IMPORTANT NOTES

Nomenclature
The term "Site of Importance for Nature Conservation" (SINC) used in previous wildlife reports is here replaced by the currently generally accepted term of "Local Wildlife Site".

Rationale
It is hoped that this identification of important Local Wildlife Sites is not seen as a hindrance to the livelihood of those landowners affected, or an attempt to blindly influence the management of such sites. It is an attempt to describe the wildlife resource we have in the district and the county as a whole. This biodiversity has been preserved thus far as a result of the management by landowners and it is hoped that the Essex Wildlife Trust, in conjunction with Maldon District Council and other interested parties will be able to help landowners retain and enhance this biodiversity for future generations.

Public Access
Identification of land as a Local Wildlife Site within this report does not confer any right of public access to the site, above and beyond any Public Rights of Way that may exist. The vast majority of the Sites are in private ownership and this should be respected at all times.

Land Ownership
It has always been the intention of the Essex Wildlife Trust to contact all landowners of Local Wildlife Sites, advising them of this identification and promoting nature conservation management of the site. To that end, the Essex Wildlife Trust has appointed a Wildlife Sites Officer, who will be actively promoting the Local Wildlife Site network in Maldon district and throughout Essex. While this lengthy undertaking is in progress it is requested that the Essex Wildlife Trust is contacted prior to any formal approach regarding any Site identified within this report.

Boundaries
Whilst every attempt has been made to ensure accurate mapping of the site boundaries, the accompanying maps should be considered as being illustrative only. The Essex Wildlife Trust should be consulted over the precise boundary of all sites, should any dispute occur or if precise determination be required.

Planning
The information within this report should not be used as a bypass to the normal planning consultation process. It is inevitable that, with the passage of time, some Local Wildlife Sites will be lost or damaged to the extent that they are no longer considered as such. Similarly, new Sites may be identified and periodically added to the list for the district. For these reasons, the Essex Wildlife Trust still wishes to be consulted on all planning proposals, regardless of whether or not they apparently affect a Site detailed within this report. This report will allow a greater understanding of the wildlife resources of the district/borough and will make the consultation process much faster and more cost-effective.

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MALDON NATURE CONSERVATION STUDY

1. INTRODUCTION

1.1 General Introduction

This report has been produced by Essex Ecology Services Ltd. (EECOS), the survey and advisory company of the Essex Wildlife Trust, on behalf of Maldon District Council. It comprises the results of a general wildlife survey of the district, to evaluate the existing network of important wildlife sites as part of the ongoing review process towards a new Local Development Framework.

A previous wildlife survey report, produced in 1991, incorporated a basic land use survey with an exercise to identify the most important wildlife habitats present within the borough. These important wildlife habitats were identified as "Sites of Importance for Nature Conservation" [SINC], with the results summarised in "Nature conservation – A Reference Guide". This present report covers a review of the advances within the SINC system since this initial study. It also includes an update of the statutory obligations of local authorities, current nature conservation initiatives and an appraisal of the Site selection process. This is then followed by a discussion of the 2007 re-survey of the district and the identification of the current network of important Local Wildlife Sites. This is then used as a framework for discussing wider biodiversity issues within Maldon district, focussing on selected Essex and UK BAP species and habitats present in the district.

The instigation of biodiversity action planning at a national, regional and local level is one of the most fundamental changes to have impacted upon how we perceive nature conservation issues. Local BAPs allow for the recognition and hopefully the conservation of local distinctiveness within the flora and fauna of an area, whilst also clarifying the framework within which local conservation initiatives help to contribute to the achievement of regional or national BAP objectives in a far wider context.

It should be stressed that the role of local authorities in planning future development and management of land goes far beyond statutory requirements, such as those laid out in Planning Policy Statement 9 and other legal requirements (see Chapter 3). There is also a desire to conserve the intrinsic appeal of the land, to maintain and, where possible, enhance, "local character" in terms of assemblages of animals and plants, the landscape appeal that

most semi-natural habitats have as well as ecological oddities that give the area a unique "selling point". There is an opinion, perhaps over-simplified, that land development inevitably leads to an ever-increasing erosion of the wildlife habitats and the number of plants and animals to be found in an area.

1.2 Review Process

The basis for this re-assessment has been a complete Phase 1 Habitat Survey of the district. The detailed methodology of this survey is given in Chapter 2. Included within the general survey was especial consideration of the actual and potential "wildlife corridors" within the district as well as those landscape features which were felt to be a particular block to the free movement of species and individuals across the countryside. A separate study evaluated a suite of potential sites for future residential development, as an Urban Capacity Study. The details of this study are reported separately.

For this present study, the applicable species and habitats that are now the subject of attention via local, county or national Biodiversity Action Plans were also especially sought. Following on from the collection of revised site data via this field survey, a draft suite of Local Wildlife Sites was compiled.

The revised Local Wildlife Site selection criteria (see Chapter 4, below) were initially developed in association with previous surveys undertaken within Castle Point in 2002, and Chelmsford Borough and Basildon district during 2004. During 2006, these selection criteria were the subject of a formal ratification process across the county, involving Natural England and Essex County Council as well as officers from the other local planning authorities and national experts, carried out by the Essex Wildlife Trust's Local Wildlife Sites Officer. Comments from the consultation process have now been incorporated into the criteria and will be published by the Essex Wildlife Sites Project (under the auspices of the Essex Wildlife Trust) as a final document in the near future.

In developing these revised criteria it is apparent that, for some groups such as invertebrates, the state of our knowledge concerning their distribution and ecological requirements is still quite limited, or at very best patchy, so that whilst criteria are now being put in place to select sites on the grounds of their invertebrate interest, the actual ability to do so is still at an early stage. However, development of the various Biodiversity initiatives across the county and the

production of an Essex Red Data List should help in focussing on the needs of these populations and identifying their key population localities. These data can then feed into subsequent Local Wildlife Site reviews, improving the effectiveness of their nature conservation role.

1.3 Limitations of the Survey

By its very nature, a Phase 1 Habitat Survey is a very "broad-brush" approach to collecting wildlife data. Generally, it does not allow for any site to be visited more than once nor can it be guaranteed that it is visited at the optimum time for the wildlife actually present. This is especially true for habitat mosaics, where a woodland component might be best surveyed in late April or early May, whilst a grassland component would be at its best in July or later. For a number of sites, this can be compensated for by one of two means:

1. Relying on the previous habitat survey data, which might have been gathered at a different time of year. Where possible, previous survey data were used to suggest the optimum time for a re-visit;
2. Using the knowledge of local naturalists who may have observed the site over many seasons, to broaden one's knowledge of the site.

This review of sites and the adoption of revised selection criteria introduces a stronger element of site adoption on the grounds of invertebrate, amphibian, mammalian and bird populations. For many of these groups our knowledge of their distribution and ecological requirements is limited, so that whilst criteria are now in place to help protect populations of nationally endangered or locally significant species, it may yet not be possible to identify sites accordingly.

2. SURVEY METHODOLOGY

2.1 General Techniques and Sources of Information

The field survey method has remained essentially the same as that used during the survey of 1991. During fieldwork sessions, the land use/habitat type for all land was recorded using standardised letter codes (see Section 2.3, below) laid down by the Nature Conservancy Council's Habitat Mapping Manual (Phase 1) (1990). For the first time, some inter-tidal land has been mapped, but only saltmarsh not mudflats.

For most areas of known or potential wildlife value, detailed flora and fauna "target notes" have already been written during the previous survey, so the main emphasis during this present study was on checking whether or not the habitat quality and general species assemblages were still present. Notwithstanding this, many new target notes were also compiled for sites not previously covered and numerous sites were upgraded from brief target note to fully detailed target note status.

Land was generally surveyed from public highways and public rights of way or by gaining permission from the relevant landowner(s), to enter onto land not accessible from such vantage points. Powers of access delegated to the surveyors by Maldon District Council allowed access to those areas where the landowner could not be traced or was reluctant to grant access.

Additional site-specific information has been gleaned from records held by the Essex Wildlife Trust, Natural England and other conservation organisations, or from published sources, including publications of the Essex Field Club.

2.2 Detailed Methodology

a) Digital 1:10000 scale Ordnance Survey raster maps were used as the basis to record land use in the field. Prior to fieldwork, existing Local Wildlife Sites and other known sites of suspected interest were highlighted on A3 or A4 photocopies of the base map, along with all public rights of way, in order to facilitate route-planning and assimilate existing knowledge.

b) The field survey maps were then transferred directly onto the Ordnance Survey Mastermap base plans using ArcView GIS software. This base map is composed of polygons, which can readily be attributed the relevant land use coding.

c) Sites for which descriptive “target notes" were written were highlighted on the base map by a five or six figure number generated by applying sequential numbers per square kilometre. In this way, the first four numbers refer to the one kilometre square (*e.g.* 8603 for the square TL 86 03) and an additional one or two (if there are more than nine target notes in a kilometre square) digit number is added identifying the note within that square kilometre. It should be noted that this numbering system is based on the original county-wide survey and so there are instances where the sequential numbering within a kilometre square swaps back and forth over a district boundary. Thus, whilst notes 1 and 3 may be mapped here as being within the district, note 2 may lie within another borough/district and will not show up on the accompanying land use map. The basic underlying data for each target note is held in pdf documents hyperlinked to the Target Note GIS layer.

d) The district was surveyed between June 2006 and August 2007. Wherever possible, habitats were surveyed at the most appropriate time of the year, *i.e.* when the most significant component plants or habitat structure is visible. For example, this means that, broadly speaking, woodlands were visited in spring and grasslands were visited in summer.

2.3 Habitat Code Definitions

The Phase 1 survey procedure is based on assigning to each habitat unit one of over ninety different habitat categories, which aim to encompass the entire range of habitat variability within Great Britain. The original definitions are given in the Nature Conservancy Council (NCC) Habitat Mapping Manual (Phase 1) (1990) and were based on those used by the NCC for surveying SSSIs. They were designed to be broadly compatible with the National Vegetation Classification (NVC).

The definitions set out below correspond to the habitat categories used on the ArcView GIS files accompanying this report, which slightly differ from the standard Phase 1 codes codes.

The codes are arranged in a hierarchical manner with a small number of 'broad habitats' split into more defined habitats. Complex habitats that cannot be broken down into smaller units effectively are described in greater detail by adding 'matrix habitats'. Thus a mosaic of scrub interspersed by amenity grassland would be assigned the habitat of 'scattered scrub' with a matrix habitat of 'amenity grassland' This allows for a more accurate picture of the habitats to be painted, but does result in some caveats regarding the habitat area values presented in section 4.2.

The following sections take each broad habitat in turn and provide some detail about the range of habitats within them. Only those main habitats that have been encountered during the Phase 1 survey are included.

2.3.1 Woodland and Scrub

Woodland habitat is made up of vegetation dominated by trees (more than 5 metres high when mature) forming a distinct, although sometimes open, canopy and is sub-divided into the following categories:

- *Broad-leaved Semi-natural Woodland*: "natural woodland" with 10% or less canopy cover by conifers;
- *Broad-leaved Plantation Woodland*: comprising mainly planted standard trees;
- *Mixed Plantation Woodland*: 11 - 90% of planted standard broad-leaved or coniferous species;
- *Coniferous Plantation Woodland*: comprising mainly planted coniferous trees.
- *Mixed Semi-natural Woodland*: comprising "natural woodland" with more than 10% canopy cover by conifers.

The following woodland types are included in the "semi-natural" rather than "planted" categories:

- Woods with planted standards in semi-natural coppice;
- Mature plantations (more than about 120 years old) of native species growing on sites where those species are native and where there are semi-natural woodland ground flora and shrub communities. Self-sown secondary stands of exotic species (e.g. Pine on heathland, or Sycamore);
- Willow carr (other than Grey Willow, which is classified as scrub) where the willows are more than 5 metres tall;

- Well-established Sweet Chestnut coppice;
- Woods which have been completely underplanted, but where the planted trees do not yet contribute to the canopy.

A wood is defined as "Planted" if the extent of planting amounts to 30% or more of the total tree canopy cover. A very open tree canopy is coded as *Broad-leaved Scattered Trees*, a category that includes parkland as well as unusually open semi-natural or planted woodland not designed for this purpose.

These woodland habitats are less likely to have matrix habitats than scrub or grassland, but combinations of woodland types are not unusual. There are also examples of woodland habitats in matrix with scrub, improved or semi-improved grassland, tall ruderal and marshy grassland habitats.

Scrub is defined as vegetation dominated by locally native shrubs, usually less than 5 metres tall, occasionally with a few scattered trees. Two sub-divisions are recognised, *Dense/Continuous Scrub* and *Scattered Scrub*, which include the following communities:

- Gorse and Broom scrub;
- Stands of mature Hawthorn, Blackthorn or Grey Willow even if over 5 metres high;
- All Willow carr, except if over 5 metres tall and of species other than Grey Willow.

This category does not include stands of young trees or stump regrowth less than 5 metres high, where these represent more than 50% of the immature canopy cover. Usually, Scattered Scrub will be included in a matrix with other habitat(s), with one or other dominant *e.g.* woodland habitats, grassland habitats or even standing water where a number of ponds are present.

2.3.2 Grassland and Marsh

This is a complex category of different habitat types. The sub-divisions are based on the general pH of the soil (acid, neutral or, in some localities, calcareous) and the degree of agricultural improvement (totally improved, species-poor semi-improved, species-rich semi-improved and unimproved/ insignificantly improved). Coastal grasslands are dealt with under Coastland habitats.

Improved Grassland

Grasslands of this type can usually be distinguished by their bright colour and lush growth. The sward is species-poor, brought about by regular treatment with artificial fertilizers and/or herbicides which favours only a very few, competitive species of little wildlife interest. This is usually compounded by reseeding with species such as Perennial Ryegrass cultivars and White Clover. Habitats classified under this heading would include intensively managed grazing pasture and hay/silage grasslands. Fields of ryegrass grown for seed or as obviously temporary leys are treated as arable land. Improved grasslands are less likely to occur in natural habitat mosaics than are other grassland types, but there are situations where this habitat is combine with broadleaved plantation woodland, parkland/scattered trees, bare ground, ephemeral/short perennial and tall ruderal habitats.

Poor Semi-improved Grassland

This habitat is intermediate between highly improved agricultural grasslands, above, and the "semi-improved" but often quite floristically diverse swards described below. It will usually have been derived from improved but permanent pasture, which tends to accumulate small quantities of common herbs and other grasses through natural seed colonisation. These herbs are often not associated with old grasslands but can be more opportunistic ruderals. The resulting sward can be quite "flowery" but its character does not closely resemble an old meadow that has undergone improvement, hence its separation from even the significantly improved "semi-improved" swards.

Some areas of longer-term set-aside land may now be classified under this heading, although short-term set-aside areas have been mapped as arable land.

This is one of the commonest grassland habitats and the one that occurs in the greatest number of different mosaics.

Semi-improved Neutral Grassland

Grasslands that have been only slightly modified by fertilizers, herbicides, high grazing pressure or drainage are included in this group. Species diversity is usually lower than the unimproved neutral grassland with characteristic species being at much lower densities and partially replaced by more competitive species such as Ryegrass. Neutral grasslands occur on

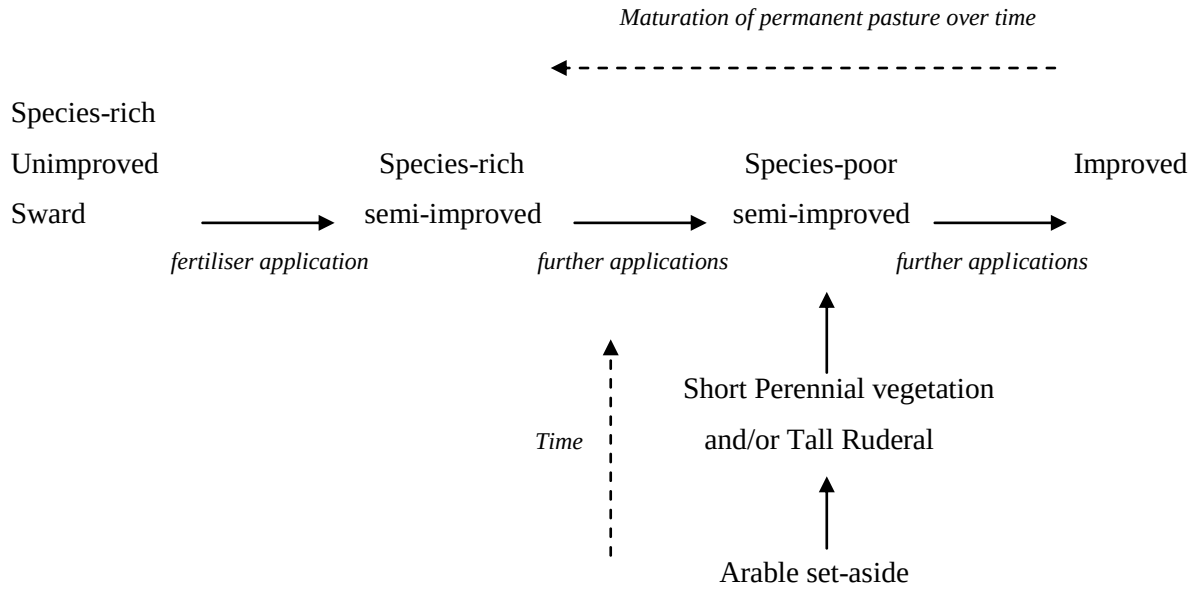
neutral soils, typically clays in Maldon district, and account for the majority of semi-improved grassland. The range of habitat matrices that occur with this habitat are almost as wide as the previous category.

Semi-improved Acid Grassland

This habitat is as above, but develops on acid soils, most often former sand and gravel workings around Maldon with only a very small number of old sites. As a consequence of the scarcity of this habitat, there are few habitats associated with this one in a matrix, scrub and semi-improved neutral grassland being the only examples encountered during this survey.

Unimproved Neutral Grassland

Such sites are often regularly grazed or mown but may be rank and neglected. Whilst they may receive farmyard manure treatment or manure direct from grazing livestock, the species complement will not have been significantly affected. This category encompasses a wide range of communities occurring on neutral (pH 5.5 - 7.0) soils, which are often clayey or loamy and generally are more intensively managed than either acidic or calcareous grasslands. The following grass species are indicative of neutral conditions when occurring frequently: Meadow Foxtail, Sweet Vernal Grass, False Oat-grass, Crested Dog's-tail, Cock's-foot, Tufted Hair-grass, Tall Fescue, Meadow Fescue, Ryegrass and Rough Meadow-grass. The associated herbs are often very diverse, producing some of the most species-rich grasslands in the country. The relationship between grassland types and associated land uses can be summarised as follows, using neutral soils as an example, although a similar case would apply to acid and calcareous grasslands:



Most coastal grazing marsh was assigned this land use code.

The only habitat recorded as a secondary habitat in a matrix with this habitat was dense/continuous scrub. No unimproved acid or calcareous grasslands were recorded during this survey.

Marsh/Marshy Grassland

Marshy grassland communities are diverse in nature, ranging from Purple Moor-grass communities to grasslands with a high proportion of rushes, sedges and/or Meadowsweet and meadows supporting communities of species such as Marsh Marigold, Valerians and Hemp Agrimony where herbs rather than grasses predominate. By their nature, depending on ground water levels, these communities tend to be interspersed with other such as inundation grassland, marginal vegetation, poor semi-improved grassland and even scrub and woodland habitats.

2.3.3 Tall Herb and Fern

The 'Fern' part of this broad habitat invariably relates to extensive stands of Bracken, a habitat that does not occur in Maldon district, *per se*.

Tall Ruderal

This category comprises stands of tall perennial species such as Rosebay Willowherb, docks, Creeping Thistle and Stinging Nettle. It will usually be found in association with a grassland or scrub community, but may be the main cover on areas of waste ground, highly disturbed open ground or in places with excessively high nutrient statuses.

2.3.4 Swamp, Marginal and Inundation

Communities within these categories are emergent from, or are frequently inundated by, freshwater, occurring over peaty or mineral soils. They differ from mires, flushes and springs and from marshy grasslands in having the water table distinctly above ground level for most of the year.

Swamp

Swamps are areas of emergent vegetation typical of the transition between open water and exposed land, normally forming a stand greater than five metres wide. The exception to this would be borrowdykes, where narrow, but very long reedbeds would still be referred to as

Swamp. Characteristic species include Greater Reedmace, Common Reed, Sea Club-rush, Reed Sweet-grass and Greater and/or Lesser Pond Sedge.

Swamps include communities generally occurring in deeper water and comprising pure stands of Common Reed, Greater or Lesser Reedmace or Sea Club-rush as well as mixed communities of reed/sedge, generally occurring in shallower water.

Swamps occur in matrices including a range of standing water, running water, coastland and grassland habitats.

Inundation

Communities in this habitat are subjected to periodic inundation and can include wetland grass habitats as well as draw-down zones and river margins. The vegetation often has a ruderal element and more stable habitats often feature Creeping Bent-grass or Marsh Foxtail.

Marginal Vegetation

This refers to the typically open, mixed communities that can become established in narrow bands along river banks and the shores of standing bodies of water. Normally these strips would be too small to map, but with the precision of the Mastermap it is possible to attribute them. The only matrix habitat associated with this one is standing water.

2.3.6 Open Water

Standing Water

The ArcView Phase 1 habitat survey codes do not allow for water bodies to be specifically identified as ponds, reservoirs or lakes. All bodies of standing water, no matter their origin or size, are lumped together as Standing Water.

Brackish Standing Water

This category specifically applies to borrowdykes and, occasionally, to other mor extensive coastal lagoons.

Running Water

This comprises rivers or streams, although as a matrix habitat it also includes brackish water where this is in conjunction with coastal habitats.

2.3.7 Coastland

Coastal Grass

This category comprises grasslands at the margins of saltmarsh, typically dominated by Sea Couch-grass or occasionally Red Fescue. There is likely to be some overlap with upper saltmarsh communities.

Saltmarsh

A catch all saltmarsh habitat code for describing habitats with a more complicated structure.

Continuous Saltmarsh

In Essex this habitat is typically dominated by Sea Purslane or Common Saltmarsh-grass, with more locally diverse communities in the salt pans that are present in more extensive saltmarsh systems.

Scattered Saltmarsh Plants

This category is associated with lower saltmarsh communities, along the banks of creeks, at the margin of the saltmarsh or in eroding saltmarshes. Typical plant species include cord-grasses, glassworts and Annual Seablite.

Shingle/Gravel above High Tide Mark

Only one block of this scarce coastal habitat was recorded, although it was also present as a matrix habitat with Saltmarsh. For the purposes of this survey this habitat includes strandline vegetation.

Intertidal Mud and Sands

The majority of intertidal habitat in the district was not mapped, but where it is interspersed with other coastal habitats this category has been used.

2.3.8 Miscellaneous

Arable

All land used for the growing of agricultural crops is included here, including Ryegrass monocultures grown as a seed crop but excluding horticultural land and allotments (categorised as Cultivated/Disturbed). Temporary Ryegrass leys are also included here, as are short-term set-aside areas. Longer-term set-aside land may be classified as grassland (see

illustration in Section 2.3.2, above). This habitat rarely supports matrix habitats, the exception being parkland/scattered trees, made up of remnant standards from removed hedgerows.

Amenity Grassland

These are intensively managed and regularly mown grasslands usually dominated by Ryegrass and with White Clover, Daisy, Greater Plantain and Dandelion although, since these grasslands are often reseeded the species composition can vary somewhat. Included within this category are sports-grounds, playing fields, golf courses, "lawns" surrounding large industrial/business premises and municipal parks. It should be recognised that, on occasions, this coding reflects a management regime rather than vegetation type, since relatively species-rich grasslands, which might otherwise be labelled as semi-improved neutral grassland, might be subjected to regular mowing as part of an open space area. This habitat occurs in a common matrix with parkland/scattered trees.

Ephemeral/Short Perennial Vegetation

Short perennial communities are those typical of urban derelict sites, quarries, railway ballast and new road cuttings, stony, well-drained substrates. Newly created set-aside areas may also conform to this vegetation type. Frequently occurring species include Greater Plantain, Creeping Buttercup, Black Medick, Coltsfoot, Creeping Cinquefoil, speedwells and melilots. Matrix habitats are not uncommon and most typically occur with bare ground, tall ruderal or poor semi-improved grassland habitats.

Introduced Shrub

Such communities, few in number, consist of shrubs that are not locally native, whether planted or self-sown, such as species of Dogwood, Privet, Rhododendron and Snowberry.

Bare Ground

The "bare ground" category is not used to describe recently ploughed arable land, but in circumstances where there is an apparently on-going change in land use of unknown nature (including recently ploughed grassland for which the after use is uncertain).

Cultivated/Disturbed Land

This category is used here to represent allotments and horticultural crops and miscellaneous other causes of ground disturbance.

2.3.9 Other Habitats

The other habitats noted during the survey are self-explanatory: *Caravan Park, Buildings, Built-up areas*. Finally there is a catch all *Other Habitat* category, where the available habitat descriptions are inadequate to describe the land use or vegetation.

Other habitats, such as heathland, bogs and fens were not encountered within Maldon district during this survey. Some habitats, such as Green Lanes, do not occur within the ArcView Phase 1 habitats list. In the latter case, these sites would have been target noted and mapped as a woodland habitat.

3. DEVELOPMENT OF WILDLIFE SITE POLICIES AND SELECTION CRITERIA

3.1 Introduction

Concerns over the state of the countryside, the loss of ancient habitats and species diversity have grown primarily since the first half of the 20th Century. Mechanised farming, the demand for more economical food production and the advent of modern pesticides and herbicides began to take a heavy toll on the country's wildlife habitats. This has been compounded by urban expansion, flourishing trunk road networks and industrial expansion.

The overall trend during this period was a transition from countryside in which wildlife still flourished in a matrix of small fields with bountiful hedgerows, flower-rich meadows and woodlands towards a situation today where wildlife is generally perceived to be surviving in a limited number of "oases", surrounded by seas of relatively inhospitable farmland or urban sprawl. Initially, the response to this perceived situation was to declare some of these wildlife oases as nature reserves. It was soon realised however, that nature conservation was not sustainable by confining it to a limited number of key sites, important though these are. Ideally, one might strive to return to the situation prior to the 20th Century, where nature reserves would be superfluous since the whole countryside would be a complete matrix of wildlife habitats. Whilst this may be an unrealistic target (although some would argue not), there is a realisation that key nature reserves still interact with the wildlife habitats around them. Thus, whilst such sites are the "jewels of the crown", nevertheless one needs the more mundane metal of the crown to hold it all together. In other words, sustainable nature conservation depends on a matrix of important wildlife sites, some of national significance, others of more local interest but vital in their support of the key sites, as well as appropriate means by which plants and animals can move between them, as a shared and mixing gene pool. This has lead to the concept of wildlife corridors, although the concept of a matrix rather than of linear "corridors" is a rather better descriptor of what is needed.

The following sections explain the evolution of government responses to this changing appreciation of nature conservation needs, starting from the idea of declaring National Nature reserves through to the realisation that sustainable nature conservation needs a large-scale matrix of important wildlife havens.

3.2 Framework for Local Nature Conservation Initiatives

Statutory site designation for nature conservation purposes has its basis in the 1949 National Parks and Access to the Countryside Act, which introduced the concept of Sites of Special Scientific Interest (SSSI) as well as National Nature Reserves (NNR). The need for habitat surveys and ultimately the desirability of being aware of the local network of important wildlife areas was identified as long ago as 1968. Section 11 of the Countryside Act 1968 advised local authorities,

> "to have regard to the desirability of conserving the natural beauty and amenity of the countryside", which embraces the conservation of flora and fauna. In particular, Paragraph 39 highlighted the advantage of having "a base of information, including thematic maps on wildlife and habitats, to inform and assist in the development of policies which take account of the needs of conservation..."

Still the single most important piece of recent wildlife legislation is The Wildlife and Countryside Act 1981, although it has undergone a number of significant amendments since its adoption, (e.g. the 1985 Wildlife and Countryside (Amendment) Act and most recently the Countryside and Rights of Way Act 2000 – the "CROW" Act). The 1981 Act made further provision for the protection of Sites of Special Scientific Interest (SSSI), which are among the most important wildlife habitats in the country. However, as discussed below, it was also widely recognised that there were a large number of sites of great value in the county and/or district context which had no legal protection but which contributed significantly to the diversity of habitat, flora and fauna in the countryside.

Over the last 20 years there has been a series of attempts to recognise and protect these "other" sites through the planning system. The first step in this direction came with the Department of the Environment's guidance to local authorities in DoE Circular 27/87: "Nature Conservation". In this, the Secretary of State said he was:

> "...anxious to ensure that conservation aspects, together with all other relevant factors, are given full consideration before planning policies are drawn up which would affect such sensitive areas (SSSIs or other types of protected areas). The inclusion in a development plan of land-use policies dealing with nature conservation can make a significant contribution to the achievement of this objective."

Circular 27/87 also recognised the role of other wildlife sites in forming buffers, wildlife corridors and links between populations of plants and animals. The importance of these connections between the statutorily designated sites cannot be over-emphasised. In Paragraph 6 it stated that:

> "...our natural wildlife heritage is not confined to the various statutorily designated sites and there is a continuous gradation of nature conservation interest throughout the countryside and in many urban areas."

Later, DoE Circular 1/92: "Planning Controls Over Sites of Special Scientific Interest" reinforced and extended the consultation required on proposals that either directly or indirectly affect SSSIs.

More recently, the national government influenced local planning policies (on all matters) through the publication of Planning Policy Guidance (PPG) notes. The most significant one for wildlife matters was PPG9 "Nature Conservation", issued October 1994. This cancelled DoE Circulars 27/87 and 1/92 quoted above. The aims of PPG9 were to:

- set out the Government's objectives for nature conservation, and the framework for safeguarding our natural heritage under domestic and international law;
- describe the key role of local planning authorities and English Nature;
- emphasise the importance of both designated sites and undesignated areas for nature conservation;
- advise on the treatment of nature conservation issues in development plans;
- state the development control criteria, particularly for Sites of Special Scientific Interest and sites with additional national and international designations;
- contribute to the implementation of the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora ("the Habitats Directive");
- elaborate on mineral development and nature conservation, and on the development control implications of species protection.

Adapted from DoE (1994).

Nature conservation considerations were not restricted to PPG9, however, with further guidance given where it impinges upon countryside and agricultural economics and development (PPG7), development plans and sustainable development (PPG12), mitigation of transport proposals (PPG13), interactions with sport and recreation (PPG17), coastal planning (PPG20) and tourism (PPG21).

PPG9 advised that local authorities should identify relevant nature conservation interests in local plans and ensure that the protection and enhancement of those interests is properly provided for in development and land-use policies.

Another significant piece of environmental legislation is the Countryside and Rights of Way (CROW) Act 2000. Campaigners were originally hoping to see some form of statutory protection for Local Wildlife Sites included in this Act and although this did not happen, there are sections that reinforce the need to conserve local biodiversity.

In September 2004 the Office of the Deputy Prime Minister (ODPM) issued a Consultation document detailing the proposed replacement of PPG9 with "Planning Policy Statement 9: Biodiversity and Geological Conservation" (PPS9), claiming that the broad policy objectives included therein are, "firmly based on the principles set out in '*Working with the grain of nature – a biodiversity strategy for England*', published by Defra in 2002. [Note: on May 5th 2006 the ODPM became the Department for Communities and Local Government, DCLG].

Parallel to this, a consultation draft of a Circular was also published. The circular set out administrative guidance on the application of the law relating to planning and nature conservation. All other previous PPGs are replaced by equivalent PPS documents.

PPS9 was published in August 2005, along with a Code of Good Practice and a Government Circular (06/2005) setting out statutory obligations for local authorities. PPS9 now sets out policies that will need to be taken into account by local planning authorities in the preparation of local development documents (Local Development Frameworks) and may also be material to decisions on individual planning applications. PPS9 promotes in general terms the various biodiversity initiatives now established at national and local level. Referring to *Working with the grain of nature – a biodiversity strategy for England* (Defra, 2002) PPS9 states that,

> "It [the Defra publication] includes the broad aim that planning, construction, development and regeneration should have minimal impacts on biodiversity and enhance it wherever possible".

By basing future Local Wildlife Site selection criteria strongly within the realm of protecting biodiversity, it should be possible to demonstrate that the Local Wildlife Site system is an integral and key part of delivering this broad aim and that, as such, Local Wildlife Sites have an irrefutable place within all local authority planning documents.

The notion of sites of "local importance" is referred to within the Key Principles of the National Planning Policies within PPS9:

> "1. Regional planning bodies and local planning authorities should adhere to the following key principles to ensure the potential impacts of planning decisions on biodiversity and geological conservation are fully considered.
> (i) Development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas. These characteristics should include the relevant biodiversity and geological resources of the area. In reviewing environmental characteristics local authorities should assess the potential to sustain and enhance those resources.
> (ii) Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment" (ODPM, 2005).

The issue of "appropriate" weight for sites that are deemed by the ODPM to be of "local importance" was also a matter of concern within the Wildlife Trust movement. Whilst Defra and English Nature favoured the term "Local Wildlife Sites" for the former SINC network, the use of the word "local" was generally resisted by the Wildlife Trusts. It implies that Local Wildlife Sites cannot be of national importance, which is often incorrect, and therefore enhances the idea that "Local Wildlife Sites" are only second or third tier sites in terms of nature conservation value. Thus, a developer might interpret the need to "ensure that appropriate weight" is given to local sites as the need to give them little if any attention, because they are of such lowly rank. However, recent Defra guidance publications have reinforced the name of Local Wildlife Sites or Local Sites and the name "Local Wildlife Sites" is therefore now being adopted by the Essex Wildlife Trust.

This "pecking order" for nature conservation sites is unfortunately further emphasised, when dealing with local development documents. Key Principle 5 states that, Local Development Frameworks should,

> "indicate the location of designated sites of importance for biodiversity and geodiversity, making clear distinctions between the hierarchy of international, national, regional, and locally designated sites"

An interesting point to dwell on here is that the level at which sites are designated i.e. by the European Union, national government or local authority is NOT always directly correlated to the level of nature conservation importance of that site. Local authorities are still looking after sites of national importance that have not been recognised as SSSIs by central

government. Such sites can be included within the Local Wildlife Site network but it should not be inferred that they are, by default, only of local importance.

Traditionally, the "Wildlife Site" networks across the country have been led, or at least strongly influenced by, county Wildlife Trusts. In recent years, however, the desires to see a national standard identified for such sites and calls to give greater statutory protection to Sites have led to English Nature and Defra now taking a more active interest in developing such systems. In April 2000 the DETR (now Defra) established a Local Sites Review Group (LSRG), with English Nature reporting its position in 2002, as cited above. The dialogue between Defra, English Nature and the Wildlife Trusts lasted for several years and resulted in final publications in 2006. Much of the deliberations dominating these discussions relate to policy emphasis, funding and management of wildlife site systems, the processes by which sites should be designated and broad ecological and biodiversity principles rather than fine detail of selection criteria.

In recent years, much more emphasis has been given to all aspects of local government acting and decision-making at a regional rather than county level. Of relevance here is the East of England Plan Regional Spatial Strategy (RSS14), which was first produced in 2004. The "vision statement" for RSS14 is,

> To sustain and improve the quality of life for all people who live in, work in, or visit the region, by developing a more sustainable, prosperous and outward-looking region, while respecting its diversity and enhancing its assets".

Its objectives are to:

(i) increase prosperity and employment growth to meet identified employment needs of the Region, and achieve a more sustainable balance between workers and jobs;
(ii) improve social inclusion and access to employment and services and leisure and tourist facilities among those who are disadvantaged;
(iii) maintain and enhance cultural diversity while addressing the distinctive needs of different parts of the region;
(iv) increase the regeneration and renewal of disadvantaged areas;
(v) deliver more integrated patterns of land use, movement, activity and development, including employment and housing;
(vi) sustain and enhance the vitality and viability of town centres;
(vii) make more use of previously developed land and existing buildings, and use land more efficiently, in meeting future development needs;

(viii) meet the region's identified housing needs, and in particular provide sufficient affordable housing;
(ix) protect and enhance the built and historic environment and encourage good quality design and use of sustainable construction methods for all new development;
(x) protect and enhance the natural environment, including its biodiversity and landscape character;
(xi) minimise the demand for use of resources, particularly water, energy supplies, minerals, aggregates, and other natural resources, whether finite or renewable, by encouraging efficient use, re-use, or use of recycled alternatives, and trying to meet needs with minimum impact;
(xii) minimise the environmental impact of travel, by reducing the need to travel, encouraging the use of more environmentally friendly modes of transport, and widening choice of modes;
(xiii) ensure that infrastructure programmes, whether for transport, utilities or social infrastructure, will meet current deficiencies and development requirements; and that the responsible agencies commit the resources needed to implement these programmes and co-ordinate delivery with development; and
(xiv) minimise the risk of flooding.

Finally and most recently, the Natural Environment and Rural Communities Act 2006 places a duty on public bodies [Section 40(1)] to consider biodiversity:

> "Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity".

International Responsibilities

Nationally and internationally important sites have a degree of statutory protection. Some designations arise from international agreements to which the British Government is a signatory, with two of the most important early agreements being those relating to Special Protection Areas (SPAs) and Ramsar sites. SPAs are defined under Article 4 of European Council Directive on Conservation of Wild Birds 79/409/EEC. Designation of the most important wetland sites is urged by the Ramsar Convention on Wetlands of International Importance.

In 1992 the United Nations Conference on Environment and Development ("The Earth Summit" or "Rio Summit") paved the way for global nature conservation measures with a mechanism that could allow for its translation down to the scale of individual nations, counties and even local authorities. Within the UK, this has resulted in the formulation of Biodiversity Action Plans (BAPs), an initiative that is of fundamental importance to the

future of nature conservation in Essex. The BAP programme now underlies the philosophy behind the selection of Wildlife Sites in Essex and so is discussed in greater detail below.

One of the newest government initiatives, again cutting across all aspects of local government, is the introduction of "best value" indicators at both national and local levels. In order to assist local authorities with the task of determining appropriate Performance Indicators (PI), the Audit Commission and the Improvement and Development Agency (IDeA) have developed a library of "off the shelf" local PIs, including those for sustaining Biodiversity.

PPS9 states in Key Principle 6 that,

> "The most important sites for biodiversity are those identified through international conventions and European Directives."

Whilst this may be true at a global level, it can be argued that it not true at a more local level, if one draws a distinction between "biodiversity" in the widest sense of the word i.e. the diversity of biological organisms and the more limited set of those species and habitats for which Biodiversity Action Plans have been or are being written. Most internationally designated sites in Essex are coastal mud-flats and marshes. These support very significant numbers of international migrant birds, such as Brent Goose, Dunlin, Redshank, Godwits and Wigeon. These birds are supported by an enormous biomass of mud invertebrates, but the number of species involved is quite small. An international site may be designated for the presence in large numbers of only a handful of birds, which feed on a few dozen invertebrate species – not a very "biodiverse" assemblage, compared to a large brownfield site that may support hundreds of invertebrate species and dozens of national rarities covering plants, bugs, spiders, bees and wasps and so on. A similar logic can be applied to ancient woods and many grassland habitats – they are all more diverse than mudflats. Some people would argue that because the brownfield site or ancient wood is more biodiverse than a mudflat, the Key Principle 6 quoted above does not hold true at a local or even national level. This does not, of course, mean to say that we should abandon our international responsibility to protect these migrant birds and their habitats, but it further illustrates the fact that true conservation of biodiversity comes through the protection of a sound Wildlife Site network, rather than a few representative SSSIs or international sites.

3.3 Background to the Development of Non-statutory Site Selection in Essex

Some local non-statutory site networks have been in existence for 20 years or more, largely based upon or at least initiated by Phase 1 Habitat Surveys. The first such habitat survey of Essex was carried out in mainly between 1990 and 1994 by the Essex Wildlife Trust as part of a county-wide wildlife assessment, based on the recognised Phase 1 Habitat Survey technique. This culminated in the production of 14 district/borough plans (printed as "Nature Conservation Reference Guides") that identified for each local authority a network of the most important wildlife areas under their control. The intention was that these Sites of Importance for Nature Conservation (SINC) should represent the minimum network of key wildlife areas that needed protection within the planning system and, equally, deserved priority attention for the promotion of positive management, with appropriate policies appearing in each Local Plan. One of the key features of this suite of sites is that they should be considered to be the minimum number of key wildlife sites needed to maintain the biodiversity of the county; they should not be viewed as the only places of wildlife value. Secondly, the importance of interaction between sites as part of a matrix of wildlife habitat, or wildlife corridors, should not be under-estimated. For example, a recent woodland SINC should not just be viewed as being located close to an ancient wood, it should be viewed as helping to support the ecology of that ancient wood by way of interaction and movement of species between the two sites.

At that time there was little or no national guidance on the criteria that should be used to identify such sites and so a local selection process was developed, using key ecological criteria used in the evaluation of Sites of Special Scientific Interest (SSSI), based on Ratcliffe (1977) and the cumulative knowledge of local natural historians. Towards the end of this county-wide review (1995), however, the RSNC/Wildlife Trusts produced just such a document, with an update in 1997, with the recommendation to adopt the more widespread name of "Wildlife Site", (Wildlife Trusts, 1997).

During 1998 and 1999 a group of interested parties (hereafter referred to as the Essex Review Panel), including representatives from the Essex Wildlife Trust, English Nature, Essex County Council and other key organisations, held a series of meetings to seek a means of strengthening, modernising and improving the selection process for Wildlife Sites. This generated three Consultation Draft documents under the generic title "Wildlife Sites – A New Approach for Essex", No.2 being "Site Identification, Proposal and Adoption" and No. 3

entitled "Criteria for the selection of Wildlife Sites in Essex". Thereafter, this Review Panel suspended its deliberations, pending a report on Wildlife Site systems from Defra and English Nature at a national level. As previously stated, this final report only materialised in 2006. (It should be noted that parts of Defra and English Nature have now been merged into one body, known as Natural England.)

In February 2002, English Nature produced a Draft Position Statement (20th February 2002) on "Local Sites" for the benefit of Defra. This statement recommends the adoption of the name "Local Wildlife Sites" and, despite concerns over perceived devaluation of the network, the Essex Wildlife Trust has adopted this term.

3.4 Site Selection Criteria

The Local Wildlife Site Selection Criteria document has been produced by the Essex Wildlife Sites Project, based on the foundations laid down by Adrian Knowles of EECOS during reviews of Local Wildlife Sites in Castle Point, Chelmsford and Basildon districts. These have been subject to consultation within the county and beyond and are nearing a final, published version. The criteria used during this study are the most up to date available draft (March 2007), but it is likely that there will be further changes before a definitive version is published, not least those arising from reviews of BAP species and habitats at a local and national level completed in 2007.

The main purpose of publishing a centralised county document for site selection is to ensure a consistency of approach, across the county and in line with national guidance. It serves no purpose to reproduce the selection statements and criteria here, but the document (in its draft form until officially published) should be read in conjunction with this report.

Under the original selection criteria developed in the early 1990s, the network of sites included all Sites of Special Scientific Interest (SSSI). Consistent with recent national guidance, this position in relation to SSSIs is no longer adopted.

4. HABITAT SURVEY RESULTS

4.1 Introduction

The results of the Phase 1 Habitat survey are presented as a separate GIS polygon layer. This digital mapping exercise has been used to generate land use data. The following sections provide a brief overview of the state of the Maldon district wildlife resource, including Local Wildlife Sites and also local Biodiversity Action Plan habitats and species that lie beyond the boundaries of this minimum critical network of sites.

4.2 Land Use Analysis

Table 1 shows the mapped areas of all of the habitats recorded during this survey. The table presents the areas of each broad habitat and of each specific habitat category used during the field survey. Mosaic habitats are not illustrated within the table as this would introduce a impenetrable level of detail.

A number of broad themes can be drawn from the comparison between the current habitat survey and that carried out in 1992. Detailed analysis is limited by variations in habitat categories between the two surveys and by the degree of accuracy of area measurements. For the 1992 survey area measurements were calculated using a digital planimeter, which has an inherent margin of error relying as it does on manual tracking of area boundaries. The use of GIS systems on this survey has allowed for habitat areas to be measured with a high degree of accuracy.

This survey recorded just over 9800 hectares of non arable or built up land amounting to 27.3% of the district, compared to 7250 hectares or 20.2% in 1992. In some part, this may reflect problems of accuracy with area measurements, but it also indicates a small shift away from arable production in the intervening period, relating to several issues.

The set aside scheme was introduced by the European Union in 1988 to curb over-production, by allowing farmers to receive payments for land without its cultivation. Uptake of this scheme was poor until 1992 when it be came compulsory for every farmer to set aside some of their land, initially 15% but then a variable amount each year. During the present survey this set aside land was recorded as a variety of habitats, depending on its degree of establishment, including tall ruderal, ephemeral/short perennial vegetation, poor semi-improved grassland and cultivated/disturbed land.

Over the same period, agri-environment schemes such as Environmentally Sensitive Areas and Countryside Stewardship encouraged the management of farmland in a more conservation friendly manner, in Essex particularly around the coast. As a result, a significant area, largely within the coastal strip, has been reverted from arable to pasture. This may account for the increase from 5400 hectares of all grassland in 1992 to 5800 hectares in the present survey. Of this grassland 59% was considered to be "highly improved" in 1992, whereas this figure now stands at 52.3%.

Other losses of arable land include to development (see below), to country parks – often in association with development – to aggregate excavation and as a result of the managed realignment of coastal defences at Tollesbury.

Maldon District has suffered relatively little development pressure over the past 10-15 years, compared to other parts of Essex. Comparison of the survey maps shows that housing development on the margins of Maldon town has been limited to a strip north of Limebrook Way on the south side and Elms Farm in the northwest. Elsewhere in the district, the most significant developments have been in Southminster (Southfield Way) and Burnham-on-Crouch (Beauchamps and Chandlers). Beyond these locations, development has been small scale and largely within existing built up areas, infilling or utilising previously developed land.

The current survey identified a total of 1200 hectares of woodland, as compared to about 1100 hectares in 1992. Very little loss of woodland was noted during the survey, but there has been a good number of small planting schemes on agricultural land and elsewhere. There are no large scale woodland planting initiatives ongoing in Maldon District.

The previous survey did not extend to intertidal habitats, so there is no direct comparison available for the area of saltmarsh remaining in the district. All other regional or national inventories have been on an estuary by estuary basis and so it is not possible to generate previous estimates of the district resource. However, this survey recorded 1165.5 hectares of saltmarsh, a significant amount in a local, regional and national context, constituting over 2.5% of the estimated UK resource.

Broad Habitat	Habitat	Area (ha)
Woodland		**1211.97**
	Broad-leaved Semi-natural Woodland	735.92
	Broad-leaved Plantation Woodland	285.29
	Broad-leaved Scattered Trees	33.7
	Mixed Plantation Woodland	69.43
	Coniferous Plantation Woodland	12.42
	Mixed Semi-natural Woodland	75.21
Scrub		**227.69**
	Dense Scrub	151.85
	Scattered Scrub	75.84
Grassland and Marsh		**5800.66**
	Improved Grassland	3033.99
	Poor Semi-improved Grassland	1647.97
	Semi-improved Neutral Grassland	536.09
	Semi-improved Acid grassland	40.81
	Unimproved Neutral Grassland	521.34
	Marsh/Marshy grassland	20.46
Tall Herb and Fern		**41.48**
	Tall Ruderal	41.48
Swamp, Marginal and Inundation		**59.59**
	Swamp	47.88
	Inundation	5.97
	Marginal Vegetation	5.74
Open Water		**633.30**
	Standing Water	508.34
	Brackish Standing Water	83.43
	Running Water	41.53
Coastland		**1172.74**
	Coastal Grass	0.56
	Saltmarsh	137.53
	Continuous Satlmarsh	1000.39
	Scattered Saltmarsh Plants	27.60
	Shingle/Gravel Above High Tide Mark	1.73
	Intertidal Mud and Sands	4.93
Miscellaneous		**22999.79**
	Arable	22212.53
	Amenity Grassland	552.92
	Ephemeral/Short Perennial Vegetation	31.30
	Introduced Shrub	0.55
	Bare Ground	51.77
	Cultivated/Disturbed Ground	69.00
	Caravan Site	61.27
	Other Habitats, buildings, built up areas	20.45
Total		**32147.22**

Table 1 – Habitat and land use areas

4.3 Identification of Local Wildlife Sites

The Essex Local Wildlife Site Selection Criteria have been used to re-assess the original suite of SINCs and also to evaluate other sites not previously selected, to generate a revised register of Local Wildlife Sites for Maldon district. Appendix 1 provides the register of these Local Wildlife Sites, with boundary maps and summary descriptions for each site, along with the criteria codes under which each site has been selected. The UK BAP habitats that are represented in each site are listed and a brief statement has been included regarding the condition of the site and any potential threats to its integrity or quality. The sites are listed in summary as Appendix 2.

The protocol behind site numbering has been changed during previous district surveys and the new system is applied here. Previously, sites were roughly grouped into habitat categories of Woodland, Grassland, Mosaic, Freshwater, Coastal or Heathland, with an appropriate letter code and sequential number. Given that this process was repeated across the 14 boroughs/districts in Essex, this meant that the county had 14 "W1" SINCs i.e. the first woodland site in each local authority area. In order to make the county-wide system less complicated, a new system is being introduced whereby each site has a borough/district and number code, with all Maldon district Sites now being prefixed "M" and with no indication of the habitat(s) present on the site.

The suite of sites has been amended from those identified in the report in 1991 for the following reasons:

- SSSIs have been removed from the system, as explained above;
- Some sites have been de-selected on account of their decreased nature conservation value or failure to satisfactorily meet the revised selection criteria;
- A few new, modified or previously overlooked sites have been identified and added to the register;
- Some sites have been amalgamated where they lie next to each other, so that whereas formerly an ancient woodland and an immediately adjacent section of recent woodland would have been identified as separate SINCs, they are now identified as one unified site. Other amendments have arisen through the availability of more accurate base

maps, the recognition of additional qualifying habitat or partial loss of habitat, for example.

4.3.1 SSSIs

A major change is that areas designated as Sites of Special Scientific Interest SSSI, included in the previous survey, are now no longer included in the Local Wildlife Site network. With regards to Maldon district this removes:

- W1. Woodham Walter Common SSSI. TL791068
- G11 Stamfords Farm TQ885980 – 21 hectare grazing marsh section to the south is now part of Crouch and Roach estuaries SSSI
- G17. Sandbeach Meadows SSSI. TM021050 and TM022057
- C1. River Crouch Marshes SSSI. (now part of Crouch and Roach Estuaries SSSI)
- C2. Blackwater Estuary SSSI.
- C3. Dengie SSSI.

4.3.2 Deletions

In instances where, upon the implementation of a review of Local Wildlife Sites, a site is no longer considered to be of sufficient quality to be retained on the register of Local Wildlife Sites, there is a presumption that the site will be added to the list of Appendix 4 "Potential" sites, although this may not always be the case. Where it is added to Appendix 4, the Council and, where appropriate the Essex Wildlife Trust, shall encourage the implementation of positive management to restore or improve the wildlife value of the site in question, so that it might be considered for re-selection in the future.

There are two circumstances in which listing as a potential site may not be appropriate:

1) The site has been damaged or otherwise altered to such an extent that it is unlikely to regain its value even with remedial management;
2) The selection criteria have been amended in such a way that the site is unlikely to meet the new, more stringent criteria, even with positive management.

Following the 2006/07 review, seven of the original SINC sites have been withdrawn from being identified as Local Wildlife Sites. These are:

- G1 Gay Bowers/Woodham Mortimer Special Roadside Verge (500.0 metres) TL 804045 to TL 808047; Lesser Calamint is no longer present on this site and no habitat or species selection criteria are met;

- G2 Maldon Special Roadside Verge (1500.0 metres) TL 813061 to TL 826064; only small amount of Lesser Calamint present (i.e. not a significant population, as required by the site selection criteria) and no habitat or species selection criteria are met;
- G4 Wickham Place Meadows (2.6 ha) TL 825117; no longer of sufficiently quality now that grazing has ceased;
- G5 River Blackwater Grasslands (26.0 ha) TL 826123; the majority of the site is now a golf course and the remainder is of insufficient quality;
- G8 Bury Farm Field (4.5 ha) TL 845037; site ploughed and planted with poplars;
- G9 Brookmead Grove Meadow (0.8 ha) TQ 846988; site planted with trees;
- G14 Sun and Anchor Meadow (2.8 ha) TL 936031; site improved and used as campsite;

These sites illustrate the vulnerability of grassland sites, particularly in respect of changes in management, an absence of management or deleterious land use. By contrast, woodlands are relatively stable, being protected from large scale destruction by the requirement for felling licences.

4.3.3 Additions

A number of new sites have added to the Local Wildlife Site register, largely on account of the more comprehensive Species Selection Criteria and greater thoroughness during the field survey. The new sites are:

- River Chelmer TL 790093 to TL 838082; riverine habitat and valuable corridor;
- Warren Golf Course Woodlands TL 793067, TL 794063 and TL 798068; good woodland habitat, some possibly ancient, adjacent to SSSI; good invertebrate populations;
- Barn Field Wood TL 793072; good woodland habitat, adjacent to SSSI;
- West Bowers Wood TL 800079; good, streamside woodland, possibly ancient;
- Warren Pit TQ 805964; mosaic of grassland, scrub, and open habitats in former gravel pit together with adjacent semi-natural and possibly ancient woodland;
- Wood Corner Grove TL 829060; streamside woodland habitat;
- Langford Churchyard TL 837090; unimproved grassland with Lesser Calamint;
- The Downs, Maldon TL 845074; unimproved grassland;
- Elms Farm Park TL 845080; riverside marsh, hedgerows, lake and rough grassland;
- Braxted Park TL 852155; including W39 Pundicts Wood, M6 Mason's Plantation and FW1 Braxted Park Lakes; mosaic of good habitat and landscape features;
- Limbourne Creek TL 869049; coastal grassland and borrowdyke adjacent to SSSI;

- Mundon Oaks TL 881026; collection of large, dead Oak trees;
- Mundon Fleet TL 891020; coastal grassland and fleets;
- Skinners Wick Decoy TL 932086; remnant decoy with emergent vegetation set in wet grassland;
- Burnham Riverside Park TQ 943958 ; populations of Adder, Common Lizard and the BAP bumblebees *Bombus sylvarum* and *B. humilis*
- Southminster Orchard Meadows TQ 953996; old orchard and associated grassland;
- St Mary's Churchyard, Tollesbury TL 956104; unimproved grassland with Lesser Calamint;
- Tollesbury Managed Retreat TL 960114; consists of BAP habitats - saltmarsh and mudflats- and supports bird populations in association with adjacent SSSI;
- Mill Farm Marshes TL 964088; arable reversion grassland regularly used by Brent Geese;
- Asheldham Fort TL 972012; sparsely vegetated acid grassland;

These sites have been selected as a result of a more thorough survey of the district as well as a broadening of the selection criteria and, in some cases, positive habitat creation in the years since the original survey was completed.

4.3.4 Amendments

Numerous amendments, ranging from minor boundary adjustments to the addition of tracts of adjacent land, have been made to the original SINCs. The following is a summary of the changes made to the original SINC list:

- W7 The Wilderness TL812073; additional streamside vegetation to the south to be included together with a block to the west known as Jacobs Well;
- W9 Charity Lane (Strawberry Hall Lane) TL 815012; approximately 300 metres of lane to the north added to link up to W6 Great Wood;
- Mope Wood TL 837127; W18 Grove Wood, W20 Mope Wood and W21 Mope Wood North to be amalgamated into one site;
- W24 Eastland Wood TL844107; addition of coniferous block at southern end shown in Ancient Woodland Inventory;
- W27 Shut Heath Wood TL 852133; extended to include peripheral woodland habitat missed out in original survey;
- W28 Captain's Wood TL853108; recent house and garden deleted from within the wood
- W29 North Fambridge Hall Wood TQ 854986; the adjacent W26 Hall Wood, West to be included in this site;

- W30 Middle Wood TL 854101; extended to full area of woodland;
- Braxted Park TL 852155; W39 Pundicts Wood, M6 Mason's Plantation and FW1 Braxted Park Lakes to be amalgamated and extended;
- W41 Mundon Furze TL 869023; southern end lost to housing development;
- W46 Great Wood TL 909118; Little Wood to the west added;
- Oaklands Park Complex TL 915154; W47 Oaklands Park Wood, W48 Green Lane, Paternoster Heath and G12 Oaklands Park Meadow to be amalgamated into one site and extended to include adjacent and linking woodland and scrub habitat;
- W50 Long Wood TL 925155; additional woodland block to the west added;
- G15 Bradwell Cemetery TM 007069; more recent southern quarter, reverted from arable land, removed;
- M2 Stow Maries Halt TQ835991; Extended along disused railway to east and west;
- M3 Maldon Wick EWT Reserve TL 842057; Maldon Wick Meadow added;
- M4 Beeleigh Abbey TL 842077; Original site extended to include additional reedbeds and inter-tidal habitat downriver to Fullbridge;
- M5 North Maldon Disused Railway TL 849080; Extended northwards along railway line as far as Wickham Bishops and renamed Blackwater Rail Trail;
- M7 Heybridge Strip TL 857077; northern section lost to development and so removed;
- M8 Chigborough Lakes TL 877086; extended to include Lofts Farm gravel pit to the west and other lakes to the south;
- M10 Goldsands Road Pits and Lakes TQ 962988; extended to include additional lakes and scrub to the west;
- M11 Asheldham Pits TL 971015; additional block of habitat to the south;
- M12 Bradwell Brook – Curry Farm TL 996057; wet woodland to southeast added;

4.3.5 Potential Sites

The LoWS network should be considered to be a dynamic system, with sites added and removed as a continuous process, reacting to the latest information available and to changes in policy and selection criteria. However, in the past, in many districts, the evolution of Local Wildlife Sites (and their precursors) has been one of punctuated equilibrium, the network being largely static with intermittent wholesale reviews.

In addition to those sites selected here as Local Wildlife Sites, there are a number of other site which have been highlighted as having potential for inclusion within the Local Wildlife Site network at a later date. The potential of these sites falls into two basic categories:

a) The site features/habitats and/or historical data available suggests that the site would qualify for inclusion but there is currently a lack of detailed modern data to support its inclusion within the current selection process;
b) The site is in need of some form of restorative management in order to improve the quality of habitats present.

These Potential Wildlife Sites are listed in Appendix 3. An awareness of these sites will allow Maldon District Council to encourage the relevant landowners to enhance the nature conservation value of the land, where appropriate, so that they might realise their potential and become listed as Local Wildlife Sites. There will also be an expectation that any proposal to develop all or part of such a site will be accompanied by an appropriately detailed ecological appraisal which will cover, as a minimum, those features that have been identified in Appendix 3 as being of potential importance. It should be considered a matter of good practice that any such ecological appraisal should also consider all species/habitats identified in local or regional Biodiversity Action Plans, regardless of whether or not they are listed in Appendix 3.

Appendix 3 should also serve as a prompt for identifying sites for reassessment during future LoWS reviews, augmented by any new sites that become apparent.

4.3.6 Summary

The 1991 report identified some 1964.6 hectares of land as SINC (including SSSIs). This included approximately 1186.2 hectares of SSSI land, giving a total of 778.4 hectares of non-SSSI SINC. This present study has culminated with the selection of some 1082.8 hectares as Local Wildlife Site land (now excluding SSSIs), an increase of 304.4 hectares of non-SSSI land. **N.B. THESE FIGURES ARE PROVISIONAL, DEPENDING ON THE RESULT OF THE CONSULTATION EXERCISE**

5. DISCUSSION

5.1 Local Wildlife Sites (SUBJECT TO CONSULTATION)

Scrutiny of the sites listed within Appendices 1 and 2 will show that they support a very wide range of habitats, including ancient woodland, more recent woodland and scrub, wet woodland, hedgerows and green lanes, old, largely unimproved meadows, newer flower-rich meadows, river corridors, coastal grassland, reedbed, coastal grazing-marsh, intertidal habitat, old railway lines and gravel pits. The suite of sites protects nationally rare populations of plants and insects, within more regionally or locally significant populations of plants, breeding birds, bat roosts, reptiles, butterflies, flies, bees and wasps and other invertebrates. It can be argued that the local authority has a national responsibility to conserve important populations of these nationally rare species, despite the sites supporting them only here receiving "local designation" (see argument in Section 3.2).

Maldon district still supports a very diverse habitat assemblage, although the tenure of some, such as unimproved grassland, is precarious, to say the least. All of the non SSSI sites that have been deleted are, or were, grassland sites, including two roadside verge sites. This has been the result of either lack of management leading to a gradual decline in quality, or inappropriate management leading to the permanent destruction of the habitat. Two small sections of ancient woodland and an area of coastal grassland have also been lost to development.

To a certain extent, the increase in area of Local Wildlife Sites, as a result of new sites and amendments to existing ones, is as a result of a more thorough survey and selection criteria that have a broader scope. Most of the woodland sites that have been added were missed from the Ancient Woodland Inventory for Essex produced by the then Nature Conservancy Council (now Natural England) in 1982. Some of these fell below the inventory's minimum threshold size of two hectares and others were just missed. Similarly, the two churchyards that have been added on the strength of their grassland habitat were probably missed during the original survey due to the time of year that they were visited.

The broadened selection criteria have allowed for the addition of several areas of coastal grassland that are old and unimproved, but not demonstrably species rich. Other similar changes in selection criteria have seen the addition of ancient woodland sites that have been wholly coniferised – in line with national policy on so called "planted ancient woodland",

which suggests that the maintenance of ancient woodland soil structure and composition can permit the recreation of important woodland communities – and the addition of inter tidal habitat.

However, some of the newly added sites have benefited from improved management, habitat creation or as a by product of other activities. This includes three sites – Ma40 Elms Farm Park, Ma76 Burnham Riverside Park and Ma77 Southminster Orchard Meadows– managed for public amenity and wildlife by Maldon District Council. It also includes the managed retreat site at Tollesbury (Ma79), which was created from agricultural land in 1995, a concept barely considered at the time of the original survey. Two areas of arable reversion grassland have been included within the suite of sites because of their proximity to the coast and their value to birds and other wildlife. Both of these sites were under arable cultivation during the previous survey.

A number of aggregates sites have now been added as their working lives have ended and the associated physical disturbance has ceased. There is scope for the addition of further sites provided that their restoration takes account of their potential and existing value as a wildlife habitat.

In summary, it would be dangerous to deduce from the increased number of Local Wildlife Sites that the wildlife "attractiveness" of the Maldon countryside has dramatically improved over the last 16 years. Rather our views and perception of what is "attractive" have changed somewhat.

One measure of the success of the Local Wildlife Site system is to consider how many sites have been lost or damaged as a result of development pressure, either by the planning process ignoring the site's status when determining a planning application or by the implementation of a previously determined planning consent. In the case of Maldon, as outlined above, three sites have been partially lost to development, with another having been subject to a change in use. Two of these were woodland sites: one with a single house built in the middle and one with a small housing development. The third developed site is a coastal grassland area that has been covered by a car park. In the fourth example a meadow has been converted to be used as a campsite.

There are few, if any, direct threats to sites from housing or industrial development, although there is a significant housing development immediately adjacent to Ma57 Heybridge Gravel Pit that may affect some aspects of the site's wildlife. Recreational pressure is more of an issue in some places within this district.

A lack of management or, conversely, over-zealous management can both pose an equally significant threat to the integrity of important Local Wildlife Sites than the more immediate impacts of development threat. Brief notes concerning management issues are included with each Site description provided in Appendix 1.

5.2 BAP Resources Within Maldon District

As discussed in section 3.2 above, the NERC Act 2006 imposes an obligation on public bodies to have regard to the conservation of biodiversity when exercising its functions. Perhaps the biggest influence local authorities can have in this direction is in the application of planning policy and the resolution of each and every planning decision. PPS9 makes the presence of legally protected species a material consideration in planning decisions and it could be argued that the NERC act makes the presence of BAP species and habitats equally material.

Both national, UK BAP and local, Essex BAP habitats and species have been changed in the past year. Nationally, some habitats have been added – Ponds, for example – and others have had their name and/or scope changed – Ancient or Species Rich Hedgerows has changed to Hedgerows, for example. A total of 695 species have also been added to the UK Priority List, encompassing birds, freshwater fish, reptiles, amphibians, higher and lower plants, fungi, marine species, invertebrates and mammals. Some of these are still apparently widespread, in Essex at least.

The Essex BAP has also been extended by the addition of habitats and species, most of which correspond to national BAP habitats and species.

The changes that affect Maldon district are highlighted in the following sections, which deal with each habitat and species in turn, considering also their extent, distribution and condition.

5.2.1 Habitats

Rivers

An expansion of the original "Chalk Rivers" Habitat. The identification criteria have not yet been fully established, but it is unlikely that any of the rivers in Maldon district will qualify. The focus will be on "natural and near-natural running waters", rivers with natural geomorphological features such as meanders, gravel bars, pool and riffle systems, *etc*.

Ponds

A completely new habitat for water bodies smaller than two hectares, with a range of definitions based on, amongst other things, vegetation community, the presence of species of high conservation importance (*e.g*. Red Data Book, UK BAP, Nationally Scarce plant, three Nationally Scarce invertebrates, *etc*.), exceptional plant or invertebrate assemblages and locally distinct pond types. A significant number of ponds in Maldon district is likely to qualify, but the survey information needed to establish which ones do, is not available in most cases. At present there are no sites selected solely on the basis of containing a pond, although some qualifying ponds are included within designated sites. A representative selection of ponds should be considered for selection as LoWS including, for example, those containing the most significant Great Crested Newt populations, dragonfly and damselfly communities or concentrations of nationally significant invertebrates together with any ponds of historic significance or of a character typical of the district.

Hedgerows

This habitat has been broadened to include all hedgerows consisting of more than 80% cover of woody species native to the county. There appears to be no requirement for species diversity or for age. All hedgerows with a rich basal flora will also be included. It has been estimated that 84% of hedgerows in the UK will qualify and the same kind of percentage could be expected for Maldon district.

It would not be appropriate for all of these hedgerows to be designated as LoWS; normally such status has been restricted to hedgerows with a more significant function as connectors between two or more woodland LoWS (e.g. Ma70 Great and Little Woods, Tolleshunt Major) or hedgerows within a more extensive area of habitat (e.g. Ma71 Oaklands Park Complex, Ma17 Hawes Wood Meadow). This is a complex issue: many *ancient* hedges in Maldon district are in fact quite species-poor, being linear suckering Elm clones and, conversely

many relatively newly planted hedges are very species-rich. The issue of hedgerows in our countryside touches strongly on matters concerned with landscape amenity and social history, as well as natural history, making it a multi-disciplinary topic. It should be possible to designate networks of hedges that: provide an important corridor function, particularly in parts of the district in which there are few woodlands; are of social or historical importance; or are important to wildlife and are typical of the district. The current survey did not allow for all hedgerows to be surveyed in the detail necessary to identify those most significant for nature conservation in Maldon district.

Field systems around the Tolleshunts in the north of the district, to the west of Maldon and on the Dengie peninsula have been identified as being of particular historic significance, likely to be either Saxon or medieval in origin (A. Gascoyne, Essex County Council *pers comm.*). The Dengie peninsula is especially noteworthy as it gives its name to the type of field system found there, Dengie-form. In consultation with archaeologists from Essex County Council examples of these field systems, where they coincide with good quality hedgerows, should be considered for selection.

Traditional Orchards

This is a new national habitat, although 'Old Orchards' featured in the original list of Essex BAP habitats. Only one LoWS within the county (Ma77 Southminster Orchard Meadows) possesses a qualifying orchard, defined as one "managed in a low intensity way" (BRIG 2007). Other important orchards have been identified within the district, but are within domestic gardens and therefore excluded from the LoWS network. The other known Traditional Orchards in Maldon district are in Basin Road, Heybridge and Downs Road, Maldon.

This is not a habitat that can be recreated easily, so the protection of existing sites is extremely important.

Wood-pasture and Parkland

This national priority habitat has been revised and expanded in the UK BAP, but is largely represented in Essex by the narrower titles 'Woodland Pasture' and 'Veteran Trees', although it should be noted that some veteran trees lie in habitats other than these. In its strictest sense, there are very few, if any, good examples of this habitat within the district. LoWS that have

included the criteria based on this habitat (HCr3 and HCr4) include: remnant parkland trees adjacent to Ma25 Blackwater Rail Trail; the distinctive dead Oaks at Mundon (Ma64) and the Moor Hall Oaks at Southminster.

Veteran trees can be found in other circumstances; either isolated or within another habitat type such as hedgerows or woodland. It would be possible to select a single veteran tree as a Local Wildlife Site and a district wide inventory of ancient trees could be a step towards this.

Lowland Mixed Deciduous Woodland

This habitat covers all of the semi-natural deciduous woodlands not covered by habitat specific HAPs, which in practice means all of the ancient woodlands in Essex. Previously this plan was named "Ancient Woodlands" both nationally and locally.

During this review a number of such sites have been added largely because the original LoWS were drawn up in line with the Ancient Woodland Inventory produced by the Nature Conservancy Council (now Natural England) in 1982 and revised in 1992. However this inventory only considers woods over two hectares in size and furthermore it appears to be somewhat inaccurate. Most of the new LoWS woods are thought to be ancient by reason of their location, flora or other documentary evidence. Similarly, some sites previously considered to be ancient have been shown, by documentary evidence, not to be so and these sites have been removed unless the habitat meets another selection criterion.

The ancient woods in Maldon district are heavily concentrated in the northwest and are virtually absent to the east of Northey Island. Particular clusters occur on Danbury Hill and around Wickham Bishops. This distribution is largely down to the widespread clearance of ancient woods for agriculture in pre-historic times, although the low-lying marshes around the coastal parts of the district, being originally derived from saltmarsh, would never have hosted woodland communities of this nature.

The main threat to many of these ancient woodlands is in the form of neglect, following the gradual cessation of traditional management techniques such as coppicing over the last century. In a few limited examples this management has been reintroduced, either for conservation purposes or as a commercial operation and this fortunately includes some of the larger blocks of woodland in the district.

Ancient woodland cannot be recreated and so it is essential that these sites are protected and, where possible, their management encouraged.

Lowland Dry Acid Grassland

No significant blocks of unimproved or old semi-natural acid grassland, or heathland, remain in the district, although similar communities are present on woodland rides in the northwest (*e.g.* Ma37 Chantry Wood) and on former aggregates sites (*e.g.* Ma8 Warren Pit, Ma14 Manor Road Complex and Ma82 Asheldham Pits). There is considerable scope for the creation of habitats of this nature on worked out aggregates sites, most notably on the ridge of sands and gravels that crosses the Dengie peninsula between Burnham and Bradwell. In many cases restoration plans require such land to be restored to agricultural use or to bland public open space landscapes dominated by amenity grassland and planted trees. More imaginative restoration schemes that seek a balance between valuable habitats and public access should be encouraged.

Lowland Meadows

The definition of this habitat is relatively loose, but is based on old, unimproved neutral grassland, which in Essex is most likely to conform to the National Vegetation Community MG5 Cynosurus cristatus - Centaurea nigra. It encompasses meadows managed for hay, utilised for grazing or subject to other management regimes, the important factor being the diversity of their flowering species and the presence of some of the key indicators, such as Green-winged Orchid, Lesser Calamint, Adder's-tongue and Pepper Saxifrage. In practice, partially improved meadows or natural meadows of recent origin are also included, provided their species diversity is sufficiently high and structural characteristics are present. LoWS comprising this habitat can be identified by their satisfaction of site selection criteria HCr10 and HCr11. This habitat has been added to the Essex BAP during its review this year under the title 'Species-rich Grassland', which also includes calcareous grassland, of which there is none in Maldon district.

Of the Lowland Meadows LoWS, three are churchyards, where the habitat is restricted to margins and unmanaged corners, and there is one remaining road verge. The larger sites, of which there are few are all in proximity to the coast and tend to be floristically less spectacular. The top quality grassland sites are all small.

Unimproved grassland can no longer be created, but the provision of replacement flower rich grasslands is vital in securing the future of a wealth of invertebrate species. Any grassland creation scheme should be tailored to the particular location and the origin of the species introduced needs to be carefully monitored to prevent the inclusion of far less valuable continental varieties of the key species or flowering plants not native to the area. .

Coastal and Floodplain Grazing-marsh

The extent of this restricted habitat has clearly been greatly reduced in Maldon over the past 60 years, with much former habitat lost to agricultural "improvement". However some of the most significant blocks of this habitat remaining in the county occur within the district. Furthermore there is considerable scope for attempts at restoring this habitat, by reverting arable land adjacent to the seawall and by re-engineering old drainage channels to facilitate the raising of water levels. Many of the characteristic plant species of this habitat remain on undamaged and well managed sections of seawall and could be encouraged to colonise these recreated marshes.

At the same time, there is some insecurity with regard the existing resource in the face of rising sea levels and the cost of seawall maintenance. Any "development" work in the coastal strip should be taken as an opportunity to secure strategic improvements to these coastal habitats.

Reedbeds

The main reedbeds in Maldon district are distributed around the coast, largely on old, isolated creek systems (Ma50 Heybridge Creek, Ma60 Limbourne Creek and Ma66 Mundon Fleet, Tollesbury Wick), duck decoys (Ma75 Skinners Wick Decoy Marsh and Ma88 Marshhouse Decoy Pond, Old Hall Marshes) or are associated with aggregates sites (Ma57 Heybridge Gravel Pits, Ma63 Chigborough Lakes, Ma80 Goldsands Road, Ma84 Stows Farm Lake). The exceptions are an extensive area on the tidal Chelmer at Beeleigh (Ma36) and Ma41 Ironworks Meadow, which is a floodplain meadow, probably wetted by seepage from the adjacent canal.

Beyond these important sites there are several other sites that have significant amounts of reed within ditches, drains or in mosaics with willow scrub as well as the extensive amount in the district's borrowdykes. Only the larger, broader sites are likely to attract significant

numbers of attention grabbing reed-breeding bird, such as Bittern and Bearded Tit, but even quite narrow but long stands of reed can support assemblages of reed-dependent invertebrates, Water Voles and some bird species. There is considerable scope for the creation of extensive reedbed habitats within the district.

Open Mosaic Habitats on Previously Developed Land

This new priority habitat and Essex BAP habitat (provisionally titled 'Brownfield Sites') is intended to afford some level of designation to sites that have been developed and then abandoned and that have subsequently naturalised into a complex of habitats suitable for a diverse range of invertebrates, including many of national significance. Brig (2007) states that, in its purest form, this habitat "…comprises mosaics of bare ground with, typically, very early pioneer communities on skeletal substrates, more established open grasslands, usually dominated by fine-leaved grasses with many herbs, areas of bare ground, scrub and patches of other habitats such as heathland, swamp, ephemeral pools and inundation grasslands". The East Thames Corridor contains the best examples of this habitat in Essex and perhaps nationally, the best known example being the former refinery site at Canvey Wick. No sites have yet been selected in Maldon district for supporting this habitat, but it is possible that further survey work on the Urban Capacity Study Sites will reveal the necessary habitat mosaic. Unfortunately it requires some specialist knowledge and detailed survey work to be able to fully assess such sites for qualification.

It is felt that this label can be applied in certain other circumstances with equal validity, where the spirit of the habitat is maintained, even if the detail is slightly different. Examples could include disused aggregates sites, landfill sites or even, in certain circumstances, abandoned agricultural or horticultural land where these have not been restored in the customary manner.

As government policy dictates that previously developed land should be a priority for development, these sites are highly threatened and so every opportunity should be taken to preserve the key elements of recognised sites and to consider the creation of similar habitat mosaics. The inclusion of "green roofs" would be a feasible way of including such mosaics in development sites, provided that good advice is sought as to the structure and composition of such features.

Coastal Vegetated Shingle

This scarce Essex habitat is represent in Maldon district by some extensive shingle and shell beaches around Bradwell and numerous smaller patches along both shores of the Blackwater estuary. This habitat supports a distinctive community of flowering plants and some highly significant invertebrates in a national context. It is also a habitat that is very vulnerable to dynamic coastal processes.

Coastal Saltmarsh

The decline in the extent of saltmarsh, recently added to the Essex BAP, in the southeast of England has been well documented and is certainly apparent in parts of Maldon, however there are some significant blocks of saltmarsh remaining, such as at, Lawling Creek, Mill Creek and near Goldhanger. There is also a significant extent of recent saltmarsh as a result of accidental and, more recently, deliberate coastal realignment, including at Orplands, Tollesbury (Ma79), Northey Island, Bridgemarsh Island and North Fambridge.

Irrespective of the changes in our climate, sea level will continue to rise and so this habitat remains under threat wherever there are hard sea defences against wish it is squeezed. The likelihood is that managed realignment will be practised more widely, for economic reasons, and so there is reason to believe that this habitat is secure into the future.

Intertidal Mudflats

Of vital importance to the thousands of migratory birds that pass through and overwinter in the county, this habitat should benefit from managed realignment in the coming years. It would appear that Maldon district is less likely to be subject to the large scale developmental pressures that are leading to the loss of such habitat elsewhere in Essex, for example Bathside Bay at Harwich and Mucking Flats in Thurrock, but it may become the focus for habitat creation schemes to compensate for such losses.

Saline Lagoons

This habitat is largely defined by the specialist species that are present within it and so identification of sites is a complicated business. The majority of qualifying water bodies in Maldon are likely to be borrowdykes, although there are a number of other coastal water bodies that may possess the chemical characteristics required by these characteristic invertebrates. The SSSIs should protect a significant proportion of the best sites, but a LoWS designation should be considered for any site that possesses a significantly diverse

assemblage of saline lagoon species. Efforts could be made to collate the existing data on these species and to survey any target areas where data is lacking.

Any potential saline lagoon site – a water body in close proximity to the coast and likely to be in some part brackish – should be investigated fully before it can be adversely influenced by development.

5.2.2 Species

Brown Hare

Brown Hares in Maldon district utilise both arable and grazing-marsh habitats. Whilst the latter are relatively stable, changes in EU and national farming policy have the potential to impact on Hare numbers, both positively and negatively. Hares favour a complex landscape with woods, grasslands, hedgerows and arable fields. They are not just animals of "big open fields", although this is where the general public most often sees them, especially in the spring. New Environmental Stewardship schemes have the potential to greatly improve the diversity of the farmed environment and this should help this species, provided that the schemes are properly supported and the attraction of high cereal prices does not prove too strong. The sweep of coastal grazing-marsh along the Maldon coast is clearly an important area for this species

Bats

Knowledge of bat roosts and especially over-wintering sites in Essex is rather limited. No sites have been identified as LoWS because of their bat populations, but should information about a significant roost become apparent in a non-domestic situation, this could happen. Many small summer roosts doubtless occur in the roof spaces of older residential properties and even in modern-built houses. One recurring issue with the Urban Capacity Study (reported separately) is that of the threat of knocking down old, sometimes derelict buildings that do offer the potential for roosting bats. Because of the legal protection given to all bat species in Britain, any such action must be preceded by a suitable survey of the property affected.

Mature trees are equally as important to bats as roosting sites and are equally vulnerable to modification in the interests of public safety. It is increasingly likely that old trees will be felled as soon as any signs of weakness are apparent, many of which signs are exactly the

features that can attract bats seeking roosting space, large cavities, flaking bark, damaged limbs, etc.

The species named in the UK BAP Priority List are Noctule, Soprano Pipistrelle and Brown Long-eared Bat, all of which occur in Maldon district.

Water Vole

Although Water Voles are now largely absent from the main rivers in Essex, as a result of predation by the introduced American Mink, populations are likely to remain on some of the smaller tributaries. A recent survey of the Blackwater catchment failed to find any signs of activity on the main river catchment, although a population was discovered on Totham Brook, close to the estuary (Darren Tansley *pers. comm.*). It is likely that coastal marshes and borrowdykes are now very important to this species. Although Mink have reached the Essex coast, their effect on Water Vole populations in coastal habitats is less dramatic and so these locations provide something of a safe haven.

This species would benefit from the restoration or creation of coastal grazing marsh with wet ditches and also from reedbed creation in appropriate locations. Widespread and ongoing Mink control operations would be needed to enable them to recolonise the main rivers.

Otter

Signs of Otter activity are regularly found along the Chelmer and, to a lesser extent, the Blackwater, although there is no indication of the size of the population involved. Records from coastal areas are surprisingly few, although the likelihood of locating signs is much lower in these habitats. This is not a species that can be adequately conserved by site designation, as individual animals can roam over whole river systems. The main threat to this species in Essex is from road traffic accidents.

Hedgehog and Harvest Mouse

No real data exists for these species in Essex, although Dobson (1999) suggests that Hedgehogs are widespread, but "likely to have declined during the last 20 years" and that "recent evidence confirms that" Harvest Mouse is still widespread, but that habitat loss and agricultural intensification have lead to population fragmentation and local extinctions. These decline have continued to such an extent that the species has been included on the UK

Priority BAP List. This is another example of species that cannot be adequately conserved by the designation of sites. For Hedgehog one reason is because one of its more important habitats is likely to be urban and suburban gardens, although it would, perhaps, be a good flagship species for interpreting the BAP process to a wider audience and to encourage more wildlife friendly gardening and land management practices. With Harvest Mouse agricultural policy is a significant factor, but its most reliable populations may end up being in the river corridors and coastal strips that would once have been marginal habitat.

Dormouse

There are few records of this mammal in Maldon district, but survey effort has been limited to date. It is now known that the habitat requirements of this species are much broader than was previously thought to be the case. Although coppiced woodlands with an abundance of Hazel, Honeysuckle and other fruiting plants remain important, it has been shown that good quality hedgerows, scrub and even Bramble thickets can also support populations of Dormouse. Such habitats are often found on development sites, particularly rural or urban fringe sites, and so the possibility of their presence should be considered in assessing planning issues.

The only sites in the district with existing records are Ma43 Shutheath Wood and Stow Maries, although they occur just over the district border from Ma2 The Warren Golf Club Woods and Ma3 Barnfield Wood on Woodham Walter Common and so may prove to be found in these woods.

Birds

There is now a long list of UK BAP Priority bird species, following the addition of 32 species during this years review. Many of these species cannot be protected in Maldon district by the designation of LoWS, because they are still sufficiently widespread for the impact of positive land management on LoWS on their population to be minimal. This would include species such as House Sparrow, Starling, Song Thrush, Bullfinch and Dunnock. More widespread changes in attitudes will be needed to make a difference significant enough to prevent further declines. Other species included on the list, such as Lesser Redpoll and Ring Ouzel are regular, but unpredictable in their presence within the district.

Some species occur in habitats that are well represented by the combined SSSI and LoWS network, principally the coastal species such as Brent Goose, Herring Gull and Lapwing. Blocks of habitat that are important to these species and that lie outside of the SSSI should be added to the LoWS network once data becomes available. With other coastal species that typically only pass through or overwinter in Essex, it is unclear what measures are necessary or possible and these include Black-throated Diver, Bewicks Swan, Black-tailed Godwit and Twite.

An important group of species is those associated principally with agricultural systems including Corn Bunting, Turtle Dove (both now added to the Essex BAP), Grey Partridge, Skylark (both already in the Essex BAP), Yellowhammer, Reed Bunting and Yellow Wagtail. Most of these species are faring well in Maldon and Essex compared with other parts of England, particularly in the coastal strip, where saltmarsh and coastal grazing marsh provide the diversity of habitats needed by these species in addition to arable land. Reasons for national decline have been ascribed to a lack of invertebrate food as a result of agrochemicals as well as loss of the small scale mosaics of arable, pastoral and semi-natural habitats that would have been typical before agricultural intensification. Two other formerly common species that are less closely associated with farmland, Linnet and Cuckoo, are increasingly concentrated on the coast following widespread declines.

Reptiles

All four reptile species native to Essex – Grass Snake, Common Lizard, Adder, Slow Worm – are now included on the UK BAP Priority Species List. These species are all protected by law to a certain extent, but that protection does not extend to their habitat. Their inclusion as BAP species, in combination with the NERC act, imparts a certain responsibility local authorities to consider impacts to their habitat resulting from their policies, including planning decisions.

Adders have declined significantly, in the county and nationally, and seawalls, of which Maldon district possesses a significant amount, are now one of the prime habitats. Common Lizards and Slow Worms are also frequent on this habitat, sometimes at high concentrations. The loss of seawall habitat to managed realignment schemes and to improvement works could have a marked deleterious effect on reptile populations, if adequate mitigation and compensation is not included as part of the schemes.

Native Oyster (EBAP)

Newly added to the Essex BAP, but not included in the national Priority List, this species has a close association with Maldon district. The Action Plan for this species is not yet complete, but it is anticipated that many of the individual actions will be applicable to Maldon district.

Great Crested Newt

There are relatively few records for Great Crested Newt in Maldon given the seeming abundance of records from other parts of Essex. There are very few recorded breeding ponds north of the River Blackwater, but the ones that are known about support significant populations. This is likely to be due to the lack of appropriate surveys rather than a real lack of this species in Maldon. Surveys are almost invariably prompted by development proposals and so where development pressures are less intense, our knowledge of this species tends to be limited. Further survey work is urgently needed to gain a better understanding of the distribution of this highly protected species, especially in the light of future development pressure. This would allow key metapopulations to be identified, which would in turn allow a more strategic approach to the conservation of this species. It is recommended that all development applications should be supported by appropriate surveys of all water bodies in or closely adjacent to the proposal site. This is as much a legal requirement as it is a means of better understanding the ecology of Great Crested Newts.

Common Toad

This species was added to the UK Priority List during the recent review because of national declines. No data has been obtained on this species during this study, but ponds supporting significant breeding populations should be included within the LoWS network. This species is often overlooked in favour of Great Crested Newts, because of the latter's legal protection, but it is equally as vulnerable to loss of habitat and breeding ponds. Experience would suggest that it is likely to be less widespread than Great Crested Newts within Essex.

Invertebrates

In recent years populations of three nationally significant bumblebees have been discovered on the Dengie peninsula, all of which are now UK Priority BAP species; these are the Shrill Carder-bee (*Bombus sylvarum*), Brown-banded Carder-bee (*Bombus humilis*) and Moss Carder-bee (*Bombus muscorum*). This is now believed to be the result of a genuine range expansion, regaining ground lost over the last half century (Benton and Dobson, 2007) with

Shrill Carder-bee also now present at Tollesbury Wick Marsh, north of the Blackwater. Most of these populations are associated with seawalls or arable field margins where there is an abundance of plant species suitable for foraging, particularly Narrow-leaved Bird's-foot Trefoil (*Lotus glaber*). The Shrill and Brown Carder-bees have nationally significant metapopulations in the East Thames Corridor, where many of the key sites are on previously developed land and/or are threatened by development. This increases the significance of the Dengie populations at a county and national level. With the prospect of managed realignment leading to the loss of significant areas of seawall habitat, the provision of alternative suitable habitat should be a priority, where possible; this is most likely to be achievable through agri-environment schemes.

Amongst the large number of other invertebrates added to the Priority List are a handful that are well represented in Maldon district. These include: Small Heath butterfly; White-letter Hairstreak butterfly; the Starlet Sea Anemone (*Nematostella vectensis*), a saline lagoon specialist found in borrowdykes south of the Blackwater; *Anisodactylus poeciloides*, a seed eating ground beetle found at the margins of saltmarshes and seawall seepages. Any sites that are shown to support significant populations of these, or any other UK BAP Priority species, should be considered for LoWS designation and the presence of lesser populations of these species can be used to support the designation of a site on habitat criteria.

Vascular Plants

Amongst the plant species added to the UK BAP Priority List are a suite of Nationally Scarce species that are well represented in Essex, including Maldon district. They can be grouped in habitat associations: Seawall and coastal grassland - Slender Hare's-ear, Sea Barley and Divided Sedge; Saltmarsh – Borrer's Saltmarsh Grass and Small Cord-grass; vegetated shingle – Prickly Saltwort. The majority of these species' habitat is protected by SSSI designation and the remainder should be included in the LoWS network, but the discovery of any of these species in any other locations should be a prompt for considering the site for selection.

Native Black Poplar

There are only four of these trees recorded in Maldon district; three together near Goldhanger and one in a garden on the district boundary at Tolleshunt Knights. Surprisingly none have been found along the main rivers, where some habitat would be suitable for planting.

5.2.3 Key Species and Habitats in Maldon District

Of the species and habitats detailed above, some are particularly relevant to Maldon district, because of their relative abundance or because of historical or sociological associations. This is particularly true of coastal species and habitats, as the district is dominated by its coastline. The following list is a suggestion of the possible flagships for the BAP process in Maldon district, including those for which the greatest potential for action exists.

- Coastal and Floodplain Grazing Marshes
- Seawalls; including characteristic plant species and Adder
- Water Vole
- Hedgehog and Common Toad
- Corn Bunting
- Native Oyster

5.3 Wildlife Corridors

For most species of flora and fauna, the term "corridor" is a misleading one. In human terms, a corridor is merely a conduit by which one gets from A to B, with the conscious decision to get to B having left A. The journey may take only a few seconds, minutes or at the most hours if one considers roads as human corridors. Furthermore, it does not necessarily matter if the human corridor passes through "inhospitable" or "useful" territory: it is, as said a means of "getting from A to B". For wildlife, only a very small handful of large-scale migratory species can be said to follow similar patterns and even then there are fundamental differences in how that corridor works. Wildebeest follow ancient, traditional routes across southern Africa, but the "corridor" still needs to support their basic needs every day along the way. The closest example of a small-scale corridor that works in a similar way to that used by humans might be a pipe underpass that allows Badgers to carry on using a traditional foraging path once a road has been built across it. In this instance, Badgers will often instantly take advantage of the underpass, provided it is very close to their known route. Badgers tend to adapt to this arrangement because they generally follow well-worn paths when out foraging for food and patrolling their home range in any case.

Within the realm of countryside planning and management it is invariably the case that it is us humans that have decided that the species concerned living at point A would be better off if it were also living at point B: wildlife merely takes advantage of living wherever it can. Thus, for B to be colonised by the species, it may well have to "live down" the corridor to

reach our desired end-point. In other words, the corridor must be of sufficient habitat quality to support the species, albeit temporarily, whilst it spreads through the habitat hopefully ending up at point B, where there is sufficient habitat for permanent populations to become established. For the successful movement of Brown Hares, this corridor will need to be of a landscape scale, whilst for reptiles it may only be a few tens of metres wide.

There is still a major variation in the time-scales in which such corridors may operate. If one is exceptionally lucky, Dormice might spread from one wood to another using an artificial rope-bridge slung over a road in a few weeks or months, but such dispersal, if it happens at all, is much more likely to take years to work. Dormice are not capable of thinking "we can use this bridge to get to the other side now" – it will just happen as part of random exploration of their surroundings. A newly planted hedge to encourage the dispersal of bats may take many years before it is big enough to attract bats to use it for foraging behaviour. It is therefore of fundamental importance that for the dispersal of wildlife through the countryside, not only should potential habitat point B be capable of supporting the species, but the land designated to allow it to spread to that point must also be suitable habitat. It would be for the good of the species in terms of mixing gene pools for the return journey from B to A to be possible at any time, along with mixing with individuals at points C, D, etc. So the concept of a matrix rather than a corridor is a better one.

For all this, there is one fundamental problem in designing and implementing wildlife corridor schemes: there are virtually no scientific papers that empirically show that such corridors work at the landscape scale. It can be demonstrated that Badgers and migrating frogs and toads use underpasses under roads, and some studies have looked at insect dispersal along road verges (e.g. Munguira and Thomas, 1992), but such insights into how and why animals move through the countryside are very few and far between and usually focus on small-scale site mitigation rather than landscape planning. As such, all that can be done is to strive towards a far-reaching matrix of what we perceive to be good quality habitat for the species or groups of species concerned and hope that their population and distribution are improved as a result.

5.3.1 Corridor Requirements

The requirements of a few selected groups of animals can be used to illustrate some of the key features that need to be considered when attempting to plan the spread of species around

the countryside. This will reinforce the fact that it is impossible to have a "one size fits all" wildlife corridor. Rather, one is likely to be dealing with "a bat corridor" or "a Water Vole corridor", with little prospect of dual use, although some shared usage may be possible e.g., bats with Dormouse, reptiles and amphibians with ground-dwelling invertebrates. In reality a "healthy", functioning rural landscape will contain many corridor features that will be used in combination by a wide range of species.

Bats

Bats are obviously very mobile species, but have been shown to have favoured foraging locations within their sometimes extensive home ranges. Habitually, they tend to spread from their roost sites along hedgerows, tree belts or similar linear features, sometimes feeding as they go, before arriving at a main feeding area. As such, these hedgerows come some way towards the human concept of a route to get somewhere. Most bat species, particularly the smaller ones, are less likely to cross large open areas whilst on nightly foraging activity. That said, bats are clearly capable of moving large distances on a seasonal basis when they travel to and from winter hibernation sites and the overall presence or absence of bats in an area is probably more down to the presence or absence of suitable summer roost sites and good quality foraging habitat capable of supporting the colonies when there. In summary, if the habitat is good enough, bats will probably find it (sooner or later). The speed at which it is found may depend on the quality of the matrix of hedgerows, woods and similar features which favour foraging activity.

Amphibians and Reptiles

Newts, toads and frogs have a tendency to return to the pond of their origin, dispersing into the surrounding countryside away from the breeding season. However, if new ponds are encountered during that dispersal, colonisation can occur. The likelihood of that colonisation taking place depends on how tempted the species is to disperse in that direction e.g. down strips of habitat that satisfy their needs at that time of year. Even apparently unsuitable habitat can be crossed, but there are limits to the penetrability of such habitats.

Consider two ponds, one in a field hedgerow and the other in the middle of an arable field nearby (see Figure 1, below).

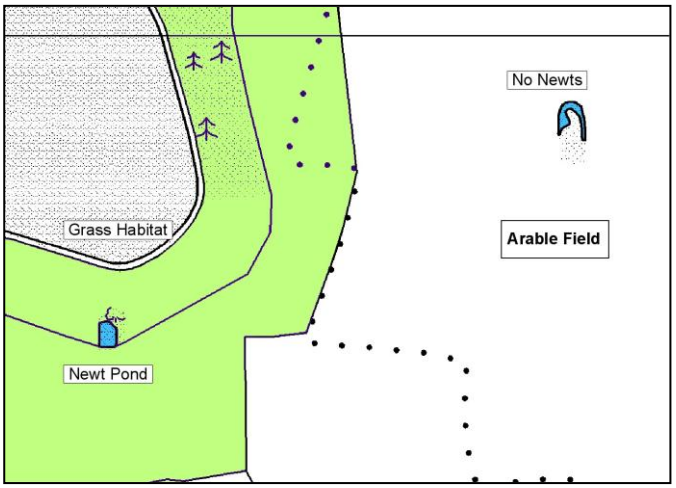


Figure 1. Landscape with isolated pond

The isolated pond within the arable field may provide suitable habitat for breeding newts, but they are unlikely to disperse in that direction, unless a short corridor of suitable terrestrial habitat is created (Fig. 2.)

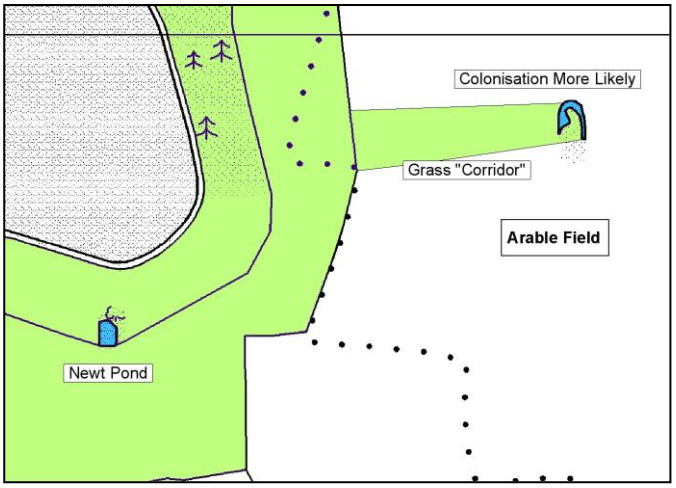


Figure 2. Corridor in place

In a landscape with a high density of ponds, a better concept is again one of a matrix rather than single corridors, since this will allow good mixing of the gene pool. It is likely that in most cases Great Crested Newts survive in metapopulations, utilising a number of different, connected ponds rather than relying on one single water body. This type of corridor would also assist the dispersal of reptile species.

Water Voles

In Britain, Water Voles are invariably closely associated with water bodies, usually rivers, streams, reedbeds and borrowdykes but sometimes ponds and lakes. It is interesting to note that this does not apply in continental Europe where, as the scientific name *Arvicola terrestris*

implies, it is a terrestrial species found well away from water. Water Voles are capable of dispersing some distance down rivers and their immediate banks and could colonise suitable sections of river bank where stands of emergent vegetation provide cover and food supply and steep banks permit burrowing. However, the biggest block to such corridor use is the presence of American Mink in the river catchment. American Mink are very significant predators of Water Voles and are thought to be largely responsible for the drastic decline in Water Vole numbers across Britain. Thus, there is an instance here of "empty corridors" – many suitable river sections are likely to remain devoid of Water Voles if Mink are present, with the complication that the Mink will be largely using the same corridor for dispersal, although they are less strictly tied to such routes.

Flying Insects

This category clearly encompasses a huge variety of organisms, each of which has strengths and weaknesses in terms of dispersal. Many such insects are highly mobile and are capable of chancing upon suitable nesting habitat and "living space" whilst out foraging for food. These colonisation events can be leaps across relatively unattractive habitat in the case of some bees and wasps, so the concept of "stepping stones" rather than corridors is a more appropriate analogy. That said, the speed and likelihood of colonisation will probably depend on how far apart the "stones" are placed. Many such insects survive as meta-populations, that is, clusters of semi-independent colonies within which some exchange of individuals takes place. In this way, re-colonisation can take place following a localised extinction and new habitats can be exploited as existing sites become less suitable e.g. by succession to scrub from an open grassland.

A more significant factor affecting the dispersal of such species over larger distances is the existence of barriers. A clear example of this is a multi-lane dual carriageway, which represents a formidable barrier to many low-flying insects. Many species will be prone to being killed by speeding traffic or will not cross such a bleak tract of land due to behavioural constraints. It should be borne in mind that, to a limited extent, such barriers may be partial corridors in themselves, in that the verges may act as grassland or hedgerow corridors along the route of the road. This duality is discussed in Munguira and Thomas (1992). This theme is returned to later.

Other species, however, are very poor colonisers of new habitat, despite being winged. Many butterflies are quite poor fliers and do not have the inclination to fly long distances. These tend to be habitat specialists that are, by and large, the rarer species in today's countryside. For these species the concept of permanent linked habitat along which they can slowly spread, living many years along the corridor, is still a valid one.

Ground-dwelling Invertebrates

The problems faced by these animals are largely parallel to those faced by reptiles and amphibians, although their willingness or otherwise to cross even minor paved roads makes the problem of road corridors as barriers rather than as means of dispersal is even more extreme (see e.g., Mader et al. 1990; Oggier, 1995).

Plants

Plants similarly display a range of abilities, from weed species that have seeds that can travel in the wind for many miles or even tens or hundreds of miles, through to species that only spread a few inches a year in patch-like growth. This latter group includes several so called "ancient woodland indicators", with the premise being that if they are found in a wood, it is likely to be ancient and possibly a modified relic of the original wildwood that once covered the land. This is because these plants are such poor dispersers that they are incapable of colonising new areas of woodland. In reality, even the poorest of such dispersers is theoretically capable of spreading into newer mature woodland if it is immediately adjacent to the ancient wood, but even then the rate of spread will be very slow. For these species the corridor needs to be effectively permanent and the rate of spread will be measured in decades or centuries for any significant movement.

5.3.2 Wildlife Corridors in Maldon

Opportunities for dispersal through the countryside can be considered as two distinct forms: via relatively or absolutely inflexible infrastructure features and also through general land use patterns and alignments. The first factor can be split into artificial and natural features, as illustrated in Map 1.

5.3.3 Artificial Infrastructure Corridors/Barriers

These are essentially major road verges and railway lines. Map 1 illustrates two levels of physical barrier: those likely to inhibit movement (solid red line), and those where the risk from crossing is less (broken red line). As indicated above, our scientific knowledge of what

makes a proven successful wildlife corridor at the landscape scale is almost nonexistent. However, our appreciation of what makes an identifiable barrier to movement is slightly better developed and it is suggested that any "green grid" would bear more fruit in terms of wildlife dispersal by addressing these issues rather than by attempting large-scale land use manipulation, at least in the first instance.

There are few, if any, such significant barriers in Maldon, as there are none of the dual carriageways or other major roads that can be found in other districts. The major road routes through the district are the A414 between Maldon and Danbury, the B1022 between Maldon and Tiptree, the B1019 between Maldon and Hatfield Peveral, the B1018/1010 between Maldon and Fambridge, and the B1012 between Fambridge and South Woodham Ferrers. None of these could be considered to be major barriers, although it should be appreciated that even minor county roads can represent physical barriers for some species (Mader, 1984; Mader, 1988). The mortality of mammals, birds and insects caught trying to cross such features is not often seen, unless it is the size of a Fox, Badger or deer.

For much of its length, the South Woodham Ferrers to Southminster railway line runs along the top of a large embankment and for many species this serves to isolate the low lying coastal grasslands to the south from the rising land to the north. Railway lines are considered to be more permeable to wildlife, because they are often flanked by scrub and other natural habitats and because their traffic is far more sporadic than is the case on roads. However even such permeable barriers may inhibit dispersal (see Yanes et al. 1995). For some species the railway line will also act as a corridor, particularly plants that are dispersed by wind.

To the north and south of Maldon are disused railway lines that, to a greater or lesser extent, serve as corridors for wildlife. Sections of both are managed with conservation in mind. The restoration of lost sections of these corridor features and the improvement of the habitat extent associated with each one could be an interesting and effective project.

5.3.4 Natural Infrastructure Corridors/Barriers

This term is taken to mean more or less natural physical features over which we have little overall control on their whereabouts (solid green, line 1, Map 1). This includes the freshwater and upper tidal sections of the River Chelmer, which together with the River Blackwater and the canal, are important for passing through the main conurbation of Maldon

itself, providing a route for urban green space (including gardens) and countryside to interact. The regular signs of Otter activity in the causeway area of Maldon are testament to this effect. However, it must be accepted that the river is, to some species, just as much of a barrier to lateral movement as are the major trunk roads. This will have its greatest effect on ground-dwelling invertebrates, reptiles (that can swim under duress but may not habitually do so, other than Grass Snake) and small mammals.

The coastal fringe, with its extensive, linear seawalls linked to other large blocks of good quality habitat is another significant corridor to invertebrates, mammals, reptiles and plants. On the Dengie peninsula this is broken by the coastal settlements of Mayland, St. Lawrence and Burnham.

Perhaps the most significant physical barrier is the estuary of the River Blackwater itself, which bisects much of the district with a broad, to many species, inhospitable environment. Of course it also serves as a corridor, bringing some of the most internationally important species right into the heart of the district.

5.3.5 Living Landscapes

There is a growing movement in conservation promoting the idea of living landscapes as a means to address the issues of habitat fragmentation, ecological connectivity and improved public access to, and interaction with, the countryside. The concept is based on the network of high conservation value protected sites – Sites with European designations (SAC, SPA, Ramsar), SSSIs and LoWS – but is not limited to such sites. It is also intended to foster environmental stewardship amongst a wide range of landowners in order to join up some of the existing protected sites, guided by the framework provided by Biodiversity Action Planning. By creating larger areas of contiguous habitat it is believed that species will more easily be able to cope with changes resulting from local habitat loss or climate change. The concept hinges on the involvement of communities, supporting them by offering open space for their enjoyment and health, as well as route ways that provide an alternative to conventional transport systems. In some areas a living landscape could feature large scale habitat creation schemes, aimed at restoring historical, extensive habitats or providing modern, sustainable alternatives.

Map 1 also identifies (in blue) a small number of more obvious chains or clusters of habitat stepping stones, centred on LoWS, where the dispersal of species is already likely to occur more freely than in other parts of the borough and where there are the clearest opportunities to pursue the living landscape concept. These are:

1. A ring of principally ancient woodland sites around Wickham Bishops;
2. A cluster of woods around Hazeleigh and Woodham Mortimer, with links across the district border into Chelmsford;
3. A chain of sites across the Dengie peninsula between Southminster and Bradwell, most of which are former aggregates sites associated with Thames Medway Gravels;
4. The coast, already identified as a corridor, also fits the concept of a living landscape, with perhaps a more immediately realistic chance of achieving a significant gain for conservation.

Maldon has relatively few of these living landscapes, largely because of the extensively agricultural land use bias in the district. In districts with more urban areas, clusters and corridors of habitat tend to be more obvious, although these are often of non-developed, potential habitat rather than being strong semi-natural features.

5.3.6 Planning for the Future

From the above discussion it should be apparent that planning for wildlife dispersal through corridors is at an embryonic stage in ecological knowledge. It could be argued that corridors should be unnecessary: the whole of the countryside should be open for movement in any direction a species cares to disperse. This is, albeit an admirable vision, a long-term project to say the least. For now, corridors or clusters of sites may be desirable to help conserve species that have either died out of a formerly populated area, or would have a far more stable population status if it were more widespread.

As previously mentioned, one cannot reasonably design a corridor that will suit all species. Rather, specific prescriptions can be designed for species projects. For example, one might have a project to encourage the spread of Water Voles through the Chelmer/Blackwater catchment. The specific features that a suitable river and its banks should possess can then be identified and, where practicable, put in place. A similar project might look to increase the

number of Great Crested Newt ponds, the number of meadowland butterflies in an area and so on.

A number of broad principles can, however, be identified to assist in the general maintenance of biodiversity in Maldon.

1. Encourage field grass margins and the re-establishment of hedgerows. Parts of the borough are intensely agricultural, as can be seen from the land use maps and the large areas without any LoWS. In these areas, north of the Blackwater and on the Dengie peninsula, even modest habitat creation schemes have the potential to reap great rewards. The concept of grass margins around every arable field epitomises the idea of a matrix, rather than corridor, based approach to nature conservation.

2. Where possible, consider means of creating green crossings through the barriers likely to be impermeable to the movement of wildlife.

3. Use planning powers to ensure that, where appropriate, development schemes involve the creation or improvement of habitat for wildlife. This could also extend to aggregates sites, flood alleviation schemes and other examples of "development" in the broad sense.

4. For urban developments, particularly those interacting with the urban fringe or an existing green open space, ensure that green spaces and networks are included within the design.

As previously discussed, it is easier to identify where and how the passage of wildlife through the countryside is being blocked than it is to design and implement routes for large-scale dispersal. Impediments to the dispersal of wildlife come in three main forms: urban growth, with no places of shelter designed into or left within them; featureless arable landscapes; and roads. The idea of green bridges is an appealing one from the perspective of the nature conservationist, but extremely expensive to implement. They have been used with great success in countries with less pressure on the land and more wildlife to contend with, such as Canada, where the pressures to keep Black Bears and Moose out of the way of speeding traffic on new cross-country routes is rather different to the pressures faced in this country. Green "butterfly" bridges were lobbied for in the UK when the M3 was driven through a

huge cutting through Twyford Down in south Hampshire, but this was declined on grounds of cost.

Not withstanding this, the need to reduce the number of obstacles in the countryside is an important consideration. There are many small-scale solutions known to work, including underpasses for Badgers, Otters and amphibians under roads, rope bridges connecting two woods either side of a road for Dormice and planting tree belts for bats.

5.4 Climate Change

It is now widely agreed that we are experiencing some degree of change to our climate, although the reasons for this are still subject to considerable debate. Balance of opinion seems to be shifting to an acceptance that the rapidity of climate change is as a result of the actions of the human race.

During the twentieth century the earth's climate rose by 0.6^{o}C. The 1990s was the warmest decade in the UK since records began in the 1660s. It has been observed that: the growing season for plants has extended by about a month since 1900; that there are more heat waves, fewer frosts and winter cold spells; that over the past 200 years winters have become wetter relative to summers; that a larger proportion of winter precipitation comes on heavy rainfall days. In addition the average sea level around the UK is now ten centimetres higher than it was in 1900. (Hulme *et al.* 2002)

According to UKCIP02, a report prepared by the UK Climate Impact Programme that sets out four predicted models of climate change under varying global emissions scenarios, the predicted changes to UK climate are:

- Annual average temperatures to rise between 2^{o}C and 3.5^{o}C by the 2080s, with most of the increase coming in the south and east (4-5^{o}C) and during the summer and autumn;
- Increase in winter precipitation, decrease in summer precipitation, with the largest changes in the south and east,
- The incidence of heat waves is likely to increase, as is that of extreme precipitation events;
- Sea levels in the East Anglia are predicted to rise by 17-77 centimetres by the 2080s;
- Coastal storm surges are expected to increase in frequency and height, with the possibility of surges 1.2 metres higher than those experienced now in the southeast.

Foreseeing the effects of this predicted change on the plants, animals and ecosystems within Maldon district becomes increasingly difficult because of the degree of complexity and number of variables involved. Rather than working in isolation it is likely that a reciprocal mechanism will develop, with climate and consequent environmental changes acting as a constraint on the response of species and ecosystems to human changes in land and resource use and vice versa.

Perhaps the most obvious impact on a district such as Maldon will be around the coast, as the coastline is so long, with largely man made sea defences protecting a considerable amount of land at or below sea level. With rising sea levels and an increased incident of surges, the seawall and other hard defences are going to be under more intense pressure. It would be reasonable to assume that managed realignment will be practised more widely and that an unplanned breach of the seawall will become more likely. The remaining fragments of coastal grazing marsh, and other important coastal grasslands such as those on seawalls, will be under threat of inundation through one of these means. The suite of Nationally Scarce plants whose distribution is centred on the Greater Thames estuary and that are almost solely found in such habitats (*e.g.* Slender Hare's-ear, Sea Clover, Curved Hard-grass, *etc.*) will be in danger of local extinction and fragmentation, through direct loss of habitat and also through disturbance during sea defence improvement works.

In order to maintain these species and habitats it will be necessary to create compensatory habitat of a similar nature further inland under suitable conditions or to prioritise the defence of the key habitat blocks. However, creation cannot hope to result in an equivalent community in such a short timescale. Coastal grassland should become an important component of any realignment scheme and consideration should be given to experiments with translocation or seed harvesting for these schemes, together with appropriate land-forming and water level management.

Assuming that managed realignment will become more widespread, then there should be an increase in the amount of saltmarsh and mudflat habitat over the district.

Changes in rainfall and temperature patterns are most likely to have an impact on wetland habitats. Prolonged flooding during the wetter winters could affect wetland species in itself, but summer drought is more likely to have a profound effect on the overall quality of wetland

habitats. This may well be exacerbated by the increased amount of water needed to satisfy agricultural and domestic supply requirements. In order to compensate for these factors, a coherent approach to water management will be required, coordinating the conflicting requirements and ensuring that supply to conservation habitats is facilitated within this balance. A move towards water neutrality in housing developments is incorporated into the "Code for Sustainable Housing" promoted by BREEAM, along with other benefits for the natural world.

Grassland habitats may well suffer reduced productivity in the face of declining summer rains, which could reduce their value as an agricultural resource. On the positive side, the reduction in biomasss may favour some of the less competitive species of higher conservation value and may produce a sward that has a structure more favourable for invertebrates. Many of the best grassland habitats, including those on "brownfield" sites are established under conditions that result in drought stress.

Many woodlands in Maldon district are unmanaged and as a result are slowly losing their biodiversity and conservation value. Increased storm events and summer droughts, could lead to an improvement in structure as mature trees succumb leaving gaps in the canopy. Unfortunately the eventual consequence of this is likely to be that more competitive and invasive species such as Sycamore will react better to these conditions than our native canopy trees and the overall composition of our woodlands will alter.

Perhaps the most profound effect on the district as a whole could be the result of the agricultural industry's response to climate change. At present there is a move toward growing wheat for biofuels, as a response to climate change. This is serving to increase the price of wheat and in the short term may encourage farmers to bring land under conservation management or set-aside back into production, particularly when combined with the poor performance of new Environmental Stewardship schemes. The minimum requirement for set aside has now been removed in order to cope with a global shortage in cereals arising from poor harvests in some areas combined with this increased demand.

In the longer term it could also be expected that a greater diversity of crops may be grown, as the change in climate favours more traditionally southern species such as soya and maize. It is likely that, despite the recent move of divorcing agricultural subsidy from production, it is the structure and detail of the system of subsidies that will have the greatest impact.

Impacts on individual species, beyond those tied to the particular examples of the habitats mentioned above will also vary. Invertebrates could benefit from a longer breeding season, allowing more generations per year and thus increased population size. This will depend on the availability of suitable habitat and connections between habitat blocks. Habitat fragmentation could lead to isolated populations that are then more vulnerable to extreme weather events, seasonal flooding or prolonged drought. The key to encouraging adaptation and survival will be to encourage policies that provide a wider matrix of countryside under favourable management interspersed with important conservation sites.

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Glossary of Abbreviations

BAP	Biodiversity Action Plan
DCLG	Department for Communities and Local Government
Defra	Department for the Environment, Food and Rural Affairs
ERDL	Essex Red Data List
NCC	Nature Conservancy Council
ODPM	Office of the Deputy Prime Minister
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
RDB	Red Data Book
RSNC	Royal Society for Nature Conservation
SINC	Site of Importance for Nature Conservation
SSSI	Site of Special Scientific Interest