-rich hay meadows occur on Langmead and Weston Level, and on West Sedgemoor. Fields near Youngwood Lane, to the south of Nailsea, have an important area of this habitat.

Current factors influencing the habitat:

- Agricultural improvements including cultivation and reseeding, use of inorganic fertilizers or herbicides, and changing from mowing for hay to silage, are the main reasons for loss of this habitat;

- Urban development, and its consequential recreational demands, is an important influence where drier hay meadows remain around the perimeter of the Moors.

Key nature conservation objectives for drier species-rich hay meadows:

1. Protect at least the present extent of drier species-rich hay meadows from the direct and indirect consequences of urban development and agricultural improvements.

2. Encourage the adoption of farming practices sympathetic to the maintenance and enhancement of the biodiversity interest of the habitat, in particular the species-richness of the grassland.

3. Seek opportunities to extend the area of this habitat by suitable restoration management schemes.

4.2.4 Fens

Background

Fens are peatlands which receive water and nutrients from the soil, rock and groundwater as well as from rainfall.

The UK is thought to host a large proportion of the fen habitat surviving in the European Union. It is a Priority Habitat for action under the UK Biodiversity Action Plan. Many parts of the Somerset Levels and Moors are underlain by fen peat, indicating that fen habitat dominated much of the Natural Area in the past. This historical fen has been drained and converted to fen meadow and species-poor wet grassland, by generations of agricultural development. Today, less than 10 ha of true fen habitat remains in the Natural Area.

Characteristic species

The remaining fens in the Somerset Levels and Moors Natural Area typically support an abundance of tall herbs such as Meadowsweet, Marsh Thistle, Meadow Rue and Yellow Iris, together with Purple Moor-grass, sedges and rushes.

The invertebrates of the Somerset Levels and Moors fens have not been fully studied but they support an abundance of nectaring plants for butterflies such as the Marbled White and prey for Hawker Dragonflies.

Key species

Marsh Pea and Milk Parsley are two key species of fen habitats in the Natural Area. The former is restricted to two locations on Catcott Moor, where it can occur in good numbers. Milk Parsley is a little more widespread in the Brue Valley and is apparently able to colonize suitably restored peat workings.

The Marsh Fern is characteristic of fen vegetation and wet woodlands on Shapwick Heath, Street Heath and Catcott Moor.

The dense vegetation cover and wet ground conditions provide good winter shelter for Snipe.

Extinct species

Other than the Swallowtail butterfly, no species have been directly recorded as becoming extinct from this habitat in the 20th Century. The very limited extent of the remaining habitat suggests that other unrecorded local extinctions are likely to have occurred.

Site protection

The fen habitats remaining in the Natural Area are restricted to Catcott Moor and Shapwick Heath. Recent fen creation work at Shapwick Heath and Westhay Moor could significantly increase the extent of this habitat if it proves successful.

Current factors affecting the habitat:

- Water table management is a critical factor in fen habitats. Throughout the year the peat soil should be saturated with a high water table, with splash flooding being appropriate during the winter months of higher rainfall. This water table management is difficult to achieve in isolated parts of the wetland.

- Fen vegetation is managed by cutting and clearing on a 3-5 year rotation, the material traditionally being used as bedding for wintering cattle. The wet ground conditions, weight of most modern farm equipment and lack of outlets for the cut material combine to make the management of fen vegetation an expensive operation.

- In the absence of management, Sallow and Alder colonize the fen, discouraging further mowing and shading the tall herb species characteristic of the fen.

Key nature conservation objectives for fen:

1. Secure water level management for the remaining fen habitats which ensures the water table is at or near the soil surface all year;

2. Ensure conservation management of fen habitats, by cutting and clearing of vegetation, seeking appropriate outlets for the cut material;

3. Encourage additional fen creation schemes to extend the area of fen habitat in the Natural Area. Undertake biological monitoring of fen creation schemes.

4.2.5 Remnant raised bogs and wet heath

Background

Lowland raised bogs consist of a deep accumulation of water-logged peat, and when intact, a surface covered by a living layer of plants or mosses. As the surface of the bog is raised above the local water table the only source of water and nutrient feeding the bog is direct rainfall.

Intact lowland raised bogs are one of Europe's rarest and most threatened habitats. They occur throughout the UK in flat, low-lying locations or basins. Since the start of the 19th century, the extent of intact, active lowland raised bog has decreased from 95,000 ha to 6,000 ha, a decline of 94%. The remaining 6,000 ha resource is scattered across a large number of small sites.

In the Somerset Levels and Moors lowland raised bog once covered much of the inland part of the Brue Valley to the north west of Glastonbury. Research suggests this raised bog ceased to grow actively about 1600 years ago due to climate changes. For many generations small areas were cut for use as domestic fuel in the local villages and towns.

The increased demand for horticultural peat and mechanization of the extraction process during the last 40 years has led to the removal of moss peat from almost all the old raised bog, leaving a single remnant of this habitat on Westhay Moor.

Other parts of the former raised bog, such as the Ashcott Plot, Street Heath and Shapwick Lows, have been degraded so much that they only retain a few species from the former habitat. These now support vegetation better described as wet heath than raised bog.

Characteristic species

The characteristic species of the raised bogs and wet heaths in the Natural Area are unfortunately indicative of the degradation of these habitats, in comparison with intact examples of the same habitats elsewhere in the UK.

In Somerset the habitats are often dominated by invasive species such as Bog Myrtle, Birch and Purple Moor-grass which out-compete the more typical species such as Heather, Ivy-leaved Bellflower, Sundews and Bog Asphodel.

Key species

The essential component of lowland raised bog is the development of the Bog Mosses. These species can be found in the remnant raised bog at Westhay Moor and occur in small numbers on Shapwick and Street Heaths.

Cross-leaved Heath is a key species of raised bog and wet heath habitats, being found in similar conditions to the Bog Mosses.

Nightjar occasionally breed in these habitats, often feeding on the invertebrates over the adjacent peat workings.

Extinct species

The Common Butterwort was last recorded on the peat moors in 1926, its location being lost to peat extraction.

The Large Marsh Grasshopper appears to have been lost from Shapwick Heath in the 1980s due to loss of suitable habitat. Recent habitat restoration work may reveal a surviving population.

Site protection

The remnant raised bog and wet heath habitats remaining in the Natural Area are restricted to Westhay Moor, Shapwick Heath, Street Heath and Catcott Heath.

Current factors affecting the habitats:

- Water table management is a critical factor for the remnant raised bog and wet heaths. Water loss from these habitats due to drainage and evapotranspiration is greater than can be recharged from rainfall alone. It is often difficult to hydrologically isolate these remnant habitats from the general drainage of the area.

- The continued extraction of peat from sites adjacent or close to the remnant habitats can adversely affect their water tables.

- Major conservation schemes have been developed over the last ten years to protect and then restore these remnant habitats. The concept of wetland restoration in the old peat workings, known as the Avalon Marshes, has been warmly embraced by the local communities and the peat industry.

Key nature conservation objectives for remnant raised bog and wet heath:

1. Protect the remnant raised bog and wet heath habitats from the direct and indirect adverse effects of peat extraction.

2. Secure appropriate water level management for the remnant raised bog and wet heath habitats.

3. Restore the appropriate vegetation characteristic of these habitats by the management of invasive species.

4.2.6 Open water, swamp and reedbed

Background

Open water, swamp and reedbed are a group of wetland habitats characterized by their need for a water table above the surface of the land.

Open water habitats include natural systems such as lakes, meres and pools, as well as man-made waters such as reservoirs, ponds and old mineral pits. The open water zone lies beyond the fringes of swamp vegetation, but may contain submerged, free floating or floating leaved vegetation.

Reedbeds are fens or swamps dominated by Common Reed and are amongst the most important habitats for birds in the UK. There are about 5,000 ha of reedbed in the UK, but of the 900 or so sites contributing to this total, only about 50 are greater than 20 ha. Reedbed is a Priority Habitat for action under the UK Biodiversity Action Plan.

A millennium of drainage schemes in the Somerset Levels and Moors Natural Area has reduced these once naturally occurring and dominant habitats of the wetlands to virtually nil. However, the extraction of peat in the Brue Valley and clay near Bridgwater during the last two centuries has created new open water and reedbed habitats.

Characteristic species

Shallow open water habitats often contain a variety of submerged plants such as the Pondweeds and Water-milfoils. Emergents such as Water Plantain can be found close to the edge of the open water, while Duckweeds may float on the sheltered surfaces.

Common Reed and Reed Mace or Bulrush dominate the reedbeds, almost to the exclusion of other species.

The open water, swamp and reed fringes are important habitats for many aquatic invertebrates, particularly the Dragonflies and Damselflies. An abundance of breeding birds

also frequent these areas such as Water Rail, Reed and Sedge Warblers, Reed Bunting, Great Crested and Little Grebes.

Key species

Milk parsley, a key species mostly found in fen habitats, also grows in reedbeds established in the recently restored peat works.

The open water and reedbed habitats in the Avalon Marshes are particularly important for their overwintering populations of waterfowl, including Wigeon, Teal, Pintail and Gadwall.

Breeding wildfowl have rapidly colonized the newly created open water habitats with important numbers of Gadwall and Garganey being recorded in recent years. The scrub margins to the reedbeds and open water habitats are particularly important for breeding Cetti's Warblers, while Marsh Harrier breed in the least disturbed reedbeds.

Otters are known to breed in the Avalon Marshes, making good use of the recently created open water habitats in the old peat workings.

Extinct species

Small numbers of Marsh Warbler used to breed in the reedbeds and swamps until the 1960s, and Bittern are known to have bred in Somerset as recently as the 1960s. They are now occasional visitors to the Brue Valley during the winter months. A considerable amount of work has been carried out to provide appropriate conditions for this very rare and threatened species to breed in the reedbeds of Somerset once more.

Site protection

Open water, swamp and reedbed habitats are important features of Shapwick Heath SSSI, Westhay Moor SSSI and Ham Wall NNR. The Local Nature Reserve at Screech Owl, near Bridgwater, contains reedbed.

Current factors affecting the habitat:

- The fragmented nature and small extent of these newly created habitats suggest it will take some time to develop their full nature conservation potential.

- Water table management for these habitats in close proximity to active mineral extraction sites can lead to incompatible water level management.

- Further expansion of these habitats is largely dependent on their creation in redundant peat workings in the Avalon Marshes, to the north west of Glastonbury.

- Open water and swamp habitats are vulnerable to pollution which can lead to chronic or acute adverse effects on the wetland ecosystem.

- Increasing demands for recreation, and access to these major wetland attractions, may prejudice nature conservation efforts if developed without an overall and sustainable strategy.

Key nature conservation objectives

1. Secure appropriate water table management for the open water, swamp and reedbed habitats.

2. Ensure the wetland habitats are not at risk from internal or external sources of pollution which might directly, or indirectly, have an adverse impact on the wetland ecosystems.

3. Develop and implement conservation management plans for the existing areas of open water, swamp and reedbed.

4. Secure restoration of old mineral workings to appropriate habitats which either promote, or are not in conflict with, nature conservation. Encourage restoration towards Priority Habitats and Species set out in the UK Biodiversity Action Plan.

5. Resist any development, including mineral extraction or leisure development, which may have a significant adverse effect on these habitats.

6. Secure local support for the development of the Avalon Marshes. In partnership with local communities, encourage the development of sustainable wetland industries which can work in harmony with natural ecosystems and provides alternative employment.

Avalon Marshes - a vision

The extensive reed fringes of the pools are alive with the calls of Reed and Sedge Warblers, occasionally quelled by the nearby boom of the elusive Bittern, answered by another boom from a neighbouring reedbed. Amongst the willow fringes Cetti's warblers and bearded tits forage to bring food to their recent fledglings. In the sheltered open water, the great crested and little grebe are followed by their young broods, regularly diving under the clear surface to retrieve one of the many small fish below.

Dragonflies and many other winged insects fly over the surface of the water. Occasionally one is plucked out of the air by the acrobatic swifts and hobbys. The unmistakable bulk of a pair of marsh harriers can be seen overhead, as the male passes food to his prospective mate.

Bog moss and sundews thrive on the raised mires, leading the peat-forming processes once again. The fens are a riot of colour, with the white meadow rue visible amongst the yellow iris and purple loosestrife. The paler green of the rare marsh fern and striking flower of the royal fern can clearly be seen. In a few days the milk parsley will flower, standing proud amongst the many other plants. The area of fen cut for bedding last autumn abounds with the same colour and life.

In a few months time, the reedbed on the other side of the rhyne will be cut for thatching material. The clear water around the base of the reeds helps them to grow strong and straight providing shelter, food and nesting areas for the reed buntings.

A family on bicycles wave goodbye to the manager of the nearby fishing lake. Along the road they pass a small peat pit which will be ready for restoration in a few years. In the next field, the reedcutter stacks bundles of last autumn's reed onto his trailer before going home.

Winter brings a different scene to the Marshes. Noisy flocks of migrating wildfowl gather to roost on the peaceful waters amongst the reedbeds, moving out to feed amongst the wet grasslands and ditches at night.

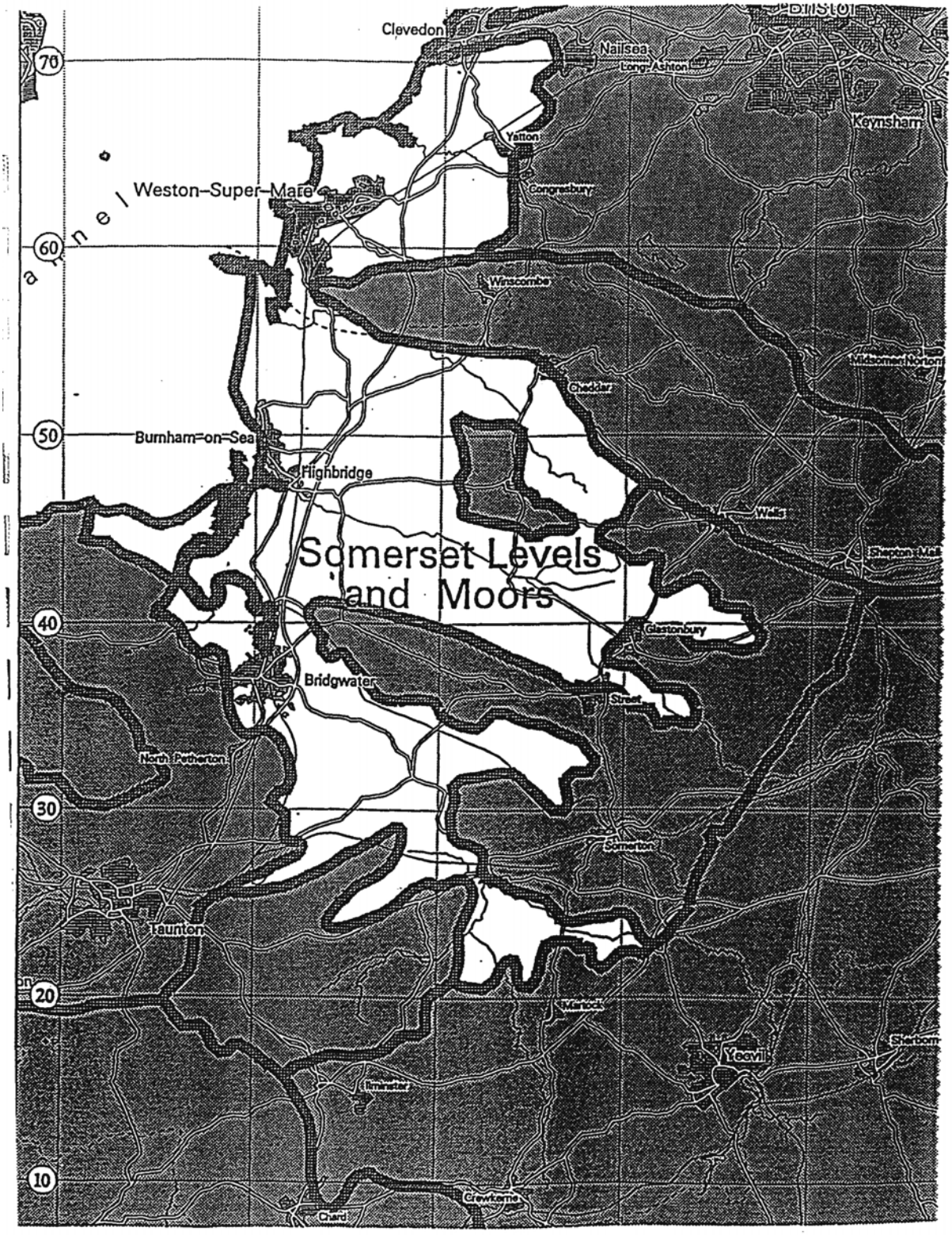
4.2.7 Rivers, rhynes and ditches

Background

The interconnecting network of rivers, drains, rhynes and ditches are the essential arteries of the Somerset Levels and Moors Natural Area. This complex of watercourses has two prime functions - to drain floodwater in winter and to supply water in summer for wet fencing and stock drinking. The balance between these two functions is very fine, and current practice has been evolved by several generations of drainage engineers, farmers and, more recently, conservationists.

In the Somerset Levels and Moors, the main rivers and drains, and some of the major rhynes, are maintained by the Environment Agency. The 20 Internal Drainage Boards in the Natural Area are responsible for the maintenance of viewed rhynes in each individual Board's area. With the exception of two Drainage Board areas, the maintenance of the field ditches are the responsibility of the farmers of the adjacent land. The functions of the wetland are a product of all these management systems, but clearly the management of water levels in the larger watercourses has a great influence on the smaller field ditches.

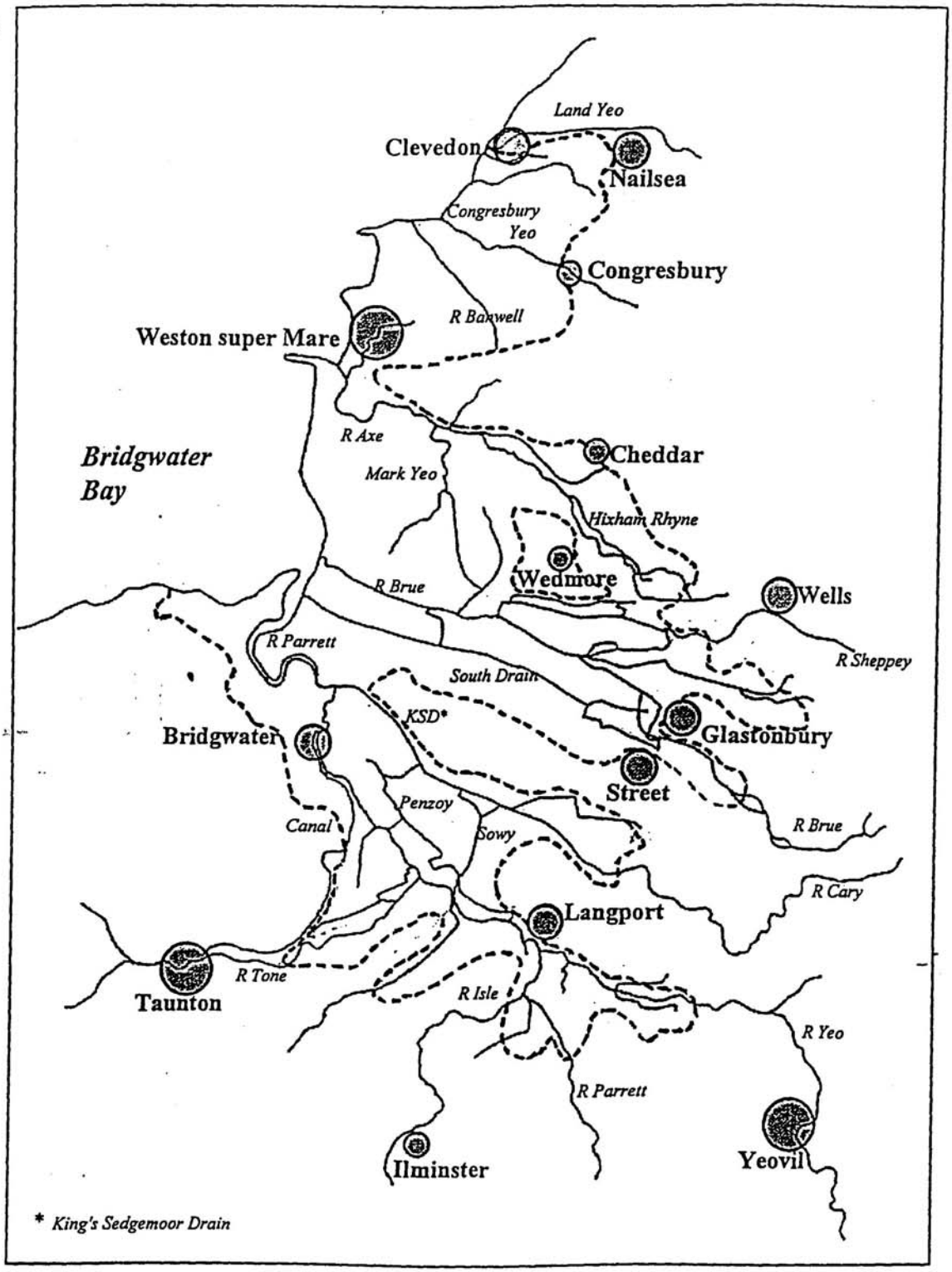
Some of the upper reaches of the smaller rivers retain their natural courses, such as the Isle and Yeo. However, the majority of rivers flowing through the wetlands no longer follow their original courses having been improved over the generations into high level carriers which speed the water to the sea. Most rhynes and field ditches originate from the time of enclosure in the late 18th and 19th Centuries. The last major new watercourse to be created was the River Sowy or Parrett Relief Channel in 1972.



Map 1 **The boundary of the Somerset Levels and Moors Natural Area**

Boundaries illustrative only, not definitive Scale 1:250,000

ENGLISH NATURE

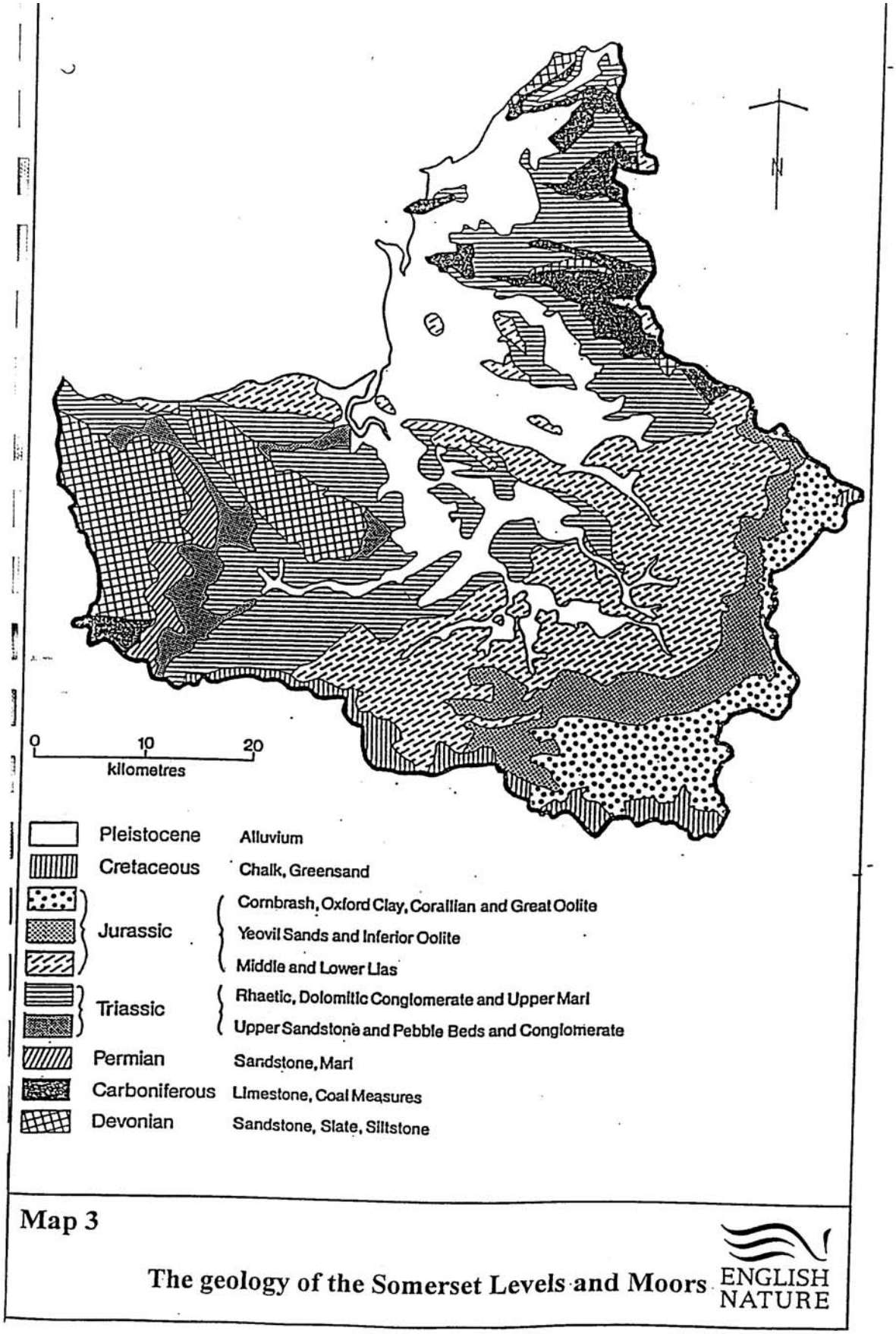


Map 2 The main rivers and drains of the Somerset Levels and Moors

------ Boundary of Natural Area
Boundaries illustrative only, not definitive

Scale 1:250,000 (approx.)

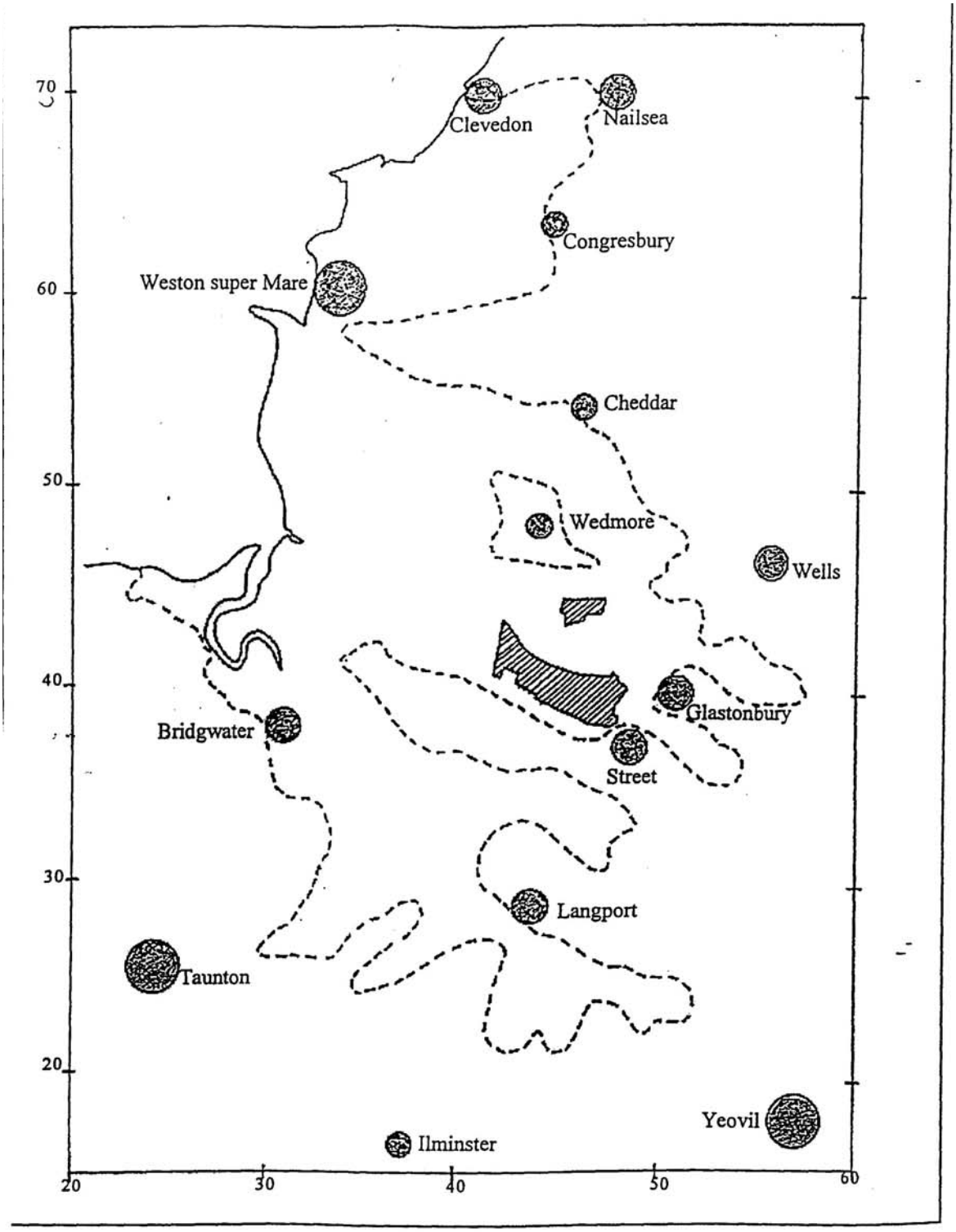
ENGLISH NATURE



Map 3

The geology of the Somerset Levels and Moors

ENGLISH NATURE



Map 4 The Avalon Marshes

- Boundary of Natural Area //// The Avalon Marshes Scale 1:250,000 (approx)

oundaries illustrative only, not definitive

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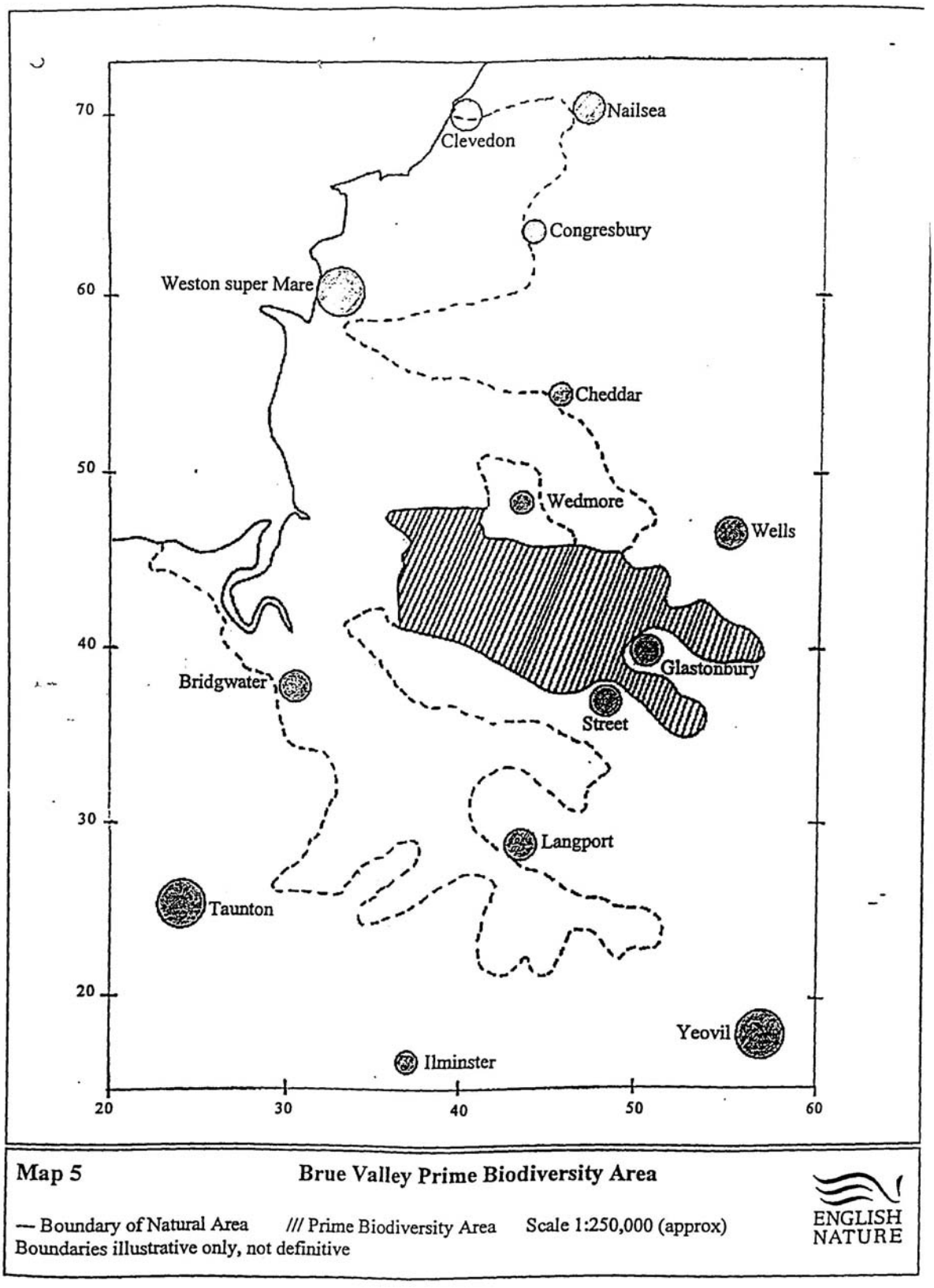

Map 5 **Brue Valley Prime Biodiversity Area**

— Boundary of Natural Area /// Prime Biodiversity Area Scale 1:250,000 (approx)
Boundaries illustrative only, not definitive

ENGLISH NATURE

The lower reaches of the Rivers Parrett, Tone and Axe remain tidal. All the other rivers have sluices constructed across their mouths to exclude the tides. The rivers draining through the wetland share four important characteristics. They:

- carry water from an upland catchment significantly larger than the wetland through which they drain;
- have a very low gradient to drain across on their way to the Severn Estuary;
- flow through areas where the ground level is lower than the high spring tide in the Estuary;
- discharge significantly less water to the sea during dry summer months.

As a result, several of the main rivers and drains are unable to contain fluvial flood water within their channels, leading to the extensive flooding of the lowlying wetlands. This storage of floodwater in the wetlands during periods of high or prolonged rainfall is a natural process and an essential part of the flood defence system to prevent the flooding of urban areas such as Bridgwater and Taunton.

Uncontrolled and prolonged deep floods can harm both property and agricultural interests, and bring little benefit to nature conservation. However, extensive areas of shallow or splash flooding during winter and early spring are essential in supporting large flocks of overwintering waterfowl, a thriving population of breeding waders and the wetland interest of the inland Moors. The greatest challenge of this floodplain wetland is how to strike a balance between natural processes, the protection of property and the water levels required to sustain our internationally important wetland wildlife.

Characteristic species

The rivers and larger rhynes are often nutrient rich and support a less diverse flora than many of the field ditches. Those maintained on an annual cycle are often dominated by Rigid Hornwort and Fennel-leaved Pondweed, with Yellow Water-lily and Shining Pondweed being found in some of the deeper channels.

Regularly maintained field ditches often support a diverse flora of Frogbit, Water Starworts and Duckweeds, with fringes of Reed Sweet-grass, Bur-reed and Sedges.

Aquatic snails and beetles are a particular feature of the Somerset Levels and Moors Natural Area. Semi-aquatic dragonflies such as the Four-spotted Chaser and Black-tailed Skimmer are commonly seen.

The watercourses of the Somerset Levels and Moors are an important coarse fishery, particularly for Pike, and the many channels provide nursery areas for a wide range of fish species.

Mute Swan and Mallard breed along the watercourses, with Reed and Sedge Warblers using taller emergent vegetation alongside unmanaged field ditches. Herons regularly feed on the banks of rivers, rhynes and ditches alike.

Key species

Fen pondweed is a key plant of field ditches in Tickenham Moor and in the Brue Valley.

The Lesser Silver Diving beetle is almost restricted in the UK to scattered populations in field ditches in the Brue Valley. Its relative, the Great Silver Diving beetle is also restricted in its distribution but is found more widely through the Natural Area.

The Hairy Dragonfly and Variable Damselfly have strong populations on several of the inland Moors.

The Hairy Click Beetle has been recorded from a single locality in England, on the banks of the tidal River Parrett.

Kingfishers frequent many stretches of rivers and rhynes in the Natural Area close to their breeding sites.

Otter and Water Vole, two of our most elusive mammals use watercourses and bankside vegetation in the Natural Area. The Otter has a strong population in the Brue Valley and is thought to colonize other catchments when home territories are in short supply. The Water Vole population is thought to have declined locally in line with the national trend, and the numbers in the Natural Area are likely to be constrained by the intensive management of the watercourses and the frequency of flooding.

The tidal stretches of the Rivers Parrett and Tone are important elver migration routes. This fishery has traditionally been used by local communities but more recently has been exploited commercially for the export market. The eel population is important in sustaining both Otters and Herons. The uncommon River Lamprey also occurs in the watercourse in the Natural Area.

Extinct species

No species have been directly recorded as becoming extinct from this habitat during the 20th century. However, changes in the nutrient status of the watercourses and the introduction of mechanical clearance has probably resulted in some local unrecorded extinctions.

Site protection

Rivers, rhynes and ditches are a frequent and abundant feature of many of the wetland SSSIs in the Natural Area. In North Somerset, English Nature's Wildlife Enhancement Scheme is targeted at safeguarding the most important watercourses in the SSSIs.

Current factors affecting the habitat:

- Intensive maintenance of rivers, drains and rhynes reduces their biodiversity potential;

- The quality of water in some stretches is likely to reduce the diversity of the aquatic flora and fauna. The low gradients and static nature of many of the watercourses can result in low oxygen levels during the hot summer months;

- Water level management is not optimum to safeguard the full range of aquatic and semi-aquatic interests. The traditional practice of lowering water levels during the winter months has a direct adverse effect on the aquatic flora and fauna, in addition to the drainage of the wetlands as a whole.

- The multitude of responsibilities and objectives for drainage, irrigation and watercourse management, add to the complexity of the wetland. The development of Water Level Management Plans by Drainage Authorities and Local Environment Agency Plans are helping to clarify some of the procedures and practices involved.

Key nature conservation objectives for rivers, rhynes and ditches:

1. Secure sympathetic management of all rivers, drains, rhynes and ditches to sustain and enhance their nature conservation interest.

2. Secure water level management which sustains the full range of aquatic and semi-aquatic flora and fauna throughout the year.

3. Encourage the adoption of water quality objectives which enhance the biodiversity interests of all the watercourses.

4. Ensure the fishery of the Somerset Levels and Moors are sustained rather than exploited for short term gain.

5. Encourage the restoration of more natural forms and channels for selected stretches of main rivers so as to provide a greater diversity of riverine habitats, without compromising the overall integrity of the wet grassland habitats.

4.2.8 Wet woodland

Background

Wet woodland was a common feature of the Somerset Levels and Moors Natural Area about 2-4,000 years ago. The drier climate at that time allowed small trees such as Willow and Alder to colonize the wetlands. In turn these carr woodlands increased the dryness and strength of the peaty soils, allowing woodland trees such as Ash, Oak and Elm to grow.

A change in climate about 5,000 years ago increased the rainfall in the Natural Area discouraging the growth of trees. These gradually died and collapsed into soil leading to the formation of wood peat and the preservation of the largest trunks as 'bog oak'.

Today, wet woodland is not a common habitat in the Somerset Levels and Moors Natural Area. It is largely restricted to some parts of the Brue Valley where it has developed on the drier soils which are the result of the peat extraction process. Much of the wet woodland covers areas that have been cut for peat many years ago, and still bear the traces of the old hand cut pits.

Characteristic species

Wet wood is dominated by Willow and Alder, with Birch and Oak favouring the drier areas or slightly higher ground.

The nationally scarce Royal Fern thrives in the open conditions of wet woodland, while Tussock Sedge can dominate some of the old peat cuts that have remained seasonally wet.

Typical woodland birds include Green Woodpecker and Nuthatch, with Grasshopper Warbler and Nightingales breeding in areas of scrub.

The wet woodlands of the Brue Valley are possibly of considerable interest for their invertebrate fauna, but further survey work is required to confirm the distribution and abundance of the notable species present.

Key species

Populations of the White Admiral butterfly can be found using the abundance of Honeysuckle in some of the drier areas of woodland in the Brue Valley.

A small number of Nightjars breed in open woodland areas, feeding on the abundance of flying insects which can often be found in the adjacent peat workings in the Avalon Marshes.

Extinct species

No species have been directly recorded as becoming extinct from this habitat during the 20th century. However, changes in the extent of the wet woodland over the last eighty years may have resulted in some local and unrecorded extinctions.

Current factors affecting habitat:

- Management to secure priority habitats such as remnant raised bog, wet heath, swamp and reedbed may require removal of scrub which would otherwise develop into woodland.

- Management of water tables to secure open water, swamp and reed habitats may result in local losses of wet woodland in the medium term.

Key nature conservation objectives for wet woodland:

1. Identify key areas of wet woodland habitat in the Natural Area and implement appropriate management for their long term enhancement.

2. Undertake further invertebrate survey work in wet woodland habitats.

4.2.9 Other habitats - withy beds, orchards, pollarded willows

Background

The Natural Area supports a number of other habitats which are either restricted in area or are inherently less valuable for conserving wildlife. Collectively, however, and because of their

special character, these habitats make a valuable contribution to the natural heritage of the Somerset Levels and Moors. These habitats include withy beds, orchards and pollarded willows.

The Somerset Levels and Moors are the centre of withy growing in Britain. Withies are currently grown on Curry Moor, Whitmoor, Stanmoor, Northmoor, Hay Moor, Aller Moor, Saltmoor and West Sedgemoor, with a total area of approximately 160 ha. Varieties of the willow *Salix triandra* and *S.viminalis* are grown for harvesting, the cut stems being used for making basketry products, hurdles and artists' charcoal.

Despite recent studies, the nature conservation value of withy beds has been difficult to evaluate. Unfortunately pesticides are used to prevent damage by insects ("button-top") and this is thought to lead to a generally low value for invertebrates and birds. Recently harvested withy beds are sometimes used by roosting snipe, whilst derelict withies adjacent to main watercourses have provided shelter for otters.

Orchards remain a special feature of the Natural Area, often found around the fringes of the villages or hamlets, or adjacent to isolated farms. The larger standard trees in an orchard provide shelter, feeding and nesting sites for a wide variety of plants and animals. Old trees often have holes in their trunks where birds such as the Little Owl, Tree Creeper and Blue Tit can nest. Their trunks are usually deeply fissured, providing sites for mosses and lichens to grow and for a host of invertebrates to live, whilst mistletoe can often be found in the crowns of older trees.

Grazed areas around the trees in old orchards have usually remained unploughed for centuries and are often rich in wildflowers. Orchards in winter can form a wildlife oasis and are the regular haunts of large flocks of winter visitors and migrants including the Redwing and Fieldfare. They require sensitive management if they are to continue making a valuable contribution to our natural heritage. Old trees need to be retained and a range of the older varieties of standard trees need to be planted to bring along the next generation of orchards.

Pollarded willows are formed by polling, or evenly cutting, the trunk of a willow about 8 feet above ground level so that the crown develops just beyond the reach of grazing animals. This resourceful approach to timber management appears to be ancient practice, with the remains of pollards having been discovered in the Somerset Levels and Moors dating back to 4000 BC.

Today, pollarded willows add considerably to the special character of the Somerset Levels and Moors Natural Area. The endless variety in their forms and shape, either growing singly or in a row beside a drove or rhyne, give the Levels and Moors an individual "sense of place". They provide shelter for cattle during the heat of the summer, and a crop of wood for harvesting every 7-10 years. Pollarded willows are also the home for a wide variety of invertebrates, and older trees with hollow trunks may be used by Little Owls. Mallard, Song Thrush and up to eighty different species of plants have been found making use of the massive boles and heads which can form on ancient pollarded willows.

Site protection

Commercial withy beds occur in Curry and Hay Moors SSSI, North Moor SSSI and West Sedgemoor SSSI but have declined significantly on West Moor SSSI.

Orchards occur in many SSSIs, being found in small numbers on the slightly higher ground adjacent to farms and hamlets. The Somerset Levels NNR includes an orchard at Southlake Moor. Both the ESA and Countryside Stewardship Schemes offer grant aid for the restoration of traditional orchards.

Pollarded willows are a widespread and characteristic feature of many SSSIs and their ongoing management is encouraged by the Wildlife enhancement Schemes, the ESA and local authority grants.

Current factors affecting these habitats:

- During major flood events it has not always been possible to harvest the withy crop during the optimum period for a high quality product.

- The withy industry is dynamic, in both its market and in the area required for the crop. Withy beds last for approximately 30 years before being returned to grass, so the location of withies are changing each decade.

- Old orchards can become neglected and fall into disuse if there is no demand or market for their products. This may encourage the removal of the remaining trees and conversion to more intensively managed grassland. The intensification of orchard management can also threaten the conservation value of orchards.

- Pollarded willows need to be maintained on a 7-10 year cycle if they are not to become outgrown and vulnerable to splitting. Over-mature pollards can be difficult to pollard again without specialist help.

Key conservation objectives for withy beds, orchards and pollarded willows:

1. Encourage the sympathetic management and restoration of other features of nature conservation interest including withy beds, orchards and pollarded willows.

2. Encourage mechanisms which provide financial support for the management and restoration of orchards using traditional techniques, standard trees and old varieties of apple and pear.

3. Encourage surveys of our heritage of orchards and pollarded willows, to inform management practices and support mechanisms (eg grant-aid).

4.3 Key conservation goals for the Natural Area

Although key nature conservation objectives are given under each of the habitats described above, this section combines these into eight overall conservation goals for the Natural Area. These goals should prioritize our actions.

The key conservation goals for the Somerset Levels and Moors Natural Area are to:

1. Secure water level management which sustains or enhances the biodiversity interest of the wet grassland and other wetland habitats, and the full range of aquatic and semi-aquatic flora and fauna throughout the year.

2. Encourage the adoption of farming practices sympathetic to the maintenance and enhancement of the biodiversity interest of the mosaic of wet grassland and wetland habitats. Particular effort should be made to secure the long term future of the characteristic species-rich vegetation, and the tussocky structure of wet grasslands.

3. Secure sympathetic management of all rivers, drains, rhynes and ditches to sustain and enhance their nature conservation interests.

4. Provide appropriate wetland conditions which support internationally important populations of overwintering waterfowl, and nationally important numbers of breeding waterfowl, each year. Particular effort should be made to providing suitable overwintering wetland habitats for Bewick's Swan, Teal, Lapwing and Golden Plover, and breeding habitat for Snipe, Curlew, Redshank and Lapwing, Bittern, Marsh Harrier, Cetti's Warbler and Garganey.

5. Seek opportunities to restore the extent and quality of key habitats of high nature conservation interest so as to increase the overall wildlife resource and to provide continuity between habitats of high quality. Particular effort should be made toward extending the area of species-rich fen meadow, flood pasture and reedbed, to restoring the condition of our remaining fens and raised bogs, and to providing habitats suitable for recolonization by those species which have recently become extinct in the Natural Area.

6. Encourage water level management and farming practices which conserves the full extent of the peat soils and deeper deposits. Particular effort should be made to secure water level management which avoids oxidation and loss of the peat soils, archaeological remains and palaeological evidence.

7. Secure local support and enthusiasm for the conservation of the Somerset Levels and Moors by encouraging greater appreciation, understanding and recognition of the value of this unique area.

8. Monitor the wildlife resources of the Natural Area. Following surveys provide both technical and popular information to those who live and farm in the area, and those whose decisions affect land use, agricultural support mechanisms and water level management.

5. The Brue Valley - A Prime Biodiversity Area?

Prime Biodiversity Areas are those where resources may be targeted most effectively to achieve wildlife conservation. In essence they are areas of maximum nature conservation opportunity. English Nature intends to identify one or more Prime Biodiversity Area within each Natural Area. Like Natural Areas, Prime Biodiversity Areas are not a designation - they are put forward by English Nature to help focus resources as effectively as possible.

The Somerset Levels and Moors Natural Area has been identified as being exceptionally rich in a significant range of wetland habitats of nature conservation value. The greatest concentration of key habitats and species for conservation attention is to be found in the Brue Valley, lying between the Polden Hills to the south and the Wedmore ridge to the north (Map 4). The Brue Valley has received considerable recognition for its wildlife value, both nationally and internationally (Table 5). It is also the location of one of England's largest wetland restoration schemes in the old peat workings of the Avalon Marshes.

However, this Natural Area Profile has highlighted the decline in the extent and wildlife interest of several of the key habitats over the last 50-60 years. Many of the key nature conservation objectives stress the importance of habitat restoration and enhancement to replace wildlife losses.

Opportunities to develop additional Prime Biodiversity Areas exist in the Natural Area and, in particular:

- in the floodplains of the Rivers Parrett, Isle and Yeo
- along the Congresbury Yeo and in its floodplain
- along the River Kenn and the Blind Yeo, and their tributaries

The Prime Biodiversity Area concept is about identifying and taking opportunities which lead to enhancements for our wildlife heritage and the biodiversity of our Natural Area. To succeed, the concept needs to be embraced with enthusiasm by local communities, land managers, conservation organizations, authorities and agencies alike. In this Profile, English Nature has identified one Prime Biodiversity Area and suggested four other possibilities. The future development of the nature conservation resources in all these Areas will be the product of enthusiasm for the idea, our pride in the area, and partnerships in achieving the changes which conserve our wetland heritage.

Table 5 -Key habitats and species in the proposed Brue Valley Prime Biodiversity Area

Key habitats	
Species-poor wet grassland	
Species-rich fen meadow and flood pasture	
Fen	
Remnant raised bogs and wet heath	
Open water, swamp and reedbed	
Rivers, rhynes and ditches	
Wet woodland	
Species for conservation attention (from table 2):	
Cross-leaved Heath	Kingfisher
Marsh Pea	Pintail
Milk Parsley	Shoveler
Fen Pondweed	Teal
Marsh Fern	Wigeon
Bog Moss	Garganey
Marsh Fritillary	Gadwall
White Admiral	Pochard
Lesser Silver Diving Beetle	Bittern

Great Silver Diving Beetle	Nightjar
Narrow bordered Bee Hawk-moth	Cetti's Warbler
Soldier Fly (*Odontomyia ornata)*	Marsh Harrier
Fen raft-spider	Mute Swan
Hairy Dragonfly	Bewick's Swan
Variable Damselfly	Snipe
Otter	Curlew
Water Vole	Whimbrel
	Bearded Tit
	Whinchat
	Yellow Wagtail
	Redshank
	Short-eared Owl
	Barn Owl
	Lapwing
	Tree Sparrow

Species thought to have become extinct (from table 3):

Common Butterwort
Large Marsh Grasshopper
Swallowtail
Spotted Crake
Marsh Warbler

6. Acknowledgements

The preparation of this Natural Area Profile by English Nature's Somerset Team coincides with the 20th Anniversary of the publication of "The Somerset Wetlands Project - A Consultation Paper" by the Nature Conservancy Council.

The Profile draws heavily upon the knowledge and experience we have gained during the last twenty years in working with the farmers, peat producers, nature conservation bodies, authorities and agencies, and the local community in this special and unique area. We are grateful to those who have shared their knowledge and pride in this unique wetland with us.

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Annex 1a

Bird species of conservation value within the Somerset Levels and Moors Natural Area.

Species of nature conservation value for their legal or other status within the Somerset Levels and Moors Natural Area. **Species in bold text are included in Table 2 "Key species for conservation attention in the Somerset Levels and Moors Natural Area".**

Abbreviations: **BAP** - Biodiversity Action Plan, short and middle lists only **EC Annex** - EC Birds Directive Annex I **WCA Sch 1** - Wildlife and Countryside Act 1981
RDB - Red Data Book species **EN Conservation priorities** - English Nature Research Report No. 62 'Birds in England', High and medium lists only
RSPB - Birds of conservation concern in the United Kingdom, Channel Islands and Isle of Man Red and Amber lists only.

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	*Latin name*				Short	Middle	High I	High II	Medium	Red	Amber		
Bittern	*Botaurus stellarius*	✓	✓	✓	✓		✓			✓		Scarce winter visitor. Brue Valley. Hasn't bred since 1960s	Reedbed
Bewick's Swan	*Cygnus columbianus bewickii*	✓	✓	✓			✓				✓	Fairly common winter visitor particularly moors south of the Polden Hills	Wet grassland and flood pasture
Wigeon	*Anas penelope*			✓				✓			✓	Very common winter. Widespread mainly Brue Valley and West Sedgemoor	Wet grassland, flood pasture, fen meadow
Gadwall	*Anas strepera*			✓			✓				✓	Fairly common winter visitor. Local/rare breeder. Brue Valley and West Sedgemoor	Open water reedbed & swamp

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	***Latin name***				**Short**	**Middle**	**High I**	**High II**	**Medium**	**Red**	**Amber**		
Teal	*Anas crecca*			✓			✓		✓			Very common winter visitor Rare breeder. Brue Valley and West Sedgemoor	Flood pasture, fen meadow, open water, reedbed and swamp
Pintail	*Anas acuta*		✓	✓				✓			✓	Fairly common winter visitor. Brue Valley	Flood pasture & estuarine
Garganey	*Anas querquedula*		✓	✓			✓				✓	Scarce summer visitor. Occasional breeder. Brue Valley	Open water reedbed and ditches
Shoveler	*Anas clypeata*			✓			✓				✓	Fairly common winter visitor. Rare breeder. Brue Valley and West Sedgemoor	Flood pasture. Fen and swamp
Pochard	*Athyra perina*			✓			✓				✓	Fairly common winter visitor. Brue Valley, West Sedgemoor and Curry Moor	Open water, reedbed & swamp
Marsh Harrier	*Circus aeruginous*	✓	✓	✓			✓			✓		Scarce summer visitor. Very rare breeder. Brue Valley	Reedbed

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	***Latin name***				**Short**	**Middle**	**High I**	**High II**	**Medium**	**Red**	**Amber**		
Hen Harrier	*Circus cyaenus*	✓		✓				✓		✓		Uncommon winter visitor. Widespread	Rough grassland. Reed bed
Merlin	*Falco columbarius*	✓		✓				✓		✓		Uncommon winter visitor. Widespread	Rough grassland. Estuarine
Peregrine	*Falco peregrinus*	✓		✓				✓			✓	Winter visitor. Very widespread	Flood pasture, wet grassland Estuarine
Grey Partridge	*Perdix perdix*			✓	✓			✓		✓		Uncommon resident. Widespread	Grassland and mixed farmland
Quail	*Coturnix coturnix*		✓	✓				✓		✓		Scarce summer visitor. West Sedgemoor	'Traditional' hay meadows
Water rail	*Rallus aquaticus*										✓	Uncommon resident Fairly common winter visitor. Brue Valley	Reedbed, fen and swamp
Golden Plover	*Pluvialis apricaria*	✓		✓				✓			✓	Common winter visitor. Tealham and Tadham, West Sedgemoor, King's Sedgemoor	Wet grassland and flood pasture

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	***Latin name***				**Short**	**Middle**	**High I**	**High II**	**Medium**	**Red**	**Amber**		
Lapwing	*Vanellus vanellus*							✓			✓	Very common winter visitor Common breeder. Widespread	Wet grassland and flood pasture
Dunlin	*Calidris alpina*			✓			✓				✓	Fairly common winter visitor. Parrett Estuary, Tealham & Tadham, Catcott and West Sedgemoor	Flood pasture and estuarine
Ruff	*Philomachus pugnax*	✓	✓	✓			✓				✓	Uncommon passage migrant & winter visitor. Catcott and West Sedgemoor	Flood pasture
Jack Snipe	*Lymnocryptes minimus*										✓	Uncommon winter visitor. Brue Valley and West Sedgemoor	Flood pasture, fen meadow, open reedbed & swamp
Snipe	*Galinago galinago*								✓		✓	Common winter visitor Uncommon breeder. Widespread	Flood pasture, fen meadow, open reedbed & swamp

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	***Latin name***				**Short**	**Middle**	**High I**	**High II**	**Medium**	**Red**	**Amber**		
Black-tailed Godwit	*Limosa lapponica*		✓	✓			✓			✓		Occasional breeder Uncommon winter visitor. West Sedgemoor and Catcott Lows	Flood pasture and fen meadow
Whimbrel	*Numenius phaeopus*		✓	✓					✓		✓	Fairly common spring passage migrant. Inland moors and Cheddar Reservoir	Flood pasture
Curlew	*Numenius arquata*			✓				✓			✓	Uncommon breeder and winter visitor. Parrett Estuary, widespread	Flood pasture and fen meadow
Redshank	*Tringo totanus*			✓				✓			✓	Uncommon winter visitor Uncommon breeder. Widespread	Flood pasture and fen meadow
Barn Owl	*Typha alba*		✓	✓				✓			✓	Uncommon resident. Widespread	Grassland and mixed farmland
Short-eared Owl	*Asio flammeus*	✓							✓		✓	Uncommon winter visitor	Rough grassland
Nightjar	*Caprimulgus europeaus*	✓		✓		✓				✓		Very rare summer visitor - peat moors. Brue Valley	Wet heath

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	***Latin name***				**Short**	**Middle**	**High I**	**High II**	**Medium**	**Red**	**Amber**		
Kingfisher	*Alcedo atthis*	✓	✓						✓		✓	Uncommon resident. Widespread	Rivers and ditches
Skylark	*Alauda arvensis*				✓					✓		Common resident - local declines. Widespread	Grassland and meadows
Yellow Wagtail	*Motacilla flava*								✓			Fairly common summer visitor. Widespread, but declining in NA	Wet grassland, flood pasture and meadows
Whinchat	*Saxicola rubetra*								✓			Uncommon summer visitor - declining. Widespread	Unimproved grassland and scrub
Cetti's Warbler	*Cetti cetti*		✓	✓			✓				✓	Uncommon resident - increasing. Brue Valley	Fen and wet woodland
Grasshopper Warbler	*Locustella naevia*										✓	Fairly common summer visitor. Brue Valley	Unimproved grassland and swamp
Aquatic warbler	*Acrocephalus paludicola*	✓			✓						✓	Vagrant. Very rare	Reedbed and fen
Sedge warbler	*Acrocephalus schoenobaenus*								✓			Locally very common summer visitor. Widespread	Reedbed, fen and wet woodland

Species		Status										Distribution (most important areas) and abundance in the Natural Area	Habitat
		EC Annex I	WCA Sch 1	RDB	BAP		EN conservation priorities			RSPB			
Common name	***Latin name***				**Short**	**Middle**	**High I**	**High II**	**Medium**	**Red**	**Amber**		
Marsh Warbler	*Acrocephalus palustris*		✓	✓		✓	✓			✓		Very rare summer visitor	Fen, fen meadows and reedbed
Reed warbler	*Acrocephalus scirpaceous*								✓			Locally very common summer visitor. Widespread	Reedbed and fen
Bearded Tit	*Panurus biarmicus*		✓	✓			✓				✓	Scarce resident and winter visitor. Brue Valley	Reedbed
Willow Tit	*Parus montanus*										✓	Rare breeder. Brue Valley	Wet woodland
Linnet	*Carduelis cannabina*					✓				✓		Relatively common resident breeder. Widespread	Grassland and scrub
Reed Bunting	*Emberiza schoeniclus*					✓				✓		Locally common resident. Widespread	Reedbed, fen and ditches

Annex 1b

Invertebrate species of conservation value within the Somerset Levels and Moors Natural Area

Species of nature conservation concern for their legal or other status within the Somerset levels and Moors Natural Area. **Species in bold text are included in Table 2 "Key species for conservation attention in the Somerset Levels and Moors Natural Area".**

Abbreviations: **BAP** - Biodiversity Action Plan, short and middle lists only **RDB** - Red Data Book species **1EN** - RDB 1 Endangered, **2VU**- RDB 2 Vulnerable
3R - RDB 3 rare **WCA Sch. 5** - Wildlife and Countryside Act 1981 Schedule 5 **EC Annex** - EC Habitats and Species Directive Annex IIa

Species		Status							Distribution or abundance in the Natural Area	Habitat
		EC Annex II	WCA Sch. 5	RDB			BAP			
Common name	Latin name			1 EN	2 VU	3 R	Short	Middle		
Coleoptera (beetles)										
Diving beetle	*Hydaticus transversalis*					✓			Somerset is one of the main British strongholds for this nationally rare species. Widespread and frequent	Ditches
Great diving beetle	*Dytiscus dimidiatus*					✓			Local distribution	Ditches
Lesser silver diving beetle	*Hydrocaris caraboides*		✓	✓					Restricted to peat moors. One of only two localities in England	Well vegetated ditches overlying peat
Great silver diving beetle	*Hydrophilius piceus*					✓			Widespread in Somerset but mainly on the peat moors	Ditches overlying peat with much vegetation
Water beetle	*Cercyon granarius*					✓			Very local	Floating vegetation in ditches
Water beetle	*Hydrochus ignicollis*					✓			Very local	Submerged vegetation in ditches
Water beetle	*Limnebius aluta*					✓			Very local	Ditches overlying peat and ponds

Species		Status							Distribution or abundance in the Natural Area	Habitat
		EC Annex II	WCA Sch. 5	RDB			BAP			
Common name	Latin name			1 EN	2 VU	3 R	Short	Middle		
Soldier beetle	*Cantharis fusca*					✓			Widespread in damp meadows. Somerset is evidently a stronghold for this nationally rare species	Fens, wet woodland. River and field margins
Weevil	*Lixus paraplecticus*			✓					Very local and rare	Ditches overlying peat. Peat moors in fen ditches. Last recorded in 1950
Weevil	*Hylobius transversovittatus*			✓					Very local on peat moors. Somerset has the only extant population of this species in Britain	Recently worked out peat pits
Weevil	*Bagous nodulosus*			✓					Confined as a British species to Somerset. Little known about its distribution	Submerged vegetation in ditches
Leaf beetle	*Oulema erichsoni*			✓					Very local, only on the peat moors. Somerset has the only known extant population in Britain	Fens or peat moors including recently worked out peat pits
Leaf beetle	*Ochrosis ventralis*					✓			Very local. Shapwick Heath	Associated with Mayweed
Rove beetle	*Paederus caligatus*					✓			Very local	Damp mud by freshwater
Burying beetle	*Aclypea undata*			✓					Very local. Possibly extinct	Not habitat specific. Phytophagous
Click beetle	*Dirhagus pygmaeus*					✓			Very local. Shapwick Heath	Oak woodlands
Crawling water beetle	*Haliplus furcatus*			✓					Very local. Possibly now extinct	Silt ponds near the sea
Diving beetle	*Laccornis oblongus*					✓			Very local and scarce on the Moors	Densely vegetated peaty ditches

Species		Status							Distribution or abundance in the Natural Area	Habitat
		EC Annex II	WCA Sch. 5	RDB			BAP			
Common name	Latin name			1 EN	2 VU	3 R	Short	Middle		
Hairy click beetle	*Synaptus filiformis*			✓					Very local. Confined as a British species to the tidal reaches of the R. Parrett	Soft, muddy river banks on Reed-canary grass
Hymenoptera (bees)										
Mining bee	*Andrena latthyri*			✓				✓	Very local. One known population in NA (Moorlinch). Recorded in 1950	Banks. Species nests in the soil
Diptera (Flies)										
Soldier fly	*Odontomyia argentata*				✓				Very infrequent	Fen, wet woodland and well-vegetated ditches
Soldier fly	*Odontomyia angulata*			✓					Restricted to three sites on the Moors. Recorded late 1940s, early 1950s	Fens and shallow ponds
Soldier fly	*Odontomyia ornata*				✓				Regular and locally frequent	Ditches on peat with floating cover and rich submergent vegetation
Hoverfly	*Lejops vittata*				✓				Locally frequent	Brackish ditches. Associated with *Scirpus maritimus*
Hoverfly	*Parhelophius consimilis*				✓				Pre 1960 record. North Somerset Levels?	Fen, often associated with *Typha* spp
Marsh fly	*Pteromicra leucopeza*				✓				One certain locality, Westhay Moor	Wetlands. Ponds and swamps with dense shading
Trichoptera (caddis flies)										

Species		Status							Distribution or abundance in the Natural Area	Habitat
		EC Annex II	WCA Sch. 5	RDB			BAP			
Common name	Latin name			1 EN	2 VU	3 R	Short	Middle		
Caddisfly	*Grammotaulius nitidus*			✓					Very local. No records post 1950s	Temporary shallow pools in wet grassland
Arachnids (Spiders)										
Wolf spider	*Paradosa palaidicola*					✓			Locally abundant. Shapwick Heath	Wet woodland. Fen and wet heath
Money spider	*Carorita paludosa*				✓				Locally rare. Restricted to peat moors. Westhay Moor	Fens and fen meadows
Fen raft spider	*Dolomedes plantarius*			✓					Very rare and localised	Rhynes and ditches, fens, fen meadows
Lepidoptera (Butterflies and moths)										
Marsh Fritillary	*Eurodryas aurina*	✓	✓	✓					Rare and local. Shapwick Heath	Fen meadows and wet heath
Narrow bordered bee hawk moth	*Hemarius tityus*							✓	Rare and local. Shapwick Heath	Fen meadows
Molluscs (Snails)										
Freshwater mussel	*Valvata macrostoma*				✓				Relatively common on the North Somerset Levels.	Ditches
Pea shell cockle	*Pisidium pseudosphaerium*					✓			Relatively common on the North Somerset Levels.	Rhynes, ditches and ponds
Orthoptera (Grasshoppers)										
Large marsh grasshopper	*Stethophyma grossum*					✓			Very rare and localised. May be extinct	Fens, rhyne and ditch banks

Annex 1c

Amphibians, Fish and Mammals of conservation value within the Somerset Levels and Moors Natural Area

Species of nature conservation value for their legal or other status within the Somerset Levels and Moors Natural Area. **Species in bold text are included in Table 2 "Key species for conservation attention in the Somerset Levels and Moors Natural Area".**

Abbreviations: **BAP** - Biodiversity Action Plan, short list. No species are on the middle list

EC Annex - EC Habitats and Species Directive

WCA Sch 1 - Wildlife and Countryside Act 1981 Schedule 5 - does not include species in respect of Section 9(5) only

Species		**Status**			**Distribution or abundance in the Natural Area**	**Habitat**
Common name	***Latin name***	**EC Annex**	**WCA Sch 5**	**BAP Short**		
Great Crested Newt	*Triturus cristatus*	II & IV	✓		Rare. Number of sites requires confirmation.	Ponds and semi-natural habitat
River lamprey	*Lampetra fluviatilis*	II			Rare	Main river, migratory species
Pipistrelle Bat	*Pipistrellus pipistrellus*		✓	✓	Uncertain. Likely to be widely distributed and common	Pastures and hedges
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	II & IV	✓		Scarce. Maybe using areas within NA for foraging	Pasture and hedges
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	II & IV	✓		Scarce. Maybe using areas within NA for foraging	Pasture and hedges
Serotine Bat	*Eptesicus serotinus*	IV	✓		Scarce	Pasture and hedges
Daubentons Bat	*Myotis daubentons*	IV	✓		Scarce	Open country close to water
Brown long-eared Bat	*Plecotus auritus*	IV	✓		Scarce	Sheltered valleys
Brown Hare	*Lepus capensis*			✓	Unknown. Rare, widely distributed	Mixed farmland
Otter	*Lutra lutra*		✓	✓	Fairly uncommon	Undisturbed ditches, rhynes, rivers, open water and reed beds
Water Vole	*Arvicular terrestris*		Proposed	✓	Very rare. Very few known populations within NA	Slow flowing ditches and rhynes with good vegetation and steep banks

Annex 1d

Plant species of conservation value within the Somerset Levels and Moors Natural Area.

Species of nature conservation value for their legal and other status within the Somerset Levels and Moors Natural Area. **Species in bold text are included in Table 2 "Key species for conservation attention in the Somerset Levels and Moors Natural Area".**

Abbreviations: **Status** - RDB Red Data Book species (1-15 km squares) NS Nationally Scare (16-100 km squares) NR - Nationally Rare (15 or fewer 10 km squares)

Species		**Status**	**Distribution or abundance in the natural area**	**Habitat**
Common	***Latin name***			
Marsh mallow	*Althaea officinalis*	NS	Rare. Limited to two moors within the NA	Grazing marsh ditches usually near the coast
Tasteless water pepper	*Persicaria laxiflora*	NS	Very small populations	Grassland and by ditches. Wet mud and peat banks
Boston horsetail	*Equisetum ramossissimum*	RDB	Single locality in North Somerset	Rough grassland on sand
Smooth rupturewort	*Hernia glabra*	RDB	Single locality in North Somerset	On bare sand in short turf on sand
Marsh pea	*Lathyrus palustris*	NS	Very rare. Formerly more widespread	Fen and fen meadows
Whorled water milfoil	*Myriophyllum verticillatum*	NS	Rare and local. North Somerset	Ponds and ditches with base rich water
Galingale	*Cyperus longus*	NS	Rare and local. North Somerset	Rhynes and ditches, fen meadows
Milk parsley	*Peucedanum palustre*	NS	Very rare. Restricted to a small area on the peat moors	Rich fen and reedbed
Fen pond weed	*Potamogeton coloratus*	NS	Peat moors	Ditches associated with fen
Hair-like pond weed	*Potamogeton trichoides*	NS	Rare	Wide range of habitats. Ditches, ponds and canals
Greater water parsnip	*Sium latifolium*	NS	Formerly plentiful in NA but now rarer	Fen and ditches associated with fen meadows, swamp and reed bed
Water soldier	*Stratioles aloides*	NS	Rare and local. Likely to have been introduced	Rhynes and ditches
Marsh fern	*Thelypteris palustris*	NS	Only on peat moors. Plentiful in places	Fen, fen meadows and reedbed
Rootless duckweed	*Wolffia arrhiza*	NS	Frequent and well distributed	Ditches, rhynes and ponds

Annex 2 The Plant communities of the Somerset Levels and Moors

This appendix lists the plant communities that are characteristic of the Natural Area's habitats. They are classified according to the National Vegetation Classification, published as the five volume '*British Plant Communities'*, (Rodwell, 1991-1995 and in prep).

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
Aquatics		
A1 ***Lemna gibba***	This community occurs widely throughout south eastern England and has also been recorded on the Gwent Levels. It occurs frequently in the NA and is widespread.	Associated with eutrophic, base-rich standing or sluggish waters. Comprises floating mats of small thalli of *Lemna gibba*, often forming a virtually continuous cover, one layer thick , with few submerged aquatics beneath. Tiny rootless thalli of the nationally scarce plant *Wolffia arrhiza* are occasionally found. It occurs in the early stages of recovery after ditch cleaning.
A2 ***Lemna minor***	Widespread distribution across lowland Britain, more so than *L. gibba*. However, recent surveys in the NA indicated *L.minor* was much less common than *L. gibba.*	Associated with mesotrophic to eutrophic, slightly base poor standing or slow moving waters. Comprises floating mats of *Lemna minor,* densely crowded forming a single layer on the water surface. Few other plants are associated with this community except *Azolla filiculoides*, an introduced aquatic fern. It is found as an early coloniser but also frequently with other floating or submerged macrophyte vegetation, among marginal swamps, encroaching emergents and often under overhanging trees.
A3 ***Spirodela polyrhiza- Hydrocharis morsus-ranae***	Increasingly local community confined to places across the country which are not polluted. Found in widely scattered sites, North Kent Marshes, Norfolk Broads, the Fens and Somerset Levels. One of the most frequently found communities in well managed ditches in the NA.	Confined to unpolluted, unshaded, clear mesotrophic and eutrophic standing waters. It is especially characteristic of more open ditches. Consists of a floating mat of various mixtures of duckweeds, *Lemna minor, L.gibba, Spirodela polyrhiza with Hydrocharis morsus-ranae* and is closely associated with a layer of submerged plants such as *Ceratophyllum demersum.* Nationally scarce *Wolfia arrhiza* and *Azolla filiculoides* occasionally found. Found midway in cleaning cycle before shading macrophytes and emergents overwhelm it and in ditches with shelving, and cattle poached banks.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
A12 ***Potamogeton pectinatus***	Widespread throughout the warmer lowlands of Southern Britain. Uncommon on the Somerset Levels and Moors.	Characteristic of still to quite fast-moving eutrophic waters often with some artificial enrichment. Species-poor dominated by *Potamogeton pectinatus*. Usually associated with few other plants except small patches of duckweed and scattered submergent plants, however, in cleaner sites it may be richer in species. Found mid to late in the ditch cleaning cycle.
A13 ***Potamogeton perfoliatus - Myriophyllum alterniflorum***	Largely a vegetation of the north and west of Britain, most commonly found in Scotland. Very localised on the North Somerset Levels.	Associated with still or gently flowing shallow to quite deep mesotrophic and base poor waters. Richer, more varied pondweed assemblages. Abundant and luxuriant character species of *Myriophyllum alterniflorum* and *Potamogeton gramineus*. *P. perfoliatus* not present on the North Somerset Levels. Other submerged pondweeds provide local diversity in this community. Often the first community of submerged aquatics.
A15 ***Elodea canadensis***	Widespread throughout the lowlands of Britain but rarely abundant. Only locally common on the Somerset Levels and Moors.	Associated with shallow to quite deep, still to sluggish nutrient-rich waters. Species-poor with *Elodea canadensis*, a North American pond weed, dominant forming free floating masses or with shoots rather loosely anchored to the substrate. Other species are at a low frequency although often diverse. *E. canadensis* overwhelms other submerged aquatic plants with its luxuriant growth , although floating plants may occur above. Found mid to late stages in the ditch cleaning cycle.
A21 ***Ranunculus baudotii***	Common along the seaboard of southern Britain associated with reclaimed grazing marshes. Local distribution on the North Somerset Levels.	Characteristic of standing or slow moving, usually brackish waters. Dominated by stands of *Ranunculus baudotii* which forms submerged spreading clumps or prostrate stands. No other character species but occasional other plants. Exists in early stages of the ditch cleaning cycle before emergents shade out the crowfoot. Disturbance by stock also helps to maintain the community.
Swamps		
S4 ***Phragmites australis***	Widespread through the British lowlands. Located within the Brue Valley. Fragments exist along ditches and rivers throughout the NA.	Associated with a wide range of permanently wet or periodically waterlogged habitats of differing trophic status and substrate - open water transitions around lakes, along ditches and in old peat cuttings. All communities characterised by a dominance of *Phragmites australis* with other species only at an occasional frequency. However, the stands can be very variable. A wide range of other swamp and fen communities are often associated with it. Occurs as a late stage in ditch cleaning cycle.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
S5 ***Glyceria maxima***	A lowland community. Frequent and widespread across the Somerset Levels and Moors.	Swamp of eutrophic water margins. Species- poor community, overwhelmingly dominated by *Glyceria maxima* which forms a luxuriant cover of leafy shoots, often over 1 metre long. Form of vegetation can vary from erect, tall emergent swamp to loosely attached margins which can become free floating islands. Encroaches on open water rapidly, often choking ditches in a late stage in the ditch cleaning cycle . Occurs at open water transition between S14 and other swamp and grassland communities. Important community for transition to fen.
S6 ***Carex riparia***	Extensive distribution across agricultural lowlands. Locally frequent across the Levels and Moors but not widespread.	Characteristic of wet or waterlogged mesotrophic to eutrophic soils adjacent to standing or slow moving waters. Dominant stands of *Carex riparia* in tufts with erect leaves, often with other swamp emergents and tall herbs. Frequently found encroaching on agricultural grassland from ditch edges. Often associated with S5 and S14.
S12 ***Typha latiflolia***	Widespread through agricultural lowlands of England. Common in the Brue Valley Catchment. Locally common on moors in ditches south of the Poldens.	Characteristic of standing or slow moving, mesotrophic to eutrophic neutral to basic waters and silty substrates. Tolerant of a wide range of water levels. Dominated by *Typha latifolia* which forms an open or closed cover of stout 1-2metre high shoots. Species poor with pure stands common. Forms an open water transitional community to tall drier fen vegetation. Can choke ditches in a late stage in the ditch cleaning cycle . Often associated with S5.
S13 ***Typha angustifolia***	Scattered distribution through the South-east and midlands. *Typha angustifolia* is an uncommon species on the Levels and Moors.	Characteristic of standing or slow, moving , mesotrophic to eutrophic neutral to basic waters and silty substrates. Always dominated by *Typha angustifolia* forming an open or closed canopy of shoots about 2 metres high. Rarely rich in other species. Similar habitat to S12 but the two species rarely occur together with *Typha angustifolia* more tolerant of less eutrophic conditions. Forms an open water transitional community to tall drier fen vegetation. Can choke ditches and is often associated with S5.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
S14 ***Sparganium erectum***	Very common community throughout the agricultural lowlands of England. A widespread community across the Levels and Moors.	Community of shallow, mesotrophic to eutrophic waters usually with mineral substrates. It occurs widely along ditches and around standing waters of small pools. It is generally dominated by an open or closed cover of *Sparganium erectum* shoots over 1 metre tall. Usually contains other species such as *Mentha aquatica, Alisma plantago-aquatica* and the nationally scarce *Wolffia arrhiza* which can achieve local prominence in the patches of open water. Associated with other tall herb communities and swamps in open water transitions and as riparian sequences.
S16 ***Sagittaria sagittaria***	Scattered occurrence through the central and southern lowlands of England.	Characteristic of moderately deep eutrophic standing or slow-moving waters with soft, silty substrates in wide ditches. *Sagittaria sagittaria* is the dominant emergent, with other species only occasional such as various duckweeds. Submerged aquatics such as *Hydrocharis morsus-ranae* maybe locally abundant. Occurs as a fringe along ditches and other open water with various swamp communities such as S5 and S23.
S17 ***Carex pseudocyperus***	Patchy distribution, most common in the Midlands. In east Anglia it occurs as a component of fen rather than swamp. Possibly common associated with fragments of tall-herb rich fen in the Brue Valley. Less common on the Levels and Moors except in particularly rich ditches.	Typical of shallow, slow moving or sluggish waters around open pools and richer ditches. *Carex pseudocyperus* forms dense pure stands of emergent vegetation over 1 metre high with some other species mainly, *Juncus effusus* and *Sparganium erectum.* Other species maybe present along water margins such as *Mentha aquatica*. This community often forms a fringe between the water and *Phragmites australis* and the pastures and meadows. It has also been associated with tall-herb rich fen.
S19 ***Eleocharis palustris***	Scattered distribution throughout the British lowlands. Uncommon community within the NA.	Swamp community of standing or running waters along the edges of open water. Dominated by open or closed cover of the slender shoots of *Eleocharis palustris*. No other species are frequent throughout.
S20 ***Scirpus lacustris spp tabernaemontani***	Occurs on and close to the English Coasts. Inland very local throughout the lowlands. Very local distribution within the NA.	Occurs in moist, brackish sites on silt and clay. Also in standing freshwater sites. Dominated by *Scirpus lacustris* spp, *tabernae montani* which forms a dense cover 80-90cm high. Occasional saltmarsh and disturbed ground species below. Geese and cattle eat the shoots. Late stage in the ditch cleaning cycle.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
S21 *Scirpus maritimus*	Occurs in suitable sites on all coasts. Primarily coastal but this species is found inland within the NA, although there is some difficulty in including it with the S21 classification. Very local, infrequent community.	Characteristic of still, slowing waters with a range of salinities. Dominated by *Scirpus maritimus*. No other species frequent. Usual brackish associates not present on the Levels. Sometimes frequent and abundant in the fringing vegetation of some of the richer field ditches. Late stage in the ditch cleaning cycle. Associated with S14 and S28.
S22 *Glyceria fluitans* water margin vegetation	Widespread and common in agricultural lowlands. Fairly frequent and widespread community within the NA.	Characteristic of shallow, standing or sluggish mesotrophic waters. Dominated by a low mat or floating carpet of *Glyceria fluitans*, sometimes continuous and very species poor. Sometimes associated with plants of shallow water margins such as *Alisma plantago-aquatica*. Exists on the margins of ditches and wet depressions in fens and pastures grazed by geese and wigeon.
S23 Other water margin vegetation	Common throughout the lowlands of Britain. Frequent and widespread across the NA.	Typical of unshaded margins of mesotrophic to eutrophic waters. Characteristically helogenous but the most frequent species are *Apium nodiflorum* and *Nasturtium officinale*. Common around field ditch and pond margins. Recovers quickly after cleaning and, therefore, occurs early in the ditch cycle, although it is also found in unmanaged channels. Will eventually give way to a swamp-like S5 or S14.
Tall - Herb Fen		
S24 *Phragmites australis - Peucedanum palustre*	Almost entirely confined to Broadland with fragments on flood-plain mires. Extremely rare within NA - Catcott Heath, Westhay Heath	Generally restricted to fen peats with a moderate to high summer water table and some winter flooding. Dominated by a very species rich herbaceous vegetation. Character species include, *Phragmites australis, Juncus subnodulosus* and *Filipendula ulmaria. Peucedanum palustre, Thelypteris palustris* and *Lathyris palustris,* all nationally scarce, are also present. Composition depends to a large extent on the fen's management.
S25 *Phragmites australis - Eupatorium cannabium*	Widespread but scattered distribution throughout English lowlands. Occurs mainly in the Brue Valley within the NA.	Characteristic of moderately eutrophic situations, frequently waterlogged with base-rich waters. Variable vegetation but a prominence of tall herbs with *Phragmites australis, Eupatorium cannabinum, Angelica sylvestris* and *Lythrium salicaria.* Species characteristic of S24 uncommon as this community associated with most enriched conditions. Found with other fen communities on old peat diggings and degraded fen/mire sites.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
S26 ***Phragmites australis - Urtica dioica***	Occurs throughout lowlands but well-represented in Broadland and the fens. Occurs mainly in the Brue Valley within the NA.	Characteristic of eutrophic and basic water margins and mires on organic or mineral substrates kept fairly moist throughout the year. Very variable in its composition although both *Phragmites australis* and *Urtica dioica* are generally abundant and often dominant. Stands frequently species poor. Local dominance of other tall herbs eg. *Epilobium hirsutum*. Found on old peat cuttings, fen margins.
S28 ***Phalaris arundinacea***	Widespread and common community through lowlands. Widespread within the NA	Found on margins of fluctuating mesotrophic to eutrophic waters, both running and standing. Found on organic and mineral soils. *Phlararis arundinacea* forms an often dense canopy usually 1-1.5m tall. Always species poor. Common on rhynes as a sparse fringe. It is often the terminating vegetation in zonations/successions around open water.
Mires		
M22 ***Juncus subnodulosus - Cirsium palustre*** **fen meadow**	Widespread on appropriate soils throughout lowlands, particular concentrations in East Anglia. Found on a number of moors in the NA but limited to small areas.	Secondary herbaceous fen vegetation over a wide range of peats and mineral soils. Species rich comprising of sedges and rushes and a large number of character species including *Filipendula ulmaria* and *Lotus uliginosus*. Considerable local variation due to management.
M23 ***Juncus effusus/acutiflorus - Galium palustre*** **rush pasture**	Widespread in the west of Britain. Local in the south west. Distribution in the NA is similar to M22.	Occurs on a variety of neutral peaty and mineral soils on ill-drained, moderately acid, unimproved pastures and along ditch boundaries, ill-defined vegetation with an abundance of *Juncus effusus* or *J.acutifloris*. Species diversity is fairly poor compared with M22. Grades into other grassland and mire communities and is often difficult to define.
M24 ***Molinia caerulea - Cirsium dissectum*** **fen meadow**	Widespread in lowland in the south of the country. Small areas within the NA, mainly limited to Shapwick Heath.	Occurs on moist to fairly dry peats and peaty mineral soils. *Molinia* dominated but it is a species-rich community of high conservation value. Grades into grassland communities of unimproved cattle grazed and hay meadow swards.
M25 ***Molinia caerulea*** **and** ***Potentilla erecta*** **mire**	Occurs throughout western Britain but the various sub-communities are particularly frequent in the south west scattered in small areas within the NA on a small number of moors.	Found on moist, acid to neutral, peats and peaty mineral soils. Dominated by an overwhelming abundance of *Molinia* forming a dense cover. Species poor community with *Potentilla erecta* the other character species surviving by growing amongst the dense herbage of the dry hummock tops, rough pastures and hay meadows.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
M27 *Filipendula ulmaria - Angelica sylvestris* mire	Occurs throughout lowland Britain with very clear regional characteristics. Small areas within the NA mainly in the Brue Valley, Shapwick Heath and along ditch margins.	Usually occurs on rich mineral and organic soils where it is kept damp and is protected from grazing. *Filipendula ulmaria* is frequent and locally abundant with a variety of tall herbs, sedges and rank grasses. Often very colourful in mid summer with *Valeriana officinalis, Angelica sylvestris* and *Lychnis flos-cuculi.* Associated with fens, rush pastures, flushes and along ditch margins.
Grasslands		
MG1 *Arrhenatherum elatius*	Ubiquitous throughout the lowlands of England. Common in the NA.	Coarse-leaved tussock grasses notably *Arrhenatherum elatius* and smaller amounts of *Holcus lanatus* and *Dactylis glomerata.* Often contains large umbellifers mainly *Anthriscus sylvestris* and *Heracleum spondylium.* Associated with road and drove verges and in neglected 'agricultural corners' and badly managed pastures and meadows. Composition and structure largely dependant on management.
MG4 *Alopecurus pratensis- Sanguisorba officinalis*	Widespread but local distribution in England. Limited extent within the NA - locally common.	Characteristic of areas with traditional hay meadow treatment. Species-rich and varied sward of grasses and herbs. Generally there is no single dominant. *Sanguisorba officinalis* is absent from the Levels, however, the vegetation type is best accommodated in MG4/5 (Rodwell, pers. comm). Other character species include, *Cerastium fontanum*, *Cynosurus cristatus*, *Lathyris pratensis* and *Leondoton autumnalis*.
MG5 *Cynosurus cristatus - Centaurea nigra*	Occurs throughout British lowlands. Limited extent within NA - locally frequent.	Typical grassland of grazed hay meadows treated traditionally on brown soils. Herb-rich grassland of variable appearance. Often tight sward with *Cynosurus cristatus*, *Agrostis capillaris* and *Festuca rubra* abundant. Herbs may account for 95% of the cover, including *Lotus corniculatus* and *Trifolium pratense*. Occurs on the drier, slightly higher areas of the Moors and Levels.
MG6 *Lolium perenne - Cynosurus cristatus*	Ubiquitous community of British lowlands. Particularly in the dairy producing areas including the Somerset Levels and Moors.	Major permanent pasture on free-draining brown soils. Short, tight grass dominated sward. *Lolium perenne* is the most abundant grass, with some *Cynosurus cristatus*. In re-sown grasslands *C. cristatus* is rare. Herb-poor with *Trifolium repens* the most abundant species.
MG7 *Lolium perenne* leys and related grasslands	Ubiquitous community of British lowlands. Widespread and abundant within the NA.	Grass dominant and very species-poor sward. Associated with intensive grassland management.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
MG8 ***Cynosurus cristatus - Caltha palustris***	Widespread but local distribution in British lowlands. Limited extent within NA although it may have the greatest area in Britain. Highest concentration on West Sedgemoor. Derivatives of MG8 found on other moors.	Characteristic of periodically inundated land which has been traditionally treated. Species-rich varied grassland with no single species consistently dominant. Grasses abundant, some sedges but infrequent *Juncus* spp. *Caltha palustris* and *Filipendula ulmaria* are character herb species. A community similar to MG8 has been found within the NA - distinctive sedge-rich *Agrostis stolonifera- Carex* spp grassland also associated with unimproved swards. Characteristic species including *Cynosurus cristatus* are deficient from this community.
MG9 ***Holcus lanatus - Deschampsia cespitosa***	Virtually ubiquitous in suitable sites throughout lowlands. Fairly widespread community within the NA, quite locally abundant.	Characteristic of permanently moist, gleyed and inundated soils. Coarse sward dominated by *Deschampsia cespitosa* and other large tufted or tussocky grasses; *Holcus lanatus, Dactylis glomerata* and *Arrhenatherum elatius*. The variety of other species depends on the shading from the tussocks. Often results from the invasion of *D. cespitosa* into MG6 and MG7 when drainage has deteriorated.
MG10 ***Holcus lanatus - Juncus effusus rush-pasture***	Ubiquitous community of British lowlands. Common within the NA.	Characteristic of a wide range of permanently moist soils. Tussocks of *Juncus effusus*, up to 80cm tall, in a generally species-poor and shorter grassland. *Holcus lanatus* and *Agrostis stolonifera* are character grasses. Herbs are few although *Ranunculus repens* and *R. acris* are usually frequent. Associated with grazed pastures and along ditches. Commonly develops due to invasion by *Juncus* of MG6 and MG7 when drainage is impeded.
MG 11 ***Festuca rubra - Agrostis stolonifera-Potentilla anserina***.	Scattered localities in lowland England. Limited distribution and extent within the NA.	Characteristic of a wide variety of moist but free-draining soils, frequently inundated with fresh or brackish water. Variable vegetation type with the three character species abundant in an open or closed sward. Other herbs are few except *Trifolium repens* which is frequent. Usually grades into MG6 on drier land and MG13 on wetter areas.
MG13 ***Agrostis stolonifera - Alopecurus geniculatus***	Widely distributed throughout British lowlands. Frequent and widespread within the NA.	Characteristic of soils kept permanently moist and sometimes waterlogged by periodic inundation with fresh water. Comprises of open or closed swards with mixtures of *Agrostis stolonifera* and *Alopecurus geniculatus*. A variety of *Juncus spp* and tall *Rumex* spp. Forms mosaics with swamp communities in fields and along ditches. Provides valuable feeding areas for wildfowl.

NVC Communities	Distribution in Britain and within the NA	Habitat and plant species descriptions.
Wet woodlands		
W5 b ***Alnus glutinosa - Carex paniculata Lysimachia vulgaris*** **sub-community**	Fairly local though quite widespread throughout English lowlands. Main area is within the Brue Valley.	Typical of wet, waterlogged, organic base-rich soils. Especially associated with fen-peats in open water transitions and floodplain mires. Canopy characterised by the high frequency of *Alnus*. Frequent bushes of *Salix cinerea* and occasional other species. Rich and varied field layer including the sedges *Carex paniculata* and *C.acutiformis*. Contains a striking number of tall herbs and possibly the nationally scarce *Peucedanum palustre* and *Thelyopteris palustris*.
W6 e ***Alnus glutinosa - Urtica dioica Betula pubescens*** **sub-community**	Widespread but local community throughout lowlands. Brue Valley.	Woodland of eutrophic moist soils. Ill-defined community including a variety of canopies dominated by *Alnu*s, *Salix* spp and *Betula pubescens* with a species-poor, distinctive field layer. In this sub-community *B.pubescens* is more dominant with *Pinus sylvestris* a frequent invader in the drier woodlands. *Rubus* and *Lonicera* are dominant in the field layer.

Annex 3

Plants

Alder	*Ulnus glutinosa*
Ash	*Fraxinus excelsior*
Birch	*Betula* spp
Bird's-foot trefoil	*Lotus corniculatus*
Black poplar	*Populus nigra*
Bog asphodel	*Narthecium ossifragum*
Bog moss	*Sphagnum* spp
Bog myrtle	*Myrica gale*
Bulrush	*Scirpus lacustris*
Bur-reed	*Sparganium* spp
Common butterwort	*Pinguicula vulgaris*
Common knapweed	*Centaurea nigra*
Common reed	*Phragmites australis*
Cowslip	*Primula veris*
Creeping bent	*Agrostis stolonifera*
Creeping buttercup	*Ranunculus repens*
Cross-leaved heath	*Erica tetralix*
Cuckoo flower	*Cardamine pratensis*
Duckweeds	*Lemna* spp
Elm	*Ulmus* spp
Fen pondweed	*Potamogeton coloratus*
Fennel leaved pondweed	*Potamogeton pectinatus*
Frogbit	*Hydrocharis morsus-ranae*
Green-winged orchid	*Orchis morio*
Honeysuckle	*Lonicera periclymenum*
Ivy-leaved bellflower	*Wahlenbergia hederacea*
Jointed rush	*Juncus articulatus*
Lesser spearwort	*Ranunculus flammula*
Marsh arrowgrass	*Triglochin palustris*
Marsh fern	*Thelypteris palustris*
Marsh foxtail	*Alopecurus geniculatus*
Marsh marigold	*Caltha palustris*
Marsh pea	*Lathyrus palustris*
Marsh thistle	*Cirsium palustre*
Meadow buttercup	*Ranunculus acris*
Meadow rue	*Thalictrum flavum*
Meadow thistle	*Cirsium dissectum*
Meadowsweet	*Filipendula ulmaria*
Milk parsley	*Peucedanum palustre*
Oak	*Quercus* spp
Perennial rye grass	*Lolium perenne*
Pondweeds	*Potamogeton* spp
Purple moor-grass	*Molinia caerulea*
Quaking grass	*Briza media*
Ragged Robin	*Lychnis flos-cuculi*
Reed mace	*Typha latifolia*

Reed sweet-grass	*Glyceria maxima*
Rigid hornwort	*Ceratophyllum demersum*
Royal Fern	*Osmunda regalis*
Sedges	*Carex* spp
Shining pondweed	*Potamogeton lucens*
Southern marsh orchid	*Dactylorhiza praetermissa*
Sundews	*Drosera* spp
Timothy	*Phleum pratense*
Tussock sedge	*Carex paniculata*
Water milfoils	*Myriophyllum* spp
Water mint	*Mentha aquatica*
Water plantain	*Alisma plantago aquatica*
Water-starwort	*Callitriche stagnalis*
Willow	*Salix* spp
Yellow iris	*Iris pseudacorus*
Yellow water lily	*Nuphar lutea*

Birds

Barn owl	*Typha alba*
Bewick's swan	*Cygnus columbianus bewickii*
Bittern	*Botaurus stellarius*
Black-tailed godwit	*Limosa limosa*
Blue tit	*Parus caeruleus*
Buzzard	*Buteo buteo*
Curlew	*Numenius arquata*
Fieldfare	*Turdus pilaris*
Gadwall	*Anas strepera*
Garganey	*Anas querquedula*
Golden plover	*Pluvialis apricaria*
Goldfinch	*Carduelis carduelis*
Great crested grebe	*Podiceps cristatus*
Heron	*Ardea cinerea*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Lapwing	*Vanellus vanellus*
Little grebe	*Tachytaptus ruficollis*
Little owl	*Athene noctua*
Mallard	*Anas platrhynchos*
Marsh harrier	*Circus aeruginous*
Mute swan	*Cygnus olor*
Nightjar	*Caprinulgus europeaus*
Pintail	*Anas acuta*
Pochard	*Athyra perina*
Redwing	*Turdus iliacus*
Reed warbler	*Acrocephalus scirpaceous*
Reed bunting	*Emberiza schoeniclus*
Sedge warbler	*Acrocephalus schoenobaenus*
Shoveler	*Anas clypeata*
Snipe	*Galinago galinago*

Song thrush	*Turdus philomelos*
Starling	*Sturnus vulgaris*
Teal	*Anas crecca*
Tree creeper	*Certhia familiaris*
Water rail	*Rallus aquaticus*
Whinchat	*Saxicola rubetra*
Wigeon	*Anas penelope*

Beetles

Greater silver diving beetle	*Hydrophilius piceus*
Hairy click beetle	*Synaptus filiformis*
Lesser silver diving beetle	*Hydrocaris caraboides*

Dragonflies

Hairy Dragonfly	*Brachytron pratense*
Variable Damselfly	*Coenagrion pulchellum*
Four-spotted Chaser	*Libellula quadrimaculata*
Black-tailed Skimmer	*Orthetrum cancellatum*

Butterflies

Marbled white	*Melanargia galathea*
Marsh fritillary	*Euphydryas aurinia*
Meadow brown	*Maniola jurtina*
White admiral	*Ladoga camilla*

Grasshopper

Large marsh grasshopper	*Stethophyma grossum*

Fish

Eel	*Anguilla anguilla*
Pike	*Esox lucius*

Mammals

Otter	*Lutra lutra*
Water vole	*Arvicular terrestris*

Annex 4 - Key features of the SSSIs in the Somerset Levels and Moors Natural Area

	Area (ha)	SPA/ Ramsar	Of national importance for:					
			wetland habitats	over-wintering waterfowl	aquatic flora	aquatic fauna	geological features	other interest
Biddle Street, Yatton	45				✓			
Bridgwater Bay (part)	c600	c	✓	✓	✓	✓		
Catcott, Edington & Chilton Moors	1,083	c	✓	✓	✓	✓		
Cheddar Reservoir	105			✓				
Curry & Hay Moor	472	c	✓	✓	✓	✓		
Ellenborough Park	1.8							✓[1]
Greylake	9						✓	
King's Sedgemoor	822	c	✓	✓	✓	✓		
Langmead & Weston Level	168		✓		✓	✓		
Meare Heath	225							✓[2]
Moorlinch	226	c	✓	✓	✓	✓		
North Moor	676		✓		✓	✓		
Puxton Moor	31		✓		✓	✓		
Severn Estuary (part)	90	c	✓	✓				
Shapwick Heath	394	c	✓	✓	✓	✓		✓[3]
Sharpham Moor Plot	0.5		✓					
Southlake Moor	196	c	✓	✓	✓	✓		
Street Heath	12		✓					
Tealham & Tadham Moors	917	c	✓	✓	✓	✓		
Tickenham, Nailsea & Kenn Moors	129		✓		✓	✓		
West Moor	213	c	✓	✓	✓	✓		
West Sedgemoor	809	c	✓	✓	✓	✓		
Westhay Heath	26	c	✓	✓	✓	✓		
Westhay Moor	574	c	✓	✓	✓	✓		
Wet Moor	491	c	✓	✓	✓	✓		
Yanal Bog	2		✓					

Special Protection Area/Ramsar sites - c = classified
Other interests: [1] = rare plants
[2] = terrestrial & semi-aquatic invertebrates
[3] = archaeological (Sweet Track)