

**SOUTH HOLLAND
INTERNAL DRAINAGE BOARD**

BIODIVERSITY ACTION PLAN

May 2010



This Biodiversity Action Plan has been prepared by the South Holland Internal Drainage Board in accordance with the commitment in the Implementation Plan of the DEFRA Internal Drainage Board Review for IDBs to produce their own Biodiversity Action Plans by April, 2010.

It also demonstrates the Board's commitment to fulfilling its duty as a public body under the Natural Environment and Rural Communities Act 2006 to conserve biodiversity.

Many of the Board's activities have benefits for biodiversity, not least its water level management and ditch maintenance work. It is hoped that this Biodiversity Action Plan will help the Board to maximise the biodiversity benefits from its activities and demonstrate its contribution to the Government's UK Biodiversity Action Plan targets whilst actively managing water and reducing flood risk.

The Board has adopted the Biodiversity Action Plan as one of its policies and subject to available resources is committed to its implementation. It will review the plan periodically and update it as appropriate.

Sam Markillie
Chairman of the Board

This Biodiversity Action Plan is a public statement by the Board of its biodiversity objectives and the methods by which it intends to achieve them.

We would welcome appropriate involvement in the delivery of the Plan from interested organisations, companies, and individuals.

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1 IDB BIODIVERSITY – AN INTRODUCTION

1.1 Introduction

The IDB has conducted a biodiversity audit of its district and identified those habitats and species that would benefit from particular management or actions by the IDB. Using this information, which is presented in later sections, the IDB's Biodiversity Action Plan has been developed. The Plan identifies objectives for the conservation and enhancement of biodiversity within the drainage district, and goes on to describe targets and actions that will hopefully deliver these objectives. The intention is to integrate, as appropriate, biodiversity into the Board's activities, such as annual maintenance programmes and capital works projects, subject to available resources.

The action plan will help to safeguard the biodiversity of the drainage district now and for future generations. In particular, it is hoped that implementing the plan will contribute to the achievement of local and national targets for UK BAP priority species and habitats. Species and habitats which are not listed in the UK BAP but may be locally significant for a variety of reasons have also been considered.

The Plan is an evolving document that will be reviewed and updated on a regular basis. It covers the entire drainage district of the IDB, as shown in Figure 1.

1.2 What is Biodiversity?

The Convention on Biodiversity agreed at the Earth Summit in Rio de Janeiro in 1992 defined biodiversity as:

“The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

Biodiversity can be defined simply as “the variety of life” and encompasses the whole spectrum of living organisms, including plants, birds, mammals, and insects. It includes both common and rare species, as well as the genetic diversity within species. Biodiversity also refers to the habitats and ecosystems that support these species.

1.3 The Importance of Conserving Biodiversity

Biodiversity is a vital resource and it is essential to acknowledge its importance to our lives along with the range of benefits that it produces:

- Supply of ecosystem services – water, nutrients, climate change mitigation, pollination
- Life resources – food, medicine, energy and raw materials
- Improved health and well-being
- Landscape and cultural distinctiveness
- Direct economic benefits from biodiversity resources and ‘added value’ through local economic activity and tourism
- Educational, recreational and amenity resources

1.4 The Biodiversity Action Planning Framework

This IDB Biodiversity Action Plan is part of a much larger biodiversity framework that encompasses international, national and local levels of biodiversity action planning and conservation.

1.5 Biodiversity – The International Context

The international commitment to halt the worldwide loss of habitats and species and their genetic resources was agreed in 1992 at United Nations Conference on the Environment and Development, commonly known as the Rio Earth Summit. Over 150 countries, including the United Kingdom, signed the Convention on Biological Diversity, pledging to contribute to the conservation of biodiversity at the global level. These states made a commitment to draw up national strategies to address the losses to global biodiversity and to resolve how economic development could go hand in hand with the maintenance of biodiversity.

The Rio Convention includes a global commitment to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level (www.biodiv.org/convention/default.html). The 2002 World Summit in Johannesburg on Sustainable Development subsequently endorsed this target.

1.6 Biodiversity – The National Context

The UK Biodiversity Action Plan (UK BAP) is the UK commitment to Article 6A of the Rio Convention on Biological Diversity. It describes the UK's priority species and habitats, and seeks to benefit 65 priority habitats and 1149 species in total. It identifies other key areas for action such as the building of partnerships for conserving biodiversity and gathering vital biodiversity data.

In England, *Working with the Grain of Nature* sets out the Government's strategy for conserving and enhancing biological diversity, and establishes programmes of action for integrating biodiversity into policy and planning for key sectors, together with appropriate targets and indicators. The Strategy has a Water and Wetlands Working Group and an associated programme of action that includes:

- Integrating biodiversity into whole-catchment management.
- Achieving net gain in water and wetland BAP priority habitats through Water Level Management Plans, Catchment Flood Management Plans, and sustainable flood management approaches.

1.7 Local Biodiversity Action Plans

For the UK Biodiversity Action Plan to be implemented successfully it requires some means of ensuring that the national strategy is translated into effective action at the local level. The UK targets for the management, enhancement, restoration, and creation of habitats and species populations have therefore been translated into targets in Local Biodiversity Action Plans (LBAPs), which tend to operate at the county level.

1.8 Internal Drainage Boards and Biodiversity

The Natural Environment and Rural Communities Act 2006 places a duty on IDBs to conserve biodiversity. As a public body, every IDB must have regard in exercising its functions, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.

The Act states that conserving biodiversity includes restoring or enhancing a population or habitat. In so doing, an IDB should have regard to the list published by the Secretary of State of living organisms and types of habitat that are of principal importance for the purpose of conserving biodiversity. In effect, this list comprises the Biodiversity Action Plan priority species and habitats for England.

In 2007, the Government's IDB Review Implementation Plan established a commitment that IDBs should produce their own Biodiversity Action Plans.

This IDB Biodiversity Action Plan has been produced to help fulfil these requirements and seeks to set out targets and actions that complement the UK Biodiversity Action Plan and Local Biodiversity Action Plans.

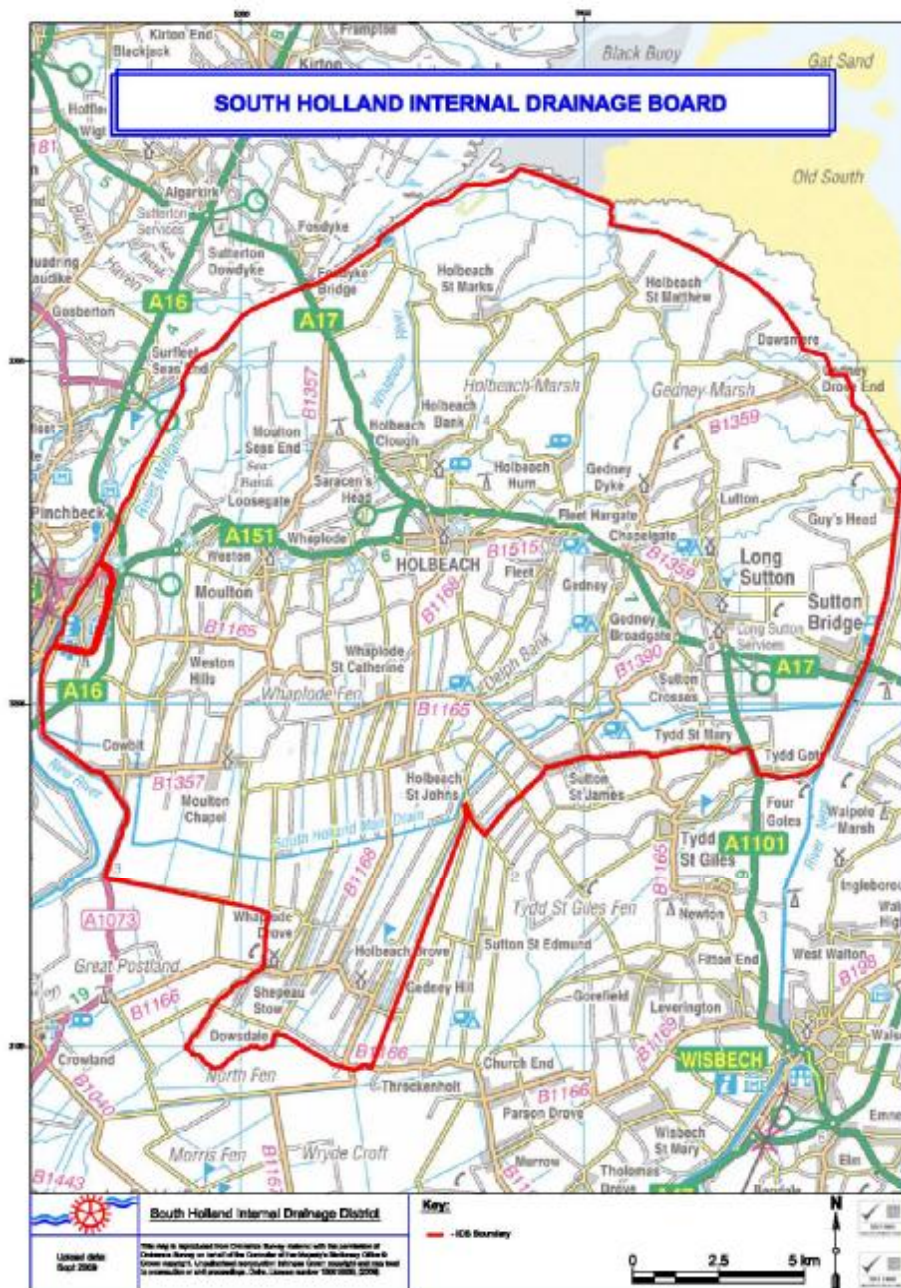
1.9 The Aims of the IDB Biodiversity Action Plan

The aims of this IDB BAP are:

- To positively demonstrate that the Boards watercourse maintenance, water level management and capital works are undertaken in a manner that, whilst reducing flood risk and managing flows, also safeguards biodiversity and, wherever possible, makes a positive contribution to the enhancement of the biodiversity and the natural environment.
- To ensure that habitat and species targets from the UK Biodiversity Action Plan and the local LBAP are translated into effective action within the drainage district.
- To identify targets for other habitats and species of local importance within the drainage district.

- To develop effective local partnerships to ensure that programmes for biodiversity conservation are maintained in the long term.
- To raise awareness within the IDB and locally of the need for biodiversity conservation, and to provide guidance to landowners, occupiers and their representatives on biodiversity and inland water management.
- To ensure that opportunities for conservation and enhancement of biodiversity are fully considered throughout the IDB's operations, and
- To monitor and report on progress in biodiversity conservation.

Figure 1. Map illustrating the Boards Area



2 THE IDB BAP PROCESS

2.1 The Biodiversity Audit

To produce this IDB Biodiversity Action Plan, information on the habitats and species present in the catchment was first obtained. This “Biodiversity Audit” involved the collation of existing data held by the IDB and by other biodiversity partners.

2.2 Evaluating and Prioritising Habitats and Species

The Biodiversity Audit identified those priority habitats and species in the UK Biodiversity Action Plan and the Local Biodiversity Action Plan that can be found in the drainage district. Additional non-BAP habitats and species deemed to be important within the drainage district were also identified.

Further habitats and species, together with revised targets and actions, may be made in the future, as knowledge is improved and delivery of the IDB BAP is reviewed.

A range of criteria was then used to select those species and habitats that are of particular importance to the IDB – that is to say, those habitats and species that could benefit from IDB actions. The criteria used included their national and local status, the opportunities for effective IDB action and the resources available.

2.3 Setting Objectives, Targets and Indicators

For each habitat and species identified as being important to the IDB, conservation objectives and targets have been drawn up and set out in the Plan. The objectives express the IDB’s broad aims for benefiting a particular habitat or species. The related targets have been set to focus IDB programmes of action and to identify outcomes that can be monitored to measure achievement. For each target an indicator has been set – a measurable feature of the target that, when monitored over time, allows delivery to be assessed.

In order for this BAP to be as effective as possible the targets and actions have been devised to be SMART (Specific, Measurable, Achievable, Relevant and Time-limited). The targets are ambitious, but are also considered to be proportionate and practicable given the resources available.

Procedural targets and actions have also been considered. These are targets that the Board will use to measure the way in which it considers and incorporates biodiversity across the whole range of its operations. These may involve changes to administrative, management and operating procedures.

2.4 Implementation

Once targets have been set for habitats and species, it is important that the actions to deliver the Biodiversity Action Plan are described. The Plan sets out how the Board intends to implement the actions in the plan, often in partnership with other organisations or individuals.

2.5 Monitoring

Achievement of the Plan targets will be measured by a programme of monitoring which the Board will undertake, in some instances with assistance from its partners, and the methods to be used are described in the Plan.

2.6 Reporting and Reviewing Progress

It is important to review the implementation of the BAP, assess changes in the status of habitats and species and the overall feasibility of objectives and targets. In addition, it is vital that the successful achievement of targets is recorded and the gains for biodiversity are registered in the public domain.

The Plan sets out the methods the IDB will be using to review the delivery of targets and to communicate progress to partner organisations and the public.

3 THE BIODIVERSITY AUDIT

3.1 Introduction

The following Sections 4, 5 and 6 summarise the results of the Biodiversity Audit, undertaken in 2008 / 2009. Section 4 provides information about the drainage district and a list of the nature conservation sites that occur within or bordering its boundaries. Sections 5 and 6 list respectively the habitats and species occurring within the district that are of potential importance to the IDB.

3.2 Local Biodiversity Action Plans

The following Local Biodiversity Action Plans covers the South Holland IDB's drainage district:

- Lincolnshire Biodiversity Action Plan
- The Wash Biodiversity Action Plan

3.3 IDB Biodiversity Audit Boundary

The Biodiversity Audit covers the entire district of the IDB, as shown in Figure 1 and Appendix X . Where data has been obtained that shows a record of a species in a 1km square or 10km square which the district wholly or partially covers, this has been included in the area of the audit.

3.4 Sources of Data - Habitats

Information on habitats of relevance occurring within the drainage district was obtained from the following sources:

- National GIS data on Priority Habitats
- Lincolnshire Biological Records Centre

3.5 Sources of Data - Species

Information on species of relevance occurring within the drainage district was obtained from the following sources:

- Lincolnshire Biological Records Centre
- National Biodiversity Network (NBN) Gateway
- Kay Heath – Personal communications
- Data collected from South Holland IDB operatives: 2000 – 2006

Future sources of information may include:

- British Trust for Ornithology
- Royal Society for the Protection of Birds
- Lincolnshire Bat Group
- Mammal Society
- Environment Agency Fisheries Data

4 NATURE CONSERVATION SITES

4.1 The Drainage District

The South Holland Drainage District covers an area of 384.43 km² and contains 709km of IDB-maintained watercourses, 307 km of these are designated high priority water course by the Board. Water levels are constantly regulated by 16 pumping stations and 6 tidal sluices. The drainage district location runs along the landward toe of the sea defence of the Wash and the district is bounded to the east and west by the Rivers Nene and River Welland, respectively. South Holland IDB infrastructure takes surface water from the market towns of Long Sutton and Holbeach and the many and various outlying villages and homesteads, draining a catchment of an estimated 60,000 individuals. Much of the arable land to the north of the catchment has been reclaimed from the sea and the drainage district as a whole includes some of the most fertile arable land in the country; indeed the widescale and bountiful agricultural production of South Holland has led to the area being widely recognised as the “Breadbasket of Britain”.

4.2 Geology

The Wash and the Fenland area, occupy a shallow clay vale, which through coming to lie close to sea level over the last 5,000 years, has become progressively filled with alluvium to a depth of around 20-30 metres: marine alluvium to the north and east and over-riding freshwater alluvium and locally peat to the south and west. The alluvial plain was built up by several rivers with varying courses, but these deposits were later overwhelmed by the greater quantities of sediments brought from the sea, which now exhibits a significant tidal range. In the last two millennia the highest ground became increasingly settled. Drainage and reclamation works have extended out from the settlements, creating areas with a greatly reduced risk of flooding. The inland fenland is now almost completely reclaimed and a series of artificial banks has established a boundary between land and sea. Where they can be drained, these alluvial deposits have been cultivated to produce fertile silt soils.

4.3 Landscape

4.3.1 Landscape Designations

There are no landscape designations within the IDB.

4.3.2 Landscape Character

Natural England has divided the whole of England into a number of National Character Areas (JCA) based on characteristic landforms, wildlife and land use. They are not designations and are not confined by traditional administrative boundaries. For each NCA, Natural England has prepared a profile that characterises the wildlife and natural features, identifies the influences that act upon those features and sets objectives for nature conservation. South Holland IDB falls whole within an area defined as The Fens.

The key characteristics of the Fens are:

- Large-scale, flat, open landscape with extensive vistas to level horizons and huge skies.
- A hierarchy of rivers, drains and ditches provide a strong influence throughout the area. Embanked rivers and roddons create local enclosure and elevation. Banks provide good grazing and grassland habitats.
- Modestly elevated 'islands' within fens provide isolated higher ground for most settlement. A higher proportion of grassland, tree cover and hedgerows are associated with these areas.
- Settled Fens or 'Townlands', in arc set back from the Wash, exhibit an ancient medieval and irregular field pattern. Typically smaller-scale with scattered farmsteads and dispersed ribbon settlements along the main arterial routes.

- Peaty Fens drained in 17th century comprise large rectilinear fields of black soil. A geometric road and drainage pattern with major high-level drains, washes and associated pumping stations. Roads and rail links often on elevated banks.
- Area south of Lincolnshire Wolds most recently drained with Wolds providing marked 'Upland' horizon to north.
- Woodland cover sparse. Occasional avenues to roads, elsewhere isolated field trees have marked significance. Shelter belts including poplar, willow and leylandii hedges around farmsteads. Numerous orchards in Wisbech area.
- Fragments of relic wet fen areas at Wicken, Woodwalton and Holme.
- Built forms exhibit strong influence ranging from historic cathedrals and churches, like Ely and Boston to large agricultural and industrial structures. Domestic architecture displays combination of elegant Georgian brick houses and bland 20th century bungalows.
- Marshes directly adjacent to the Wash exhibit an exceptionally open aspect, broken only by a series of sea walls. Associated river outfall structures, tidal saltmarshes and mudflats.
- Rich and varied intensive agricultural land use including wide range of arable, root crops, bulbs, vegetables and livestock. Field labourers prevalent at harvesting. Horticultural glasshouses and general agricultural clutter a significant feature.
- Bronze Age, Iron Age and Roman landscapes emerging from below the falling peat. Very rich archaeology especially on fen margins.

4.3.3 **Sites and Monuments Records**

No information for sites and monuments was obtained as part of the audit. The Board consults with English Heritage and the Lincolnshire Archaeology Service prior to works taking place.

4.3.4 **Tree Preservation Orders**

The Board hold some information on tree preservation orders. The Board will continue to carry out searches prior to work, as required, to prevent any new Tree Preservation Orders being missed.

4.4 **Statutory Nature Conservation Sites**

4.4.1 **Nationally and Internationally Designated Nature Conservation Sites**

There are no national or international sites within the Boards area, however the following nationally and internationally-designated conservation sites are found adjoining the area.

All maps of the nationally and internationally designated nature conservation sites are shown in Appendix I.

Table 1. Nationally and Internationally Designated Nature Conservation Sites

Site name	National Designation	International Designation	UK BAP Priority Habitat Description
The Wash	SSSI, NNR	The Wash & Norfolk Coast SAC The Wash RAMSAR, The Wash SPA,	Littoral sediment

4.4.2 **Local Nature Reserves**

The following Local Nature Reserves, which are designated by local authorities under Section 21 of the National Parks and Access to the Countryside Act 1949, are found within the district:

Table 2. Local Designations

Site name	Designation	Features Relevant to IDB
The Shrubberies Nature Reserve	Local Nature Reserve, Lincolnshire Wildlife Trust Reserve, Site Of Nature Conservation Interest	Mature Lime, Oak and Walnut trees, various bird and butterfly species

4.5 Non-statutory Local Sites

A number of sites have been identified locally as being important for wildlife. Whilst these designations do not have statutory status, the sites themselves are important for their contribution to biodiversity and planning policy requires that they are given consideration. The following local sites are to be found within or bordering the drainage district:

Table 3. Non-Statutory Designations

Site name	Designation	Features Relevant to IDB
Arnolds Meadow Nature Reserve	Site of Nature Conservation Interest, Lincolnshire Wildlife Trust Reserve	Early Marsh Orchid, Southern Marsh Orchid, Common Spotted Orchid, Green Winged Orchid, Greater Water Parsnip, Kingfisher, Water Vole, Toad, Frog and Grass snake Various songbird species Woodland, marsh pond pasture
Moulton Marsh Nature Reserve	Site of Nature Conservation Interest, Lincolnshire Wildlife Trust Reserve,	Spiral Tassleweed, Strawberry Clover, Sea Milkwort, Pyramidal Orchid, Tits Finches, Whitethroats Reedbuntings, Grebe, Water Rail, Redshank, Little Egret Reedbed, Saltmarsh, Lagoon
South Holland Main Drain Banks	Site of Nature Conservation Interest Area belongs to South Holland Drainage Board,	Twayblade, Bee Orchid, Autumn Ladies Tresses, Common Spotted Orchid, Pyramidal Orchid, Early Marsh Orchid, Pipistrelle, Daubentons Bat Calcarous grassland
Sutton Bridge Disused Railway	Site of Nature Conservation Interest	
Boatmere Creek	Site of Nature Conservation Interest	Greenshank, various other waders, Water Rail, Reedbunting, High tide roost site.
Gedney Dyke Pits	Site of Nature Conservation Interest	
Lordship End, Gedney Hill	Site of Nature Conservation Interest	
Springfields Garden	Site of Nature Conservation Interest	
Dawsmere Church yard	Site of Nature Conservation Interest	
Mr Scrimshaw's Field	Site of Nature Conservation Interest	
Guy Wells	Site of Nature Conservation Interest	

Site name	Designation	Features Relevant to IDB
South Bank Fosdyke	Site of Nature Conservation Interest	(EA Managed Calcareous grassland)
Woodhouse Clay Pit	Site of Nature Conservation Interest	
Moulton Park	Site of Nature Conservation Interest	
Halgarths Pit	Site of Nature Conservation Interest	

Table 4: Other sites of Interest

Site name	Designation	Features Relevant to IDB
Fleet Haven –Wards Farm	None	SHIDB maintained drain. Spiral Tassleweed
Fleet Haven Sluice	None	SHIDB maintained drain. Grassland, Scrub, various songbird species
Lawyers Sluice Soke Dyke	None	SHIDB maintained drain. Beaked tassleweed
Main Flood Bank of Nene	None	Pyramidal Orchids, Calcareous grassland
Spalding Marsh, Marsh Road	None	Heronry
Hospital Wood Heronry	None	Heron, Little Egret
Common Pit, Tydd St Mary	None	

5 HABITATS

5.1 Habitat Audit Summary

This habitat audit summary lists the broad habitat types and UK BAP priority habitats that occur within the IDB district as identified by the information gathering exercise. Also listed are habitats deemed to be of local importance and/or featured in the county Local Biodiversity Action Plan that occur in the IDB district. Habitats that are of potential importance for the IDB, where water level management or other IDB activities may be of benefit, are identified.

Table 5. Habitat Audit Summary

Broad Habitat Types	UK BAP Priority Habitat	Local Biodiversity Action Plan Habitat	Habitat of Importance for IDB
Farmland	Lowland Calcareous grassland		Yes
	Arable Field Margins	Arable Field Margins	Yes
	Hedgerow and Hedgerow trees	Hedgerow and Hedgerow trees	
	Coastal and Floodplain grazing marsh	Coastal and Floodplain grazing marsh	
Rivers and Wetlands	Rivers Canals and Drains	Rivers Canals and Drains	Yes
	Reedbed	Reedbed	Yes
	Ponds Lakes and Reservoirs	Ponds Lakes and Reservoirs	Yes
Coastal	Saline Lagoons	Saline Lagoons	Yes
	Mudflats		

5.2 Habitats of Importance for the IDB

The following section provides more information on the status and location of the habitats within the drainage district that are of importance for the IDB and may benefit from water level management or other IDB activities. The information is taken, for most part, from the Lincolnshire Biodiversity Action Plan and has the IDB objectives and actions identified for each habitat.

- Rivers, Canals and Drains
- Saline Lagoon
- Ponds
- Reedbed
- Arable Field Margins
- Lowland Calcareous Grassland

The IDB have considered the actions proposed in the Lincolnshire LBAPs and by the Lincolnshire Biodiversity Partnership and have used this as guidance in the synthesis of IDB actions. A summary of the Lincolnshire LBAP for the key habitats follows with IDB actions formalised and highlighted in green.

5.2.1 Rivers, Canals and Drains

Current Status

The drainage system of Lincolnshire is an historical epitaph to the engineers who created it; from Roman to Post-War eras. Much of the county now presides over a uniform, canalised and largely maintenance dependent waterway. The many hundreds of miles of watercourse however, supports a vast proportion of South Holland wildlife; otter, water vole can be regularly found and Barn owl are prolific hunters along the complex matrix of linear freshwater features. A diverse plant community including several orchid species proliferate on some of the more calcareous banksides.

Threats in Lincolnshire

- Land Drainage and Management of watercourses may impact on watercourses particularly where there is an increase in arable production right to the edge of a watercourse potentially resulting in the loss of instream, marginal and bankside vegetation and habitats; increased siltation; increased agrochemical input into the watercourse and increased algal blooms.
- Water Abstraction particularly for spray irrigation may lead to low flow conditions potentially leading toward low oxygen and water quality issues.
- Chemical enrichment and pollution has a potentially huge and damaging influence on water quality. Fertilizer enrichment may cause the deoxygenation of watercourses and subsequent fish kills. Longterm problems with heavy metals and pesticides may also be an issue.
- Flood defence structures may prevent the migratory movements of fish and invertebrates.
- Climate change is expected impact on East Anglia, with drier summers and wetter winters.

Lincolnshire BAP Objectives:

- To improve water quality, water resources and habitat diversity of key rivers and streams and to maintain the current extent of rivers and streams.
- To enhance the characteristic flora and fauna of Lincolnshire’s key rivers canals, drains and drainage ditches.

Lincolnshire Targets 2005 – 2015

Target 1 Achieve condition for all designated rivers canals and drains by 2010

Target 2 Restore 100ha of degraded floodplain by 2015

Lincolnshire Actions

Action	Date	Partners
Site Safeguard and Management		
Ensure that appropriate mitigation is delivered for maintenance works and projects to ensure no net loss of biodiversity.	2015	EA, IDBs, LWT, WESG
Implement habitat improvements (including floodplain restoration) on the most suitable watercourses.	2015	EA, IDBs
Control introduced exotic species as appropriate on sites where organizations have that responsibility	ongoing	EA IDB’s LWT WESG
Internal Drainage Boards, notwithstanding their responsibilities for flood defence to operate an environmentally sensitive management regime, paying specific attention to timing and scale of operations.	2015	IDBs
Ensure protection of drains/ ditches within new development and encourage appropriate management to enhance wildlife value. Prevent inappropriate culverting	2015	LA’s EA IDB
Ensure sufficient research is carried out in advance of proposed navigation schemes so that environmental impact is clearly understood. If a project goes ahead, ensure appropriate enhancement measures and no loss of biodiversity	Ongoing	BW, IWA, EA, IDB’s LA’s LWT WESG
Advisory		
Set up training courses for all maintenance crews, machine drivers and relevant office personnel.	2015	IDBs, FWAG, IWA, LAs, LWT, NE, WESG
Ensure landowners are aware of and observe statutory requirements relating to spraying near drainage ditches and channels.	2015	FWAG, IDBs, Las

South Holland IDB Objectives

- To improve habitat diversity on watercourses maintained by the Board.
- To enhance the flora and fauna of the watercourses maintained by the Board

South Holland IDB Actions

- Action 1** Establish a Standard Maintenance Operations Policy by 2011.
- Action 2** Explore the potential for implementing habitat improvements on suitable watercourses and set SMART Actions as appropriate
- Action 3** Develop a Standard proforma for biodiversity and protected species surveys by 2010
- Action 4** Ensure appropriate protection of drains/ ditches within new development and encourage appropriate management to enhance wildlife value.

5.2.2 Saline Lagoon

There are several different types of lagoon ranging in salinity from hyper-saline to brackish. They differ in the way in which sea water moves or percolates into them by means of natural or man-made channels. True lagoons support two types of aquatic vegetation, namely green algae and sea grasses. Common reed and sea club rush is also a common feature.

It is estimated that in the latter half of the 1980's, 38 lagoons were lost in England. Saline lagoons are a nationally rare habitat and a priority habitat under the European Habitats Directive 1994. They cannot be viewed in isolation as they merge into reedbed, fen or wet grassland and are sensitive to change in adjacent salt marshes and mudflats.

Current Status

Twenty one sites with Lagoon characteristics have been identified in Lincolnshire. Past sea defence works may have resulted in loss of saline lagoon habitat. Moulton Marsh LWT and Lawyers Farm Pond, Holbeach are thought to be excellent and notable examples of coastal saline lagoon habitat, respectively.

Many agricultural ditches adjacent to sea defences contain brackish water. Some are poor in Nature Conservation value due to nutrient enrichment, but some are thought to contain plants and invertebrates characteristic of slightly and moderately saline conditions. Many of these have not been surveyed in many years however.

Threats

- Inappropriate management for saline lagoon plant specialists.
- Natural succession into other habitats.
- Pollution via nutrient runoff from fields can have detrimental effects on saline ditches.
- Artificial control brackish and freshwater to lagoons can have a profound influence on habitats.
- Sea Level Rise. It is estimated that 120 ha of coastal lagoon may be lost in the next 20 years.

Lincolnshire BAP Objectives

- To maintain the current area and number of saline lagoons in the county.
- To create new saline lagoons where opportunities arise through managed realignment and other coastal defence schemes.

Lincolnshire Targets 2005 – 2015

- Target 1** Maintain the current extent (75ha) of saline lagoon and saline brackish ditch habitat by 2015.
- Target 2** Achieve favourable condition for all saline lagoons by 2010
- Target 3** Expand the extent of saline lagoons in Lincolnshire – create 10 ha of saline lagoons by 2010.

Lincolnshire Actions

Action	Date	Partners
Research and Monitoring		
Carry out survey and periodic monitoring of saline/ brackish ditches to understand more about their current state, previous resources that have been lost and conservation importance.	Ongoing	NE, IDBs, LNU

South Holland IDB Objectives

- To establish the extent and importance of saline ditches within the drainage network in the Boards' Area.

South Holland IDB Actions

Action 1 Survey the Boards drains around the Wash to establish current state by 2013.

5.2.3 Ponds

Ponds are defined as small water bodies of water between 1m² and 2 hectares in the area, which hold water for more than four months in the year. Ponds have suffered a huge decline (a loss of more than 75%) over the last century. This is thought to be due to a decline in water quality as a result of agricultural intensification, pollution or poor management. Ponds are of great importance for wildlife with around 3500 of the UK's invertebrate species live in freshwater and upto half of these live in ponds. Two thirds of red data book species occur in ponds as do 300 vascular plants including half of the UK's wetland plants and are often fringed by other wetland habitats such as reedbed, fen, grassland and wet woodland.

Current Status

Many of the pits and ponds in Lincolnshire have come about as the result of clay extraction for brick and tile making, and for the manufacture of cement in the 19th and 20th centuries. FWAG has recently become involved in encouraging farmers to create new ponds. School, garden and community ponds have assumed importance in sustaining populations of amphibians and other aquatic organisms.

Threats

- Neglect /Lack of management –natural succession occurring.
- Non native species may result in the loss of native flora.
- Over zealous pond clearance – valuable habitat round the edge of ponds such as reedbed may be cleared during the reestablishment of open water.
- Damage and disturbance caused by recreational usage.
- Pollution from road run off or pesticides in an agricultural setting.
- Eutrophication caused by agricultural fertilizer runoff may cause blanketing by duckweed or algae.
- Direct loss of ponds by infilling.
- Dumping and infilling of ponds with waste.
- Climate change causing ponds to dry out.

Lincolnshire BAP Objectives:

- To determine the extent and condition of waterbodies in the county and to ensure that waterbodies known to be in favourable condition are maintained in that state.
- To enhance existing ponds, lakes and reservoirs through appropriate management and to create new wildlife ponds.

Lincolnshire Targets:

- Target 1** Establish a baseline for existing extent and condition of standing open waterbodies over 100m sq in Lincolnshire by 2008.
- Target 2** Maintain the current extent of standing open water in Lincolnshire (based on 2008 figures) by 2015.
- Target 3** Achieve favourable condition of sites by 2015.
- Target 4** Create 200 new wildlife ponds and scrapes/flushes where appropriate on land of low conservation importance in Lincolnshire by 2015.

Lincolnshire Actions

Action	Date	Partners
Site Safeguard and Management		
Encourage landowners, schools, parish councils, local authorities, community groups and the public to construct new ponds, with specialist advice.	2015	LWT, BTCV, CLA, FWAG, IDBs, LAs, LWCS, NFU, WESG

South Holland IDB Objectives

- To create new ponds within the Board’s Area by working in Partnership with the Million Ponds Project.

South Holland IDB Actions

- Action 1 Explore the potential for pond creation within the Boards Area and set SMART Actions as appropriate. Develop a partnership with the Million Pond Project and others to establish new ponds where environmentally suitable and feasible.
- Action 2 Train key staff to advise on pond restoration and creation.

5.2.4 Reedbed

Reedbeds are wetland habitats dominated by stands of common reed *Phragmites australis* where the water table is at or above ground level for most of the year. They also incorporate areas of open water and ditches. Reedbeds are of great conservation value, supporting birds such as the bittern and the marsh harrier. This habitat has declined drastically in the last century in Europe. In UK it is estimated that there is 12000 ha over 1000 sites with the majority of sites being less than 20ha.

Current Status

Reedbed and fen was once extensive in Lincolnshire but is now rare, as much of the area has been drained since 17th century for agriculture. Reedbed can be found fringing former clay pits and are found in association with wet woodland, ponds, lakes, rivers, drains, fen, marsh and saline lagoons. These tend to be small, but linear reed stands along drains and rivers can be quite extensive.

Threats

- Lack of appropriate management, resulting in natural succession to woodland.
- Sea Level rise due to climatic change is predicted to result in loss of further reed bed habitat in coastal areas.
- Pollution of freshwater supplies to reedbed through siltation, toxic chemicals and eutrophication.
- Land drainage and conversion to agriculture

Lincolnshire BAP Objectives

- To create a countrywide network of well managed fens, swamp and wet reedbeds to encourage large scale fen habitat recreation – especially as part of the Wet Fens Partnership.

Lincolnshire Targets 2005 – 2015

- Target 1** Establish a baseline for existing extent and condition of all fens, swamps and wet reedbeds of at least 0.5 ha by 2008.
- Target 2** Maintain the current extent of fens swamps and wet reedbeds in Lincolnshire (based on 2008 figures) by 2015.
- Target 3** Achieve favourable condition on 95% of sites by 2015.
- Target 4** Expand the area of fens, swamps and wet reedbeds in Lincolnshire – 280 ha by 2015.

Lincolnshire Actions

Action	Date	Partners
Site Safeguard and Management		
Promote the maintenance of reedbeds and encourage management on appropriate sites where they occurred in the past	Ongoing	LWT
Create (including the extension of existing reedbeds) and appropriately manage new fen and wet reedbeds habitat on identified sites	2015	LWT, EA, NE, LA's RSPB, WESG
Research and Monitor		
Identify priority sites for habitat recreation and expansion	2009	LWT, NE, NLC, WESG

South Holland IDB Objectives

- To maintain the current extent of Reedbed within the Boards' Area.

South Holland IDB Action

- Action 1** Map existing reed cover on the drains covered by the reed management Policy by 2014.
- Action 2** Review current reed management Policy.

5.2.5 Arable Field Margins

Arable field margins are effectively wildlife corridors which provide connectivity between fragmented or isolated habitats. The arable strip is a planned strip of uncropped land lying between the crop and the field boundary which is managed to create conditions that benefit key farmland species, or minimise pesticide leakage or sediment runoff. There is an estimated 400,000km of cereal field margin in the UK and if all boundaries included a 6m managed margin, this would increase the conservation value for wildlife on farmland by 200,000 ha.

In the fens, fields abutting drains should be of utmost importance to the farmer as these drains are one of the few features on which Entry Level Scheme points can be gained.

Current Status

New rules under Cross compliance, introduction of Local Environmental Risk Assessment for Pesticides to control pesticides and increased funding from Environmental Stewardship is resulting in the promotion of field margins. There is still potential for new field margins and the management of existing field margins however.

Threats

- Spay drift of pesticides into the field-edge environment, which reduces plant and invertebrate biomass and diversity.
- Overspreading of fertilizers into the field edge causing vigorous plants to gain the competitive edge.
- Lack of cultivation. A mix of cultivated and non-cultivated margins are needed to provide maximum benefit for biodiversity.
- Erosion from crop land may carry silt containing high levels of phosphate and some pesticides.

Lincolnshire BAP Objectives

- To increase the range of suitably cultivated field margin habitats and provide effective buffer zones over a wide geographical area covering a range of field types.
- To monitor the uptake of the less popular margin habitat types under Environmental Stewardship with a view to promoting uptake or increasing incentive payments and to monitor the biodiversity of field margins.

Lincolnshire Targets 2005 – 2015

- Target 1** Encourage the creation of arable field margins for wildlife - 1000km created and in favourable management by 2015.
- Target 2** Produce and distribute guidance for farmers on the importance of botanically diverse field margin habitat by 2008.
- Target 3** Produce a report on scarce arable weeds, with distribution data, for Lincolnshire past and present by 2015.

Lincolnshire Actions

Action	Date	Partners
Policy and Legislation		
Identify the most appropriate areas (areas of biodiversity value) for special targeting of arable field margin options via the new agri-environment schemes.	2010	NE, FWAG, LNU
Research and Monitor		
Create additional areas of field margins through the Environmental Stewardship – aim 1000km	2015	NE, FWAG

South Holland IDB Objectives

- To maintain, enhance and expand the area of arable field margins within the Boards' Area.

South Holland IDB Actions

- Action 1** Map the existing area of arable field margins along drains maintained by the Board and on Board-owned land.
- Action 2** Explore the potential for expanding arable field margins along Board maintained drains and on Board-owned land, and set SMART Actions as appropriate.
- Action 3** In collaboration with FWAG and Natural England, work with tenants to encourage the expansion of arable margins.
- Action 4** Monitor the benefits to farmland birds by establishing links with the RSPB's Farm Monitoring Scheme.

5.2.6 Lowland Calcareous Grassland

In the UK, calcareous grasslands are developed on shallow, lime rich soils derived from limestone and chalk strata. This habitat supports a range of lime loving plant communities and is important for various invertebrate and bird species. Calcareous grassland is often part of a mosaic of habitats, of which scrub plays an important part, providing cover for various species.

Current Status

It is estimated that 142 ha of calcareous grassland still exists in Lincolnshire, much of which has been given SSSI status. The majority of calcareous grassland sites however are relatively small and scattered. They have no protection, are small and fragmented and in severe risk of grazing abandonment. Twenty eight nationally scarce plant species are listed as occurring on Lincolnshire calcareous grassland. In recent years however, loss of habitat has continued due to ploughing, re-seeding, improvement by fertilizer, tree planting and loss of grazing rights, leading to the invasion of coarse grasses and scrub. There are however many semi-natural calcareous areas that with the appropriate management could be restored.

Threats in Lincolnshire

- Undergrazing or overgrazing ultimately affect species richness. The type and timing of the grazing is also important. Overgrazing by rabbits can also cause a problem.
- Decline in traditional livestock farming leading toward arable conversion.
- Spray drift and fertilizer run-off. Small sites are particularly vulnerable to this.
- Unmanaged access leading to disturbance and trampling.
- Damage to road verges – by vehicles, road repair, building and unsympathetic tree planting. Management issues are also a problem where there is a lack of management or cuttings are not removed off site.

Lincolnshire BAP Objectives

- To prevent further loss of extent and quality of existing calcareous grassland sites.
- To re-create extensive areas of flower rich calcareous grassland in appropriate areas, linking and buffering existing fragmented sites.

Lincolnshire Targets 2005 – 2015

- Target 1** Establish a baseline for existing extent and condition of calcareous grassland in Lincolnshire by 2010.
- Target 2** Maintain the extent of calcareous grassland in Lincolnshire by 2015.
- Target 3** Achieve favourable condition of all calcareous grassland SSSIs and Local Wildlife sites by 2015.
- Target 4** Expand the extent of calcareous grassland habitat by 150ha by 2015 through restoration and recreation at suitable sites.

Lincolnshire Actions

Action	Date	Partners
Policy and Legislation		
Target conservation management under HLS and other grant schemes	2010	NE, LWT
Site Safeguard and Management		
Ensure that all calcareous grassland SSSIs and LWSs are in favourable condition	2015	NE, LWT LAs
Ensure appropriate habitat management at important sites for key calcareous grassland species.	2015	LWT, LAs, NE
Ensure availability of locally sourced seed for grassland re-creation.	2010	LWT, NE,

South Holland IDB Objectives

- To maintain the calcareous grassland sites on South Holland main drain in favourable condition.

South Holland IDB Action

- Action 1** Ensure appropriate habitat management for Calcareous grassland species on the South Holland main drain through the development of a 10 year management plan.

6 SPECIES

6.1 Species Audit Summary

This species audit summary lists the BAP priority species that occur within the IDB district as identified by the information gathering exercise. Also listed are species deemed to be of local importance and/or identified in the county Local Biodiversity Action Plan that occur in the IDB district. Species that are of potential importance for the IDB, where water level management or other IDB activities may be of benefit, are identified.

Table 6. Species Audit Summary

Common Name	Scientific Name	UK BAP Priority Species	Local Biodiversity Action Plan Species	Non-BAP Species But Important in IDB District
MAMMALS				
Water Vole	<i>Arvicola terrestris</i>	Yes	Yes	Yes
Badger	<i>Meles Meles</i>	No	No	Yes
Otter	<i>Lutra lutra</i>	Yes	Yes	Yes
European Hedgehog	<i>Eriaceus europaeus</i>	Yes	No	
Brown Hare	<i>Lepus europaeus</i>	Yes	Yes	
Water Shrew	<i>Neomys fodiens</i>	No	No	
Bank vole	<i>Clethrionomys glareolus</i>	No	No	
Soprano Pipistrelle Bat	<i>Pipistrellus pygmaeus</i>	Yes	Yes	
Daubentons Bat	<i>Myotis daubentonii</i>	Yes	Yes	
BIRDS				
Reed bunting	<i>Emberiza schoeniclus</i>	Yes	Yes	
Barn owl	<i>Tyto alba</i>	No		Yes
Marsh Harrier	<i>Circus aeruginosus</i>	No		
Lapwing	<i>Vanellus vanellus</i>	Yes	Yes	
Eurasian Curlew	<i>Numenius arquata</i>	Yes	Yes	
Redshank	<i>Tringa totanus</i>	Yes	Yes	
Snipe	<i>Gallinago gallinago</i>	Yes	Yes	
Water Rail	<i>Rallus aquaticus</i>	No		
Kingfisher	<i>Alcedo attis</i>	No		Yes
Bittern	<i>Botaurus stellaris</i>	Yes	No	
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	Yes	No	
Sandmartin	<i>Riparia riparia</i>	No		Yes
Swallow	<i>Hirunda rustica</i>	No		Yes
Housemartin	<i>Delichon urbica</i>	No		Yes
Reedwarbler	<i>Acrocephalus scirpaceus</i>	No	No	Yes
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	No	No	Yes
Corn Bunting	<i>Embiriza calandra</i>	Yes	Yes	
Yellow Wagtail	<i>Motacilla flava</i>	Yes	Yes	
Skylark	<i>Alauda arvensis</i>	Yes	Yes	
Bullfinch	<i>Pyrrhula pyrrhula</i>	Yes	Yes	

Common Name	Scientific Name	UK BAP Priority Species	Local Biodiversity Action Plan Species	Non-BAP Species But Important in IDB District
Linnet	<i>Carduelis cannabina</i>	Yes	Yes	
Yellow Hammer	<i>Emberiza citrinella</i>	Yes	Yes	
Tree Sparrow	<i>Passer montanus</i>	Yes	Yes	
Starling	<i>Sterna vulgaris</i>	Yes	Yes	
Grey Partridge	<i>Perdix perdix</i>	Yes	Yes	
Turtle Dove	<i>Streptopelia turtur</i>	Yes	Yes	
REPTILE				
Grass snake	<i>Natrix natrix</i>	Yes		
AMPHIBIAN				
Common Frog	<i>Rana helveticus</i>	No		Yes
Common Toad	<i>Bufo bufo</i>	Yes		Yes
Great Crested Newt	<i>Triturus cristatus</i>	Yes		
Palmate Newt	<i>Triturus helveticus</i>	No		Yes
Smooth Newt	<i>Triturus vulgaris</i>	No		Yes
FISH				
Eel	<i>Anguilla anguilla</i>	Yes		Yes
Spined Loach	<i>Cobitis taenia</i>	Yes	Yes	
VASCULAR PLANTS				
Greater water-parsnip	<i>Sium latifolium</i>	Yes	Yes	
Pyramidal Orchid	<i>Anacamptis pyramidalis</i>	No		Yes
Common spotted orchid	<i>Dactylorhiza fuschii</i>	No		Yes
Green winged Orchid	<i>Orchis morio</i>	No		Yes
Bee Orchid	<i>Ophrys apifera</i>	No		Yes
Common Twayblade	<i>Listera ovata</i>	No		Yes
Early Marsh Orchid	<i>Dactylorhiza incarnata</i>	No		Yes
Southern Marsh Orchid	<i>Dactylorhiza praetermissa</i>	No		Yes
Primrose	<i>Primula vulgaris</i>	No		
Water Violet	<i>Hottonia palustris</i>	No		
Marsh Marigold	<i>Caltha palustris</i>	No		
Meadowsweet	<i>Filipendula ulmaria</i>	No		
Yellow Flag Iris	<i>Iris pseudacorus</i>	No		
Bluebell	<i>Hyacinthoides non-scripta</i>	No		
Cowslip	<i>Primula veris</i>	No		
Cuckoo Flower	<i>Cardamine pratensis</i>	No		
Purple Loosetrife	<i>Lythrum salicaria</i>	No		
Oxeye Daisy	<i>Chrysanthemum leucanthemum</i>	No		
Grasswack Pondweed	<i>Potamogeton compessus</i>	Yes	Yes	
Ribbon Leaved Water plantain	<i>Alisma gramineum</i>	Yes	Yes	

Table 7. Non-native Invasive Species

Common Name	Group	Scientific Name
American Mink	Mammal	<i>Mustella vision</i>
Japanese Knotweed	Vascular plant	<i>Fallopia japonica</i>
Floating Pennywort	Vascular plant	<i>Hydrocotyl ranunculoides</i>
Giant Hogweed	Vascular plant	<i>Heracleum mantegazzianum</i>
Himalayan Balsam	Vascular plant	<i>Impatiens glandulifera</i>
Crassula	Vascular plant	<i>Crassula helmsii</i>
Parrots Feather	Vascular plant	<i>Myriophyllum aquaticum</i>
Azolla	Vascular plant	<i>Azolla filiculoides</i>

6.2 Species of Importance for the IDB

The following section provides more information on the status and location of the species within the drainage district that are of importance for the IDB and may benefit from water level management or other IDB activities. The information is taken, for most part, from the Lincolnshire Biodiversity Action Plan and has the IDB objectives and actions identified for each species.

- Water Vole
- Otter
- Bats
- Grass Snake
- Greater Water Parsnip
- Eel
- Swallow
- Swift
- Sand Martin
- Kingfisher
- Non-native Invasive Species

The IDB have considered the actions proposed in the Lincolnshire LBAPs and by the Lincolnshire Biodiversity Partnership and have used this as guidance in the synthesis of IDB actions. A summary of the Lincolnshire LBAP for the key species follows with IDB actions formalised and highlighted in green. Where there is no LBAP then information on species has been obtained from other sources and IDB actions formulated as appropriate.

6.2.1 Water Vole

This is the largest of the British vole species. It is not particularly well adapted to the aquatic environment, but it rarely ventures far from the waterside. It is herbivorous and eats a huge variety of emergent plant species. Once a common species, the water vole has suffered a long-term decline since 1900 with an estimated decline in the UK population in 1998 estimated as 89% decline when looking at areas where they had previously been recorded. It has legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) in respect to Section 9 where it is an offence to kill, injure or take (section 9 (1)); intentionally damage, destroy, or obstruct access to any structure or place that water voles use for shelter or protection and to disturb water voles whilst they are using this place (Section 9 (4))

Current Status

In Lincolnshire, populations appear to be stable. This population is thought to be significant in the sustainability of the national population as they are widespread throughout the county. They show a preference for steep grassy banks rising from margins fringed with reeds and other emergent plants along slow to moderately flowing watercourses. Water vole populations are particularly sensitive to predation by mink and fragmentation of populations via culverting or insensitive bank management.

Threats

- Damage to and loss of habitats due to insensitive routine maintenance of the channel and bankside, culverting or piling.
- Development within the floodplain that result in direct loss of habitat.
- Poaching or trampling of banks and margins by livestock.
- Fluctuation in water level, where burrows are set during the active winter months can leave entrances wide open as water levels are lowered during winter. This leaves the hole open to predation.
- Population fragmentation leaves colonies remote from their neighbours and results in genetic restriction and susceptibility to disease.
- Predation particularly by mink.
- Pollution of the aquatic environment.
- Persecution through mistaking water vole for brown rat.

Lincolnshire BAP Objectives

- To maintain the nationally important Lincolnshire population of water voles at its current level
- To continue surveys in order to monitor the species status.

Lincolnshire Targets 2005 – 2015

Target 1 Maintain the current distribution of the water vole in Lincolnshire (based on 2006 report) with no loss of range by 2015.

Target 2 Successfully establish the Lincolnshire Key Water Vole Sites Project.

Lincolnshire Actions

Action	Date	Partners
Species Management and Protection		
Investigate whether there are problems with mink in key water vole sites. Consider mink control.	2015	LWT, EA, FWAG, IDBs, NE
Site Safeguard and Management		
Establish pilot Key Water Vole sites and support them to ensure they are successful. Expand the scheme if appropriate.	2015	EA, LWT, Las, NE, WESG,
Ensure routine maintenance of riparian habitat is water vole friendly and where possible will enhances the habitat.	2015	EA, FWAG, IDBs, LAs LWT
Research and Monitoring		
Post-project monitoring of schemes affecting water voles is often inadequate. Projects should undertake monitoring to establish if the mitigation that has taken place has been successful. This information should be supplied to the LERC to inform future works.	Ongoing	EA, IDBs, LAs, BW, LERC, LNU, LWT, NE
Monitor a series of water vole sites to establish a long term data set for Lincolnshire.	Ongoing	EA, IDB, LERC, WESG

South Holland IDB Objectives

- To maintain the current distribution and abundance of water vole within the Board's Area.

South Holland IDB Actions

Action 1 Map the current distribution of water vole within the Boards' Area.

Action 2 Ensure regard to wildlife law, by promoting compliance with the standard pro forma for biodiversity and protected species surveys.

Action 3 Ensure that watercourses and wetlands are managed appropriately for the water vole, by developing a Standard Maintenance Operations for the Board.

Action 4 Undertake an IDB water vole study to establish the current water vole distribution and abundance within a defined area and establish the links between maintenance regimes and water vole distribution.

6.2.2 Otter

The European otter is a large carnivorous mammal that feeds mainly on fish but also takes molluscs, small mammals and water birds. It lives predominantly in rivers, streams, lakes ponds wetlands and suitable coastal waters. The species was widespread during the 1950s, but as a result of extensive use of organochloride insecticides, by the 1980s otters were found at only 5% of sites at which they had previously been recorded.

Otters are now protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation (Natural Habitats) Regulations (1994) (Regulation 38). The otter is listed on Appendix I of CITES, Appendix II of the Bern Convention and Annexes II and IV of the Habitats Directive 1994. It is listed in the national Red Data book.

As a result of the banning of organochlorides and more sympathetic bank management otters are naturally recolonising watercourses and numbers are increasing.

Current status

Otters are present in Lincolnshire and are thought to be present on nearly all catchments. Recent surveys suggest the population in the county is increasing.

Threats in Lincolnshire

- Impoverished bankside habitats through intensive watercourse management, tree removal and habitat destruction.
- Incidental road death and drowning in eel traps.
- Insufficient food associated with poor water quality.
- Persecution – otters are still illegally trapped.
- Recreational and developmental disturbances.

Lincolnshire BAP Objectives

- To clarify the current status of otters in the county.
- To maintain the existing population and expand the range where appropriate.

Lincolnshire Targets 2005 – 2015

Target 1 Maintain the existing population of otters and extent of suitable habitat (based on 2006 report) by 2015.

Lincolnshire Actions

Action	Date	Partners
Species Management and Protection		
Limit accidental killings of otters on roads by reviewing mortality data and retrofitting otter deterrents as required. Include otters' needs in all new road bridge design – even on minor roads.	2015	Highways Agency, LAs, EA, IDBs, NE
Site Safeguard and Management		
Identify suitable stretches of watercourse where habitat improvements for otters should be focused and improve habitat where necessary.	2015	EA, FWAG, IDBs, LNU, LWT, NE, WESG
Research and Monitoring		
Encourage reporting of dead otters to the Environment Agency for collection and analysis	Ongoing	All partners

South Holland IDB Objectives

- To maintain the range and population of otter within the Boards' Area.

South Holland IDB Actions

Action 1 Carry out a survey for otters at five key sites within the Boards' Area.

Action 2 Ensure regard to wildlife law, by promoting compliance with the standard pro forma for biodiversity and protected species surveys.

6.2.3 Bats

This is a generic action plan covering all bats recorded in Lincolnshire. All species of bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981. Pipistrelle is listed in Appendix III of the Bern Convention Annex IV of the EC Habitats Directive and Appendix II of the Berne Convention (and is included under the Agreement of the Conservation of Bats in Europe).
NERC Act (2006)

Current Status

Daubenton's Bat

This is a relatively widespread species, most frequently found in the vicinity of lakes, ponds and rivers, and woodlands with ponds. It is common in the Fens and is thought to be increasing. The species is known to roost in a pumping station. The bat tends to hibernate in subterranean sites and also possibly trees.

Pipistrelle Bat

This is the most abundant and widespread bat in the UK, but is thought to have undergone a significant decline in numbers in the second half of the 20th century. A national bat colony survey suggests a national decline of approximately 70% between 1978 and 1993. The species is found near habitation, woodland and watercourses. The species is thought to have declined in the county and Lincolnshire bat group showed that about 40% of roosts had ceased to exist. In 1997 DNA testing confirmed that pipistrelles are divided into two species. The division is according to the peak echolocation. The Common Pipistrelle, *Pipistrellus pipistrellus* and the Soprano Pipistrelle, *Pipistrellus pygmaeus* peaks at 55kHz. Both are present in the county.

Threats in Lincolnshire

- Reduction in insect prey due to widespread pesticide use.
- Reduction in quality and quantity of habitats including hedgerows, old trees, ditches drains, ponds, riverside and pasture habitats.
- Loss of breeding and winter hibernation sites in buildings, old trees and farmyard features.
- Continued loss and removal of old trees that provide food habitat and roost sites.
- Floodlighting of churches and buildings causing disturbance.
- Destruction and disturbance of roosts during reproofing processes.
- Widespread confusion over/ ignorance of/ ignoring the law regarding bats.
- Deterioration of water quality has also been shown to affect food supply. Pesticides, oil and fertilizers still affect invertebrate populations.

Lincolnshire BAP Objectives

- To continue both the mapping and publicity work.
- To use the results of this work to inform conservation efforts and planning decisions.

Lincolnshire Targets

Target 1 Survey and monitor the status of bat populations in Lincolnshire in order to establish baseline data by 2010 for future targeting of conservation efforts.

Target 2 Maintain and enhance the existing populations and range of bats in Lincolnshire. This will require the successful completion of Target 1.

Target 3 Increase the quantity and quality of suitable bat habitat through agri-environmental schemes.

Target 4 Promote improved understanding of bats and their ecology.

Target 5 Encourage appropriate building techniques.

Lincolnshire Actions

Advisory	Date	Partners
Ensure that landowners/land managers are aware of the presence and legal status of bats and that advice is available on appropriate methods of management for conservation of their roosts and foraging habitats	Ongoing	Lincs bat group, NE, FWAG LA's LWT, RSPB, WESG Woodland Trust

South Holland IDB Objectives

- To maintain the current distribution and abundance of bats within the Board's Area.
- Where possible increase the range and population of bats within the Boards' Area.

South Holland IDB Action

- Action 1** Establish policies (good working practice) to ensure management needs and compliance with legislation are incorporated in working practices by 2011.
- Action 2** Establish the current distribution and abundance of Bats within the IDB District. To develop a greater understanding of the habitat needs, in relation to watercourses, and distribution of the different species of bats within the Boards Area
- Action 3** Ensure the appropriate management bats roost sites.
- Action 4** Establish the potential for development of bat roost site on IDB property.
- Action 5** Increase the awareness of the species and their habitat requirements.

6.2.4 Greater Water Parsnip

This species is a 1-2m tall perennial plant with white flowers arranged in upturned parasols with ash shaped leaves. It flowers in July – August and likes its roots wet at all times. It will tolerate moderate shading by some emergent species but not carr woodland. It thrives in water kept open by occasional clearance and is generally found in peat or alluvial soils. The plant will not tolerate over management or overgrazing and is therefore often restricted to inaccessible ditch banks. Bare ground is also required for the germination of seedlings.

There has been a substantial decline in the species and is now described as a nationally rare plant. It is a good indicator of healthy fen-type communities.

Current Status

The Greater Water Parsnip has declined in Lincolnshire since the late 1950s. It was present in 2003 in seven nature reserves, mostly in South Holland district. The plant seemed stable at these sites.

Threats

The greater water parsnip is not under any great threat at any of the six original nature reserve sites on which it occurs. The main threats whether on nature reserves or on farmland are:

- Lack of bare ground for seedlings to develop. To thrive long-term, the plant needs disturbed ground from time to time.
- Too frequent cutting.
- Exposure to heavy grazing.
- Too many nutrients being washed off farmland.
- Drainage of sites and land reclamation.
- Over management of ditches and banksides.
- Abandonment of ditch management leading to reed and scrub invasion.
- Lowered and excessively fluctuating water levels leading to the plants roots drying out.

Lincolnshire BAP Objectives

- To establish a self-sustaining population and remove the species from the endangered species list in Lincolnshire by 2015.

Lincolnshire Targets 2005 – 2015

- Target 1** Maintain the current (2005) range of greater water parsnip in Lincolnshire and ensure that viable populations are present at all extant sites by 2015.

Target 2 regenerate plants from the seed bank for further reintroduction and stocking to suitable additional sites in Lincolnshire creating 25 self sustaining county locations by 2010.

Lincolnshire Actions

Action	Date	Partners
Site Safeguard and Management		
Check relevant management plans on nature reserves to ensure that the plant's requirements are catered for.	2010	LWT, EA, NE, IDBs
On other sites within its known historic range, target sympathetic management on potential dyke sites. If no plants appear in 5 years, and continuing sympathetic management can be agreed, consider establishing plants from seed collected from its nature reserve sites.	2015	EA, IDBs
Provide opportunities for the spread of greater water parsnip from extant sites to encourage natural dispersal into the wider countryside.	2015	LWT, EA, IDBs
Research and Monitoring		
Monitor populations of greater water parsnip in Lincolnshire through the survey of known sites	2015	LWT, LERC,
Identify suitable sites to introduce the plant	2010	LWT, FWAG, IDBs, NE, WESG

South Holland IDB Objectives

- To maintain the current distribution and abundance in the Boards' Area.
- To explore opportunities to expand the population of Greater Water Parsnip.

South Holland IDB Action

Action 1 To work in partnership with Plantlife to establish current distribution of the plant by 2011.

Action 2 To work in partnership with Plantlife to explore the opportunities to expand the distribution of the plant by 2012.

6.2.5 Grass Snake

The grass snake, *Natrix natrix*, is the UK's largest reptile, with some adults growing to well over a metre in length. It is the most common snake found in Britain, and the only native snake that lays eggs. Grass snakes are typically grey-green in colour and have a distinctive yellow or cream collar behind the head on a dark background, with black bars down the side and sometimes black spots on top.

They are most frequently associated with water, feeding on amphibians, fish and small mammals but are also often encountered basking in the sun. The main habitat areas favoured by grass snakes are river valleys, ponds, lakes, streams, marshes, reservoirs and damp meadows but they also travel widely in surrounding drier habitats, including open woodland, rough grassland, heath, derelict urban areas and low intensity farmland. When the temperatures drop, grass snakes will seek hibernation sites, such as rubble or log piles and mammal burrows which provide frost, flood and predator-free accommodation. They generally emerge from hibernation around April, and after mating, females lay clutches of white leathery eggs in a warm environment such as a compost heap or pile of rotting logs. The young hatch then between August and October.

Current Status

Grass snakes are protected under Schedule 2 of the Conservation (Natural Habitats etc) Regulations 1994 (Regulation 38) and Schedule 5 of the Wildlife and Countryside Act 1981. It is illegal to kill, injure or trade in this species.

The grass snake has suffered from the loss of suitable habitat because of changes in farming practices and loss of land due to new houses or industrial building. In some areas there has been an

increase in disturbance because of increased recreational usage. A general loss of habitat will also lead to the destruction of hibernacula and refuges.

Hibernacula (places where reptiles hibernate) and refuges (places where reptiles can shelter) may also be lost through sites being managed in inappropriate ways. Areas may be cleared of overgrown vegetation, fallen logs or piles of stones and other rubbish, and ponds may be filled in. Work on sites around compost heaps may be carried out at the wrong time of year and disturb incubating eggs.

Destruction of linear habitats such as hedgerows and ditches and building or change in land use leads to barriers being created between suitable sites. This means that there is much less potential for small populations to expand.

Current Threats in Lincolnshire

- Habitat destruction.
- Persecution.
- Loss of egg laying sites.

South Holland IDB Objectives

- To maintain and where possible increase the range of Grass Snake within the Boards' Area.

South Holland IDB Action

Action 1 Determine the extent and distribution of the existing populations at the Boards pumping stations and on key drains.

Action 2 Develop Hibernacula at pumping station where appropriate.

Action 3 Increase the awareness of the species and their habitat requirements.

6.2.6 Eel

The European eel travels to freshwater as a glass eel from its spawning site in the Sargasso Sea in the Atlantic Ocean. On arrival into freshwater in the summer, the tiny unpigmented eel must travel upstream to find appropriate habitat where it will feed and mature through the elver and yellow eel stage, living in some cases up to 15 years, before changing physiologically and returning to the ocean from which it spawned, as a silver eel. Certain abiotic factors such as temperature and the phase moon stimulate this movement to the sea, which usually occurs in the autumn months.

Prior to 1930, the fens had undergone hundreds of years of drainage for agriculture and habitation, it was only post 1940 that more intensive drainage programmes were put into operation to optimise the high grade agricultural land of East Anglia to feed the populous both during and after World War II. During this time a widescale loss of aquatic habitat took place. However, it was in response to the saline surge and floods of 1953 that emphasis was placed on defending the East Anglian coast from the North Sea. The "passibility" of these hugely important tidal defence schemes, tidal flaps and pumping stations is likely to have played a role in the successes or non successes in the life history of the migratory eel in East Anglia.

Eel Management Plan

The eel became a priority BAP species in 2007. There is currently no Eel BAP for the UK or Lincolnshire. There is however an Eel Management Plan (EMP) for the UK, published in December 2008 which divides the UK into different River Basin Districts (RBD). Lincolnshire falls under the Anglian River Basin District. This document aims to describe the current status of eel populations in the Anglian RBD, assess compliance with the EU Council Regulation 1100/2007 and detail management measures to increase silver eel escapement.

Current Status

The eel is thought to be of huge economic and ecological significance to UK waters. It has been estimated that eel recruitment has fallen by 70% in the UK and by 95% in other EU countries since the 1980's. The European Eel Regulation (2007) (EU Council regulation 1100/2007) states that the UK must hope to achieve a 40% silver eel escapement relative to best estimates, with no anthropogenic

influences. A failure to achieve this target will result in a 50% reduction in fishery effort for all life stages.

Eel legislation

The Salmon and Freshwater Fisheries Review (2000) recommended new legislation to improve fish passage in England and Wales to improve fish passage on all rivers, not just those containing salmon and sea trout. The Fish Passage (England and Wales) Regulations 2009 will increase the circumstances in which fish passes will be required to be built or screened and will provide a more robust fish pass authorisation scheme.

Current Threats in Lincolnshire

- Problems with glass eel recruitment, due to the blockage of glass eel passage into watercourses by means of tidal flaps, sluice gates and pumping stations.
- Problems with silver eel escapement into main river and the sea by means of tidal flaps, sluice gates and pumping stations.
- Parasites – *Anguillicoloides crassus* a nematode worm effects the ability of the eel to alter buoyancy during swimming by attaching to the swim bladder of the animal.
- Water quality.
- Illegal commercial fishing.

South Holland IDB Objectives

- To contribute toward the Eel Regulation Action and the Eel Management Plan.

South Holland IDB Actions

Action 1 Work in Partnership with the Environment Agency to assess the current status of eel populations within the Boards' Area.

Action 2 Identify barriers to migration in the Boards' Area and assess options for overcoming these.

Action 3 Ensure regard to wildlife law, by promoting compliance with the standard pro forma for biodiversity and protected species surveys.

6.2.7 Barn Owl

The Barn owl is a bird which hunts mainly on open farmland, mainly at night. It feeds primarily on small mammals; mice shrew, field vole and even young rat. The species requires rough ungrazed or lightly grazed grassland, tussocky in nature. The barn own will occupy habitat of this nature and have an estimated home range of between 3 – 9km². The species nest mainly in purpose built nest boxes which accounts for approximately two thirds of their nest sites. They previously would have nested predominantly in farm buildings and trees.

Current Status

A decline in the species nationally up until the mid-1990's was probably due to a decrease in prey availability due to habitat loss, including the fragmentation of rough grassland and the decrease in field margins alongside watercourses. The use of DDT in the mid-1900s and rodenticides may have also contributed to the decline in the population.

The Barn owl is listed in Annexes II and IV of the EC Habitats Directive, Appendix I of the Berne Convention and is protected under Schedule 2 of the Conservation (Natural Habitats) Regulations (1994). Its protection is also covered in the Wildlife and Countryside Act (1981) (as amended), the Countryside Rights of way Act (2000) and the Natural Environment and Rural Communities Act (2006).

Threats in Lincolnshire

- Intensive agriculture leaving no field margin upto the edge of watercourses.
- The loss of traditional nesting and roosting sites in traditional farm buildings or large trees felled.

South Holland IDB Objectives

- To enhance the present range and population of Barn Owls through natural recolonisation during the next 10 years.

South Holland IDB Action

- Action 1** To effect a sustainable three-fold increase in the breeding population within the IDB district by 2020, taking account of the short-term annual changes in breeding productivity caused by the three-year cyclical fluctuations in Field Vole abundance.
- Action 2** To determine the success of the action plan, by encouraging WCP to conduct a monitoring and maintenance of IDB nestboxes within the district and report these results annually.
- Action 3** In association with WCP, to provide guidance on habitat and nest site requirements for riparian landowners in the district.
- Action 4** To raise the awareness of IDB staff, managing agents and consultants, with regard to the significance of Barn Owls in the IDB district.

6.2.8 Kestrel

The Kestrel is a small falcon which hunts mainly on open farmland during the day. It feeds primarily on small mammals insects and earthworms. The species requires rough ungrazed or lightly grazed grassland, tussocky in nature, similar to that required of the Barn Owl. The Kestrel will occupy an estimated home range of between 2 – 5km². Nowadays, the species nest mainly in purpose built nest boxes. Kestrels will often share Barn Owl nest boxes and are known to breed in separate compartments at the same time.

Current Status

It is estimated that nationally, the Kestrel has undergone a 20% decline in numbers in the last 10-20 years. It is thought that this may be due to decreases in vole and starling abundance or the rapid increase in buzzard numbers. The use of DDT in the mid-1900s and rodenticides may have also contributed to the decline in the population.

The Kestrel is listed in Annexes II and IV of the EC Habitats Directive, Appendix I of the Berne Convention and is protected under Schedule 2 of the Conservation (Natural Habitats) Regulations (1994). Its protection is also covered in the Wildlife and Countryside Act (1981) (as amended), the Countryside Rights of way Act (2000) and the Natural Environment and Rural Communities Act (2006).

Unlike the Barn Owl, there is yet to be seen a turnaround in the fortunes of this species.

Threats in Lincolnshire

- Intensive agriculture leaving no field margin upto the edge of watercourses.
- The lack of appropriate natural nesting sites.

South Holland IDB Objective

- To enhance the present range and population of Kestrels through natural recolonisation during the next 10 years.

South Holland IDB Action

- Action 1** To affect a sustainable three-fold increase in the breeding population within the district by 2020, taking account of any short-term changes in breeding productivity which may be caused by annual fluctuations in vole populations.
- Action 2** To assess the success of the plan by enlisting WCP to conduct monitoring of all IDB nest boxes within the district and to report these results to them on an annual basis.
- Action 3** In association with WCP to provide guidance on habitat and nest site requirements for riparian landowners.
- Action 4** To raise the awareness of IDB staff, managing agents and consultants about the significance of Kestrels in the IDB region.

6.2.9 Swallow

Swallows are small birds with dark glossy blue backs, red throats, pale under parts and long distinctive tail streamers. They are extremely agile in flight and spend most of their time on the wing. They are widespread breeding birds in the Northern Hemisphere, migrating south in winter. It is an iconic bird of the British Summer. Swallows feed low in the air, over open meadows, often with access to water and quiet farm buildings. In flight they weave from side to side chasing and feeding on flies. With the onset of insecticides, swallow numbers have declined.

In autumn the birds begin to gather in flocks in readiness for the flight south. Groups may be seen on overhead wires but the biggest flocks will be seen over reedbeds where they roost. Swallows nest on beams or narrow supports under some sort of roof: not under eaves like house martins, but anywhere with an open door or window. The 4 – 5 eggs hatch within 15 – 16 days and the chicks fly 18 – 23 days later.

Swallows arrive in the UK in April and May. They return to their wintering grounds in September and October. British swallows spend their winter in South Africa.

Current Status

Swallows and their nests are fully protected under the Wildlife and Countryside Act (1981).

Swallow populations fluctuate from year to year and are affected greatly by weather. They require rain for wet mud for nest building and for encouraging the abundance of insect prey, but cold wet weather prevents them from feeding. Large-scale mortality is regularly recorded during and after bad weather, during both breeding and migration. On the other hand, hot and dry weather can result in mortality through dehydration and heat stress.

Independent of weather-related fluctuations, there are believed to have been widespread declines in Europe since 1970. The swallow is included on the Amber List of Birds of Conservation Concern because of its adverse conservation status Europe-wide.

Possible explanations for the decline include the following:

- Climatic changes in the swallows African winter quarters and on migration routes may be having a serious effect. Research has shown that swallows are returning to their breeding areas in poor condition and are laying fewer eggs than previously recorded.
- Adverse climatic conditions in Europe may also be having a detrimental effect. Cold springs with late frosts in May and early June cause problems for swallows, as do very hot summers. In the latter case, pools dry out, reducing the numbers of emerging insects, and nestlings die from heat exhaustion and dehydration.
- The continuing spread of the Sahara desert may be making this formidable barrier increasingly difficult for swallows to cross.
- Changes in farming practices throughout Europe may be reducing the numbers of nest sites and flying insects.

Current Threats in Lincolnshire

- Changes in farming practices may be reducing the numbers of nest sites and flying insects.

South Holland IDB Objectives

- To maintain and where possible increase the range of Swallow within the Boards' Area.

South Holland IDB Action

- Action 1** Determine the extent and distribution of the existing nesting site at Board Property.
- Action 2** To explore the potential for enhancing the number of nest sites available to swallows on IDB property and establish a monitoring programme.
- Action 3** Increase the awareness of the species and their habitat requirements.

6.2.10 Swift

Swifts, being summer migrants, arrive in Britain in late April and early May and leave in August and September. The species is not well monitored by any of the national schemes and long-term trends are unclear. However many swift nest sites have been lost to re-development and not replaced and modern buildings lack suitable nest sites. This means that swift numbers could decline in the future. At present, swift populations in Lincolnshire appear to be stable where suitable buildings for nest sites are available.

Current Threats in Lincolnshire

- Loss of suitable feeding and breeding areas.
- Trend towards small and 'tidy' gardens.
- Predation by domestic cat, sparrowhawk and other predators. It is likely that house sparrow and song thrush are particularly vulnerable to cat predation.
- Changes in agricultural (and related) practices which have brought about a reduction in both weed seeds and invertebrates in the wider countryside.
- Loss of open space as a result of high density development with less 'wild' habitat.
- Use of pesticides, herbicides and molluscicides (e.g. slug pellets). Molluscicides have been implicated in the decline of song thrushes as these birds tend to eat more slugs and snails than other species do, and may be dependent on this food source at some seasons.

Lincolnshire BAP Objectives

- To determine current distribution and status.
- To encourage suitable management of urban habitats to maintain populations.

Lincolnshire Targets 2005 – 2015

- Target 1** Determine current extent of knowledge on populations and status by collation of existing information by 2010.
- Target 2** Using the results of Target 1 determine appropriate future action for Urban birds.

South Holland IDB Objectives

- To maintain and where possible increase the range of Swifts within the Boards' Area.

South Holland IDB Action

- Action 1** Determine the extent and distribution of the existing nesting site at Board Property.
- Action 2** To explore the potential for enhancing the number of nest sites available to Swifts on IDB property and establish a monitoring programme.
- Action 3** Increase the awareness of the species and their habitat requirements.

6.2.11 Sand Martin

Sand Martins are the smallest European hirundines (martins and swallows), with dark brown upper parts and dark under wings contrasting with otherwise pale under parts divided by a distinctive dark chest bar. Agile fliers, feeding mainly over water, they will perch on overhead wires or branches. They are gregarious in the breeding season and winter. Over the past 50 years the European population has crashed on two occasions as a result of drought in the birds' African wintering grounds.

Sand Martins are summer visitors to the UK. They are one of the first spring migrants to appear, arriving mid-March to mid-April, with late arrivals up until June. Found along rivers and other water bodies throughout the UK. Also found around man-made gravel pits where artificial nesting banks are sometimes provided.

Sand Martins are very gregarious and nest in colonies, which may contain more than 100 pairs. They excavate tunnels in sandy, dry vertical banks in sand pits and gravel pits, railway cuttings, riverbanks and sea-cliffs, and exceptionally in drainpipes in walls, and holes in brickwork. Both males and females make a horizontal tunnel 45-90 cm long with a chamber at the end. Suitable sites may be

used for years. New tunnels will be dug as the cliff collapses, or as old holes become too big (when they may be taken over by sparrows or starlings).

The birds depart British Isles from late July to September. Most are thought to winter in the Sahel, the zone south of Sahara, where they feed in damp places that offer plentiful supplies of flying insects

Current Status

The Sand Martin is still relatively common throughout Eastern England, however, the species is included in the long list of Globally Threatened/Declining species, though an action plan for its conservation has not yet been published. In Europe the Sand Martin has been identified as a species of European Concern (Category 3) on account of significant declines in populations. Drought conditions in the wintering grounds of the Sahel in the 1970's and 1980's saw large reductions in colony sizes within the UK.

Sand Martins and their nests are fully protected by the Wildlife and Countryside Act 1981. Sand Martins often turn up at active sand quarries. They will tunnel into the quarry face even when the sand is being excavated, and in some cases have been known to start nesting in heaps of loose sand.

Natural nest sites for Sand Martins are holes excavated in banks and cliffs, particularly along riverbanks. Artificial Sand Martin banks have also been a success, even on sites with no previous record of breeding. Reedbeds provide roosting habitat for Sand Martins and are covered in the Reedbed habitat action plan. Sand Martins feed on invertebrates associated with wetlands and areas of open water.

Current Threats in Lincolnshire

- Loss of suitable nesting banks
- Disturbance to colonies
- Loss of roost sites due to drainage and scrub encroachment
- Loss of feeding sites such as wet meadows, river margins, field ponds and other wetland habitats

South Holland IDB Objectives

- To maintain and where possible increase the range of Sand Martin within the Boards' Area.

South Holland IDB Action

- Action 1** Maintain the Sand Martin Roost on the South Holland main drain in favourable condition.
- Action 2** Explore the potential for establishing further roosting sites.
- Action 3** Establish a monitoring programme.
- Action 4** Increase the awareness of the species and their habitat requirements.

6.2.12 Kingfisher

The kingfisher is a very shy bird often glimpsed only as a bright flash of blue and green as it flies fast and low over water. Measuring 16.5cm, it has orange underparts, a white throat and neck patch with green wings and bright blue upper parts. It has a large head, short tail, and a dagger like bill; the female's having a red base. The kingfisher's habitat consists mainly of lowland freshwater areas with slow moving waters and brackish estuaries. Overhanging branches for shady perches above sunlit pools provide excellent feeding opportunities. It dives from low perches or hovers into clear water for small fish and tadpoles.

The kingfisher nests in holes in suitable riverbanks. Kingfishers breed in their first year, and pair-formation usually starts in February. If the male and the female have neighbouring territories, these may merge for the breeding season.

Both birds excavate the nest burrow into the stone-free sandy soil of a low stream bank, usually about 0.5m from the top. The birds choose a vertical bank clear of vegetation, since this provides a reasonable degree of protection from predators. The nest tunnel is usually 60-90 cm long, and the 6 cm diameter is only a little wider than the bird. The nest chamber at the end has a slight depression to prevent eggs rolling out, but no material is brought to the nest.

2-3 broods are raised in quick succession, normally in the same nest. The first clutch of 6-7 eggs is laid late in March or early in April. Both adults incubate the eggs, and the chicks hatch 19-21 days later. Each chick can eat 12-18 fish a day, and they are fed in rotation once a chick is fed, it moves to the back of the nest to digest its meal, causing the others to move forward. The chicks are normally ready to leave the nest when they are 24-25 days old, but if the fish supply is poor, they can take up to 37 days. Once out of the nest, the young are fed for only four days before the adults drive them out of the territory and start the next brood. Kingfishers will have two broods a year of around six or seven eggs.

Current Status

They are fairly widespread, especially in central and southern England, becoming less common further north but following some declines last century, they are currently increasing in their range in Scotland. Kingfishers are found by still or slow flowing water such as lakes, canals and rivers in lowland areas. In winter, some individuals move to estuaries and the coast. Occasionally they may visit garden ponds if of a suitable size.

The kingfisher is afforded the highest degree of legal protection under the Schedule 1 of the Wildlife and Countryside Act 1981, the Bern Convention, Appendix II and the Birds Directive Annex 1.

Current Threats in Lincolnshire

- Very cold winters, which can cause numbers to fall significantly.
- Human persecution, because of the damage individual birds have been alleged to cause young fish stocks.
- Canalisation and flood alleviation schemes can destroy local nesting habitat. The kingfisher needs vertical banks in which to excavate nest holes.
- Untimely clearance of bankside vegetation can expose nest sites and cause disturbance to nesting adults.
- Agricultural improvement of bankside areas and damage caused to bankside habitat by livestock.
- Lack of nesting sites on certain, otherwise suitable river sections.
- Reduced river flow due to over-abstraction makes the entrance to the bird's nest more exposed and leads to an increase in predation of eggs and young by scavengers such as rats.

South Holland IDB Objectives

- Protect, maintain and enhance existing kingfisher populations and related habitats within the Boards' Area.

South Holland IDB Action

- Action 1** Encourage the sympathetic management of suitable waterways for kingfishers where appropriate.
- Action 2** Establish the status and distribution of the kingfisher within the Boards' Area.
- Action 3** Raise awareness of kingfishers and their habitat requirements.

6.2.13 Non-native Invasive Species

A non-native invasive species is a species which has been moved outside its natural range with the aid of humans, is spreading rapidly and is causing problems for the local environment and economy. At a global level, invasive non-native species are now believed to be one of the most significant causes of biodiversity loss. The impacts particularly of freshwater and riparian non-native species are also of concern at a local level to the hydrological engineer, due to the ease and speed at which many plants can spread and grow, causing major problems by blocking watercourses. The low-lying nature of this part of Lincolnshire and its abundance of watercourses means that it is particularly at risk from colonisation by these plants.

The six non-native invasive aquatic or riparian plants of concern in are:

- Australian Swamp Stonecrop (*Crassula helmsii*)
- Floating Pennywort (*Hydrocotyl ranunculoides*)
- Parrots Feather (*Myriophyllum aquaticum*)
- Japanese Knotweed (*Fallopia japonica*)

- Giant Hogweed (*Heracleum mantegazzianum*)
- Himalayan Balsam (*Impatiens glandulifera*)

Cost for Control

There is no doubt that if an infestation, particularly of the aquatic non native invasive species, is left to grow the cost to the board will be considerable. The Board has a duty under the Wildlife and Countryside Act (1981) to prevent the spread of non-native invasives and therefore it would not simply be a matter of removing large areas of invasives during the maintenance period, as often the processes of flailing strimming or mowing of the species will subsequently result in its continual spread. This will occur particularly with Floating Pennywort, Australian Swamp Stonecrop, Parrots Feather and Japanese Knotweed, as they can all reproduce via an asexual, vegetative means. It is likely that the problem will continue on site from small pieces of material left behind from the mechanical operation, but will result in an additional problem of waterborne material causing a further infestation downstream.

The approach to the invasive problem should definitely be one of reaction when the species is manageable and relatively cheap to control. This should hopefully prevent the problem from manifesting into a much larger more expensive control strategy. The key to this is communication and knowing where the invasives are on IDB land or on landowner controlled land, so that an integrated partnership approach may be established.

South Holland IDB Objectives

- To promote the prevention, control and eradication of non-native invasive species within the Boards' area.

South Holland IDB Actions

- Action 1** Collate records for all species of concern and share these with the local records centre.
- Action 2** Continue to establish protocols to ensure that the Consortium's activities stop the spread and help towards the eradication of invasive alien species through the Boards' Area.
- Action 3** Train staff in the identification of key non-native species
- Action 4** Develop identification guides for the non-native species of most concern, to be used by officers, staff and contractors
- Action 5** Develop control and eradication projects for invasive non-native species of particular concern, and seek external funding where necessary

7 HABITAT AND SPECIES ACTION PLANS

7.1 Habitat and Species Action Plans

The following sections contain action plans for each of the habitats and species that have been prioritised for action by the IDB. The plans set out the actions that the IDB believes are appropriate for each. Some of the IDB BAP actions are dependant upon the cooperation of other organisations to gain access to the necessary information in order to inform the Board's work programmes. These plans will be reviewed and updated periodically.

7.2 Key IDB Habitat Actions

Habitat	Objective	Actions	Start and end Dates	Potential Partners
Rivers, Canals and Drains	To improve habitat diversity on watercourses maintained by the Board.	Establish a Standard Maintenance Operations Policy by 2011.	2010- 2011	
		Explore the potential for implementing habitat improvements on suitable watercourses and set SMART Actions as appropriate	2010 - 2013	
	To enhance the flora and fauna of the watercourses maintained by the Board	Develop a Standard proforma for biodiversity and protected species surveys by 2010.	2010	
		Ensure appropriate protection of drains/ ditches within new development and encourage appropriate management to enhance wildlife value.	Ongoing	
Saline Lagoon	To establish the extent and importance of saline ditches within the drainage network in the Boards' Area.	Survey the Boards drains around the Wash to establish current state by 2013	2012-2013	LWT
Ponds	To create new ponds within the Board's Area by working in Partnership with the Million Ponds Project.	Explore the potential for pond creation within the Boards Area and set SMART Actions as appropriate. Develop a partnership with the Million Pond Project and others to establish new ponds where environmentally suitable and feasible.	2011-2015	Landowners, NE, Million Pond project.
		Train key staff to advise on pond restoration and creation.	2011-2015	Million Pond project.
Reedbed	To maintain the current extent of Reedbed within the Boards' Area.	Map existing reed cover on the drains covered by the reed management Policy by 2014	2012-2014	
		Review current reed management Policy.	2014-2015	

Habitat	Objective	Actions	Start and end Dates	Potential Partners
Arable Field Margins	To maintain, enhance and expand the area of arable field margins within the Boards' Area.	Map the existing area of arable field margins along drains maintained by the Board and on Board-owned land.	2010- 2012	
		Explore the potential for expanding arable field margins along Board maintained drains and on Board-owned land, and set SMART Actions as appropriate.	2010-2015	NE
		In collaboration with FWAG and Natural England, work with tenants to encourage the expansion of arable margins.	2010-2015	Tenants, FWAG, NE
		Monitor the benefits to farmland birds by establishing links with the RSPB's Farm Monitoring Scheme.	2010-2015	RSPB
Lowland Calcareous Grassland	To maintain the calcareous grassland sites on South Holland main drain in favourable condition.	Ensure appropriate habitat management for Calcareous grassland species on the South Holland main drain through the development of a 10 year management plan.	2010-2011	FWAG, LWT

7.3 Key IDB Species Actions

Species	Objectives	Actions	Start and end Dates	Potential Partners
Water Vole	To maintain the current distribution and abundance of water vole within the Board's Area	Map the current distribution of water vole within the Boards' Area	Ongoing	-
		Ensure regard to wildlife law, by promoting compliance with the standard pro forma for biodiversity and protected species surveys.	Ongoing	LCC, EA, LWT, NE
		Ensure that watercourses and wetlands are managed appropriately for the water vole, by development of a Boards' Standard Maintenance Operations	2011-2012	LCC, EA, LWT, NE
		Undertake an IDB water vole study to establish the current water vole distribution and abundance within a defined area and establish the links between maintenance regimes and water vole distribution.	2011-2014	KLIDB
Otter	To maintain and where possible increase the range and population of otter within the Boards' Area	Carry out a survey for otters at five key sites within the Boards' Area	2010-2015	LWT, LERC
		Ensure regard to wildlife law, by promoting compliance with the standard pro forma for biodiversity and protected species surveys	Ongoing	LWT, FWAG

Species	Objectives	Actions	Start and end Dates	Potential Partners
Bats	<p>To maintain the current distribution and abundance of bats within the Board's Area.</p> <p>Where possible increase the range and population of bats within the Boards' Area.</p>	Establish policies (good working practice) to ensure management needs and compliance with legislation are incorporated in working practices by 2011.	Ongoing	
		Establish the current distribution and abundance of Bats within the IDB District. To develop a greater understanding of the habitat needs, in relation to watercourses, and distribution of the different species of bats within the Boards Area	2010-2011	LOCAL BAT GROUP
		Ensure the appropriate management bats roost sites.		
		Establish the potential for development of bat roost site on IDB property.	2011-2013	
		Increase the awareness of the species and their habitat requirements	2011-2012	
Greater Water Parsnip	<p>To maintain the current distribution and abundance within the Boards' Area.</p> <p>To explore opportunities to expand the range and population of greater water parsnip.</p>	Work in partnership with Plantlife to establish the current distribution of the species by 2011.	2010-2011	Plantlife
		Work in partnership with Plantlife to explore appropriate opportunities for expanding the range and population of greater water parsnip by 2012.	2011-2012	Plantlife
Grass Snake	<p>To maintain and where possible increase the range of Grass Snake within the Boards' Area.</p>	Determine the extent and distribution of the existing populations at the Boards pumping stations and on key drains.	2012-2013	
		Develop Hibernacula at pumping station where appropriate.	2013-2014	
		Increase the awareness of the species and their habitat requirements.	2013-2014	
Eel	<p>To contribute toward the Eel Regulation Action and the Eel Management Plan.</p>	Work in Partnership with the Environment Agency to assess the current status of eel populations within the Boards' Area.	2010-2012	EA
		Identify barriers to migration in the Boards' Area and assess options for overcoming these.	2011-2013	EA
		Ensure regard to wildlife law, by promoting compliance with the standard pro forma for biodiversity and protected species surveys.	Ongoing	LCC, EA, LWT, NE

Species	Objectives	Actions	Start and end Dates	Potential Partners
Barn Owl	To enhance the present range and population of barn owls through natural recolonisation during the next ten years.	Achieve a sustainable increase in the breeding population within the Boards' Area by 2020, taking account of the short-term annual changes in breeding productivity caused by the three-year cyclical fluctuations in field vole abundance.	2011-2020	WCP, LWT, Landowners
		Determine the success of the action plan, by encouraging WCP to conduct monitoring and maintenance of IDB nestboxes within the Boards' Area and report these results annually.	2011-2020	WCP
		In association with WCP, provide guidance on habitat and nest site requirements for riparian landowners in the Boards' Area.	2011-2020	WCP, LWT, LBP
		Raise the awareness of IDB staff, managing agents and consultants, with regard to the significance of barn owls in the Boards' Area.	2011-2020	
		Effect a sustainable increase in the breeding population within the Boards' Area by 2020, taking account of any short-term changes in breeding productivity which may be caused by annual fluctuations in vole populations.	2011-2020	WCP
Kestrel	To enhance the present range and population of kestrels through natural recolonisation during the next ten years.	Assess the success of the plan by enlisting WCP to conduct monitoring of all IDB nest boxes within the Boards' Area and to report these results to them on an annual basis.	2011-2020	WCP
		Work in association with WCP to provide guidance on habitat and nest site requirements for riparian landowners.	2011-2020	WCP
		Raise the awareness of IDB staff, managing agents and consultants about the significance of kestrels in the Boards' Area.	2011-2020	WCP
Swallow	To maintain and where possible increase the range of Swallow within the Boards' Area.	Determine the extent and distribution of the existing nesting site at Board Property.	2011-2012	
		To explore the potential for enhancing the number of nest sites available to swallows on IDB property and establish a monitoring programme	2012-2013	
		Increase the awareness of the species and their habitat requirements.	2012-2013	

Species	Objectives	Actions	Start and end Dates	Potential Partners
Swift	To maintain and where possible increase the range of Swift within the Boards' Area.	Determine the extent and distribution of the existing nesting site at Board Property.	2011-2012	
		To explore the potential for enhancing the number of nest sites available to Swifts on IDB property and establish a monitoring programme	2012-2013	
		Increase the awareness of the species and their habitat requirements.	2012-2013	
Sand Martin	To maintain and where possible increase the range of Sand Martin within the Boards' Area.	Maintain the Sand Martin Roost on the South Holland main drain in favourable condition.	Ongoing	
		Explore the potential for establishing further roosting sites.	2012-2013	
		Establish a monitoring programme.	2010-2011	
		Increase the awareness of the species and their habitat requirements	2010-2011	
Kingfisher	Protect, maintain and enhance existing kingfisher populations and related habitats	Carry out surveys to establish the status and distribution of the kingfisher within the Boards' Area.		
		Encourage the sympathetic management of suitable waterways for kingfishers where appropriate		
		Raise awareness of kingfishers and their habitat requirements.		

7.4 Non-native Invasive Species Actions

Objective	Actions	Start and end Dates	Potential Partners
To promote the prevention, control and eradication of non-native invasive species within the Boards' area	Collate records for all species of concern and share these with local records centre on a regular basis	Ongoing	
	Continue to establish protocols to ensure that the Consortium's activities stop the spread and help towards the control or eradication of non-native invasives through the Drainage Districts	Ongoing	
	Train staff in the identification of key non-native species	Ongoing	
	Develop identification guides for the non-native species of most concern, to be used by officers, staff and contractors	2010	
	Develop control and eradication projects for invasive non-native species of particular concern, and seek external funding where necessary	2009-2011	Landowners, NE,

8 PROCEDURAL ACTION PLAN

8.1 Introduction

A number of procedural targets and actions have been established within this Procedural Action Plan. These are intended to integrate biodiversity considerations into IDB practices and procedures.

8.2 Duty to Conserving Biodiversity

Project	Outputs and Outcomes	Start and end Dates	Potential Partners
Ensure compliance to standard proforma for biodiversity and protected species surveys	All works assessed using agreed standards of information to ensure that appropriate mitigation is delivered for capital/maintenance works and projects to ensure no net loss of biodiversity.	Ongoing	
Ensure compliance to Boards Standard Maintenance Operations	Assess 5 % of maintenance works are being carried out to an agreed minimum standard of operations across the whole board	Ongoing	
Land Drainage consent and Bylaws	Through the application of Land Drainage Consents and Bylaws, seek to ensure that natural features of conservation interest and habitat importance are not damaged or destroyed.	Ongoing	
Attend Local Biodiversity Forum	Communication and network opportunities with other organisations to facilitate actions for BAP Species and Habitats. PR and lifting profile of Board	Ongoing	LBP
Raising awareness	Biodiversity training days organised for staff and board members	Ongoing	
Recording	Develop and populate a recording system for BAP species and habitats within the South Holland Board area.	Ongoing	LERC
Communication	A new biodiversity section on the website. Share successes with media and promote public awareness?	Ongoing	
Monitoring	Continue to develop the Consortium’s record base and continue to work internally and in partnership with other organisations to ensure that we have up to date information on species to help inform future works. The results of monitoring to be added BARS to enhance awareness of IDB successes.	Ongoing Ongoing	

9 IMPLEMENTATION AND MONITORING

9.1 Implementation and Monitoring

The procedural action plan shows how the Board is planning to integrate the BAP into its mainstream work planning process. With the guiding principle that in planning for maintenance, capital and non regular maintenance work consideration will be given to the implementation of the Boards Biodiversity Action plan Actions.

The Board, has part of the Water Management Alliance, has adopted the Environmental Management System ISO 14001, which will also help integrate the Biodiversity Action Plan within the organisation.

A simple process will be put into place to record actions and help with the reporting. Any new data on habitats and species will be shared with the Lincolnshire Biological Record Centre and the Lincolnshire Biodiversity Partnership.

10 REVIEWING AND REPORTING PROGRESS

10.1 Reviewing and Reporting Progress

The Board recognises the importance of reviewing the implementation of the Biodiversity Action Plan to assess changes in the status of habitats and species and the overall feasibility of objectives and actions. In addition, they recognise the benefit of recording successful achievements and reporting on those achievements.

The Board's Biodiversity Action Plan was developed with the help of a working group made up of Board members and it is hoped that the working group will continue to meet annually to review progress. A comprehensive review of the plan will take place after five years.

The Board, through the Water Management Alliance, will continue to be a partner in the Lincolnshire Biodiversity Partnership.

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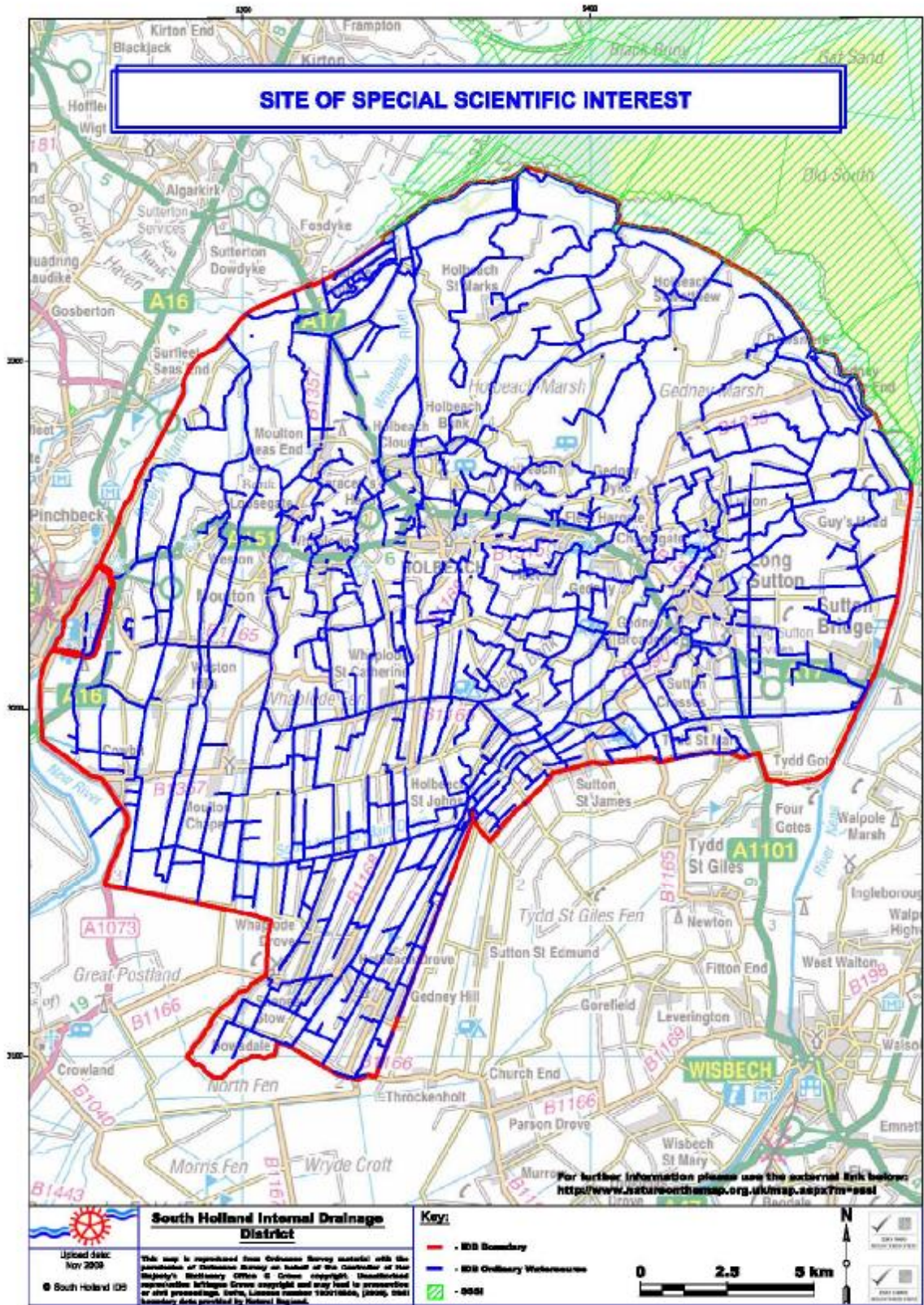
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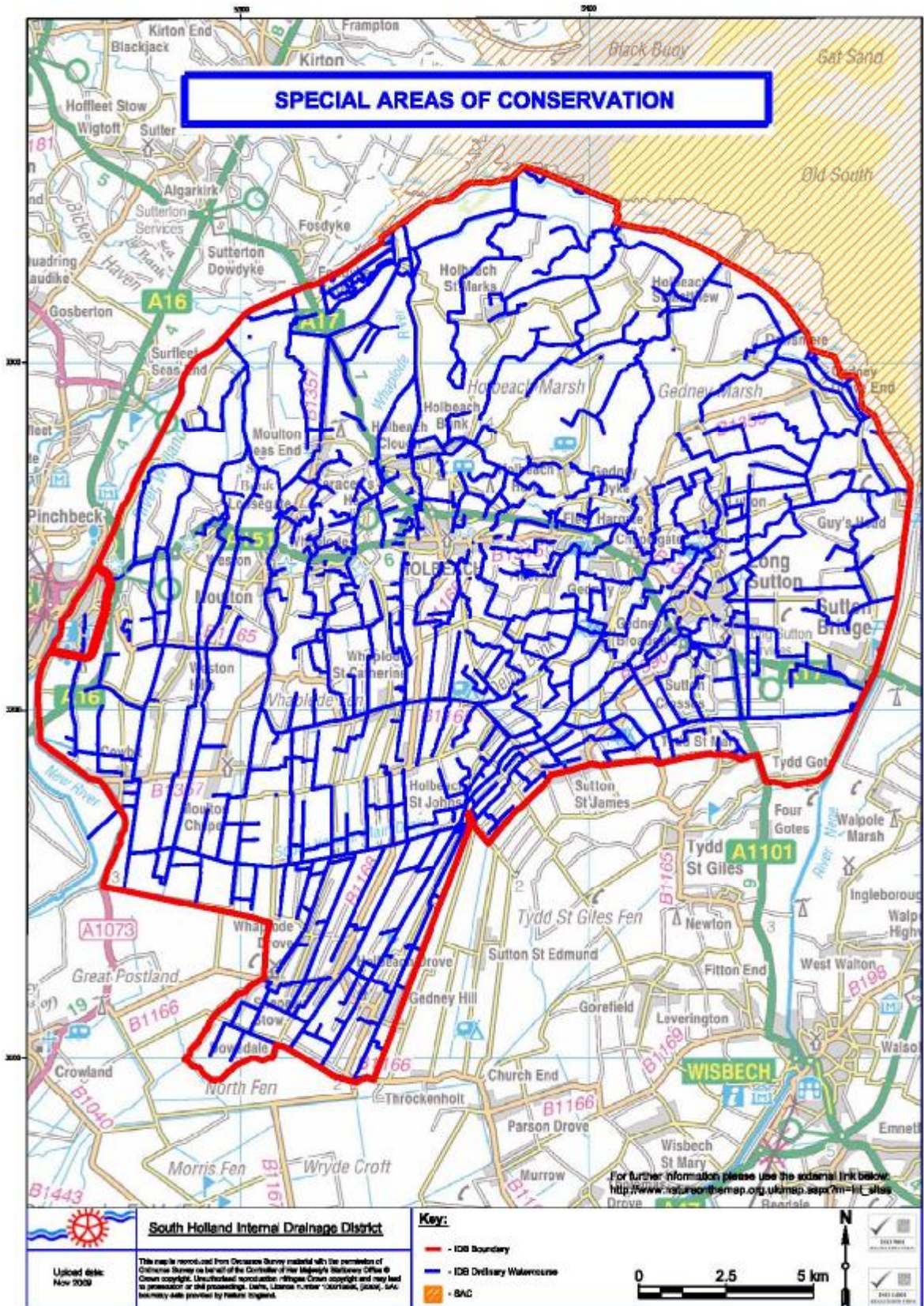
12 APPENDICES

12.1 Appendix I: Nationally, Internationally Designated Nature Conservation Sites

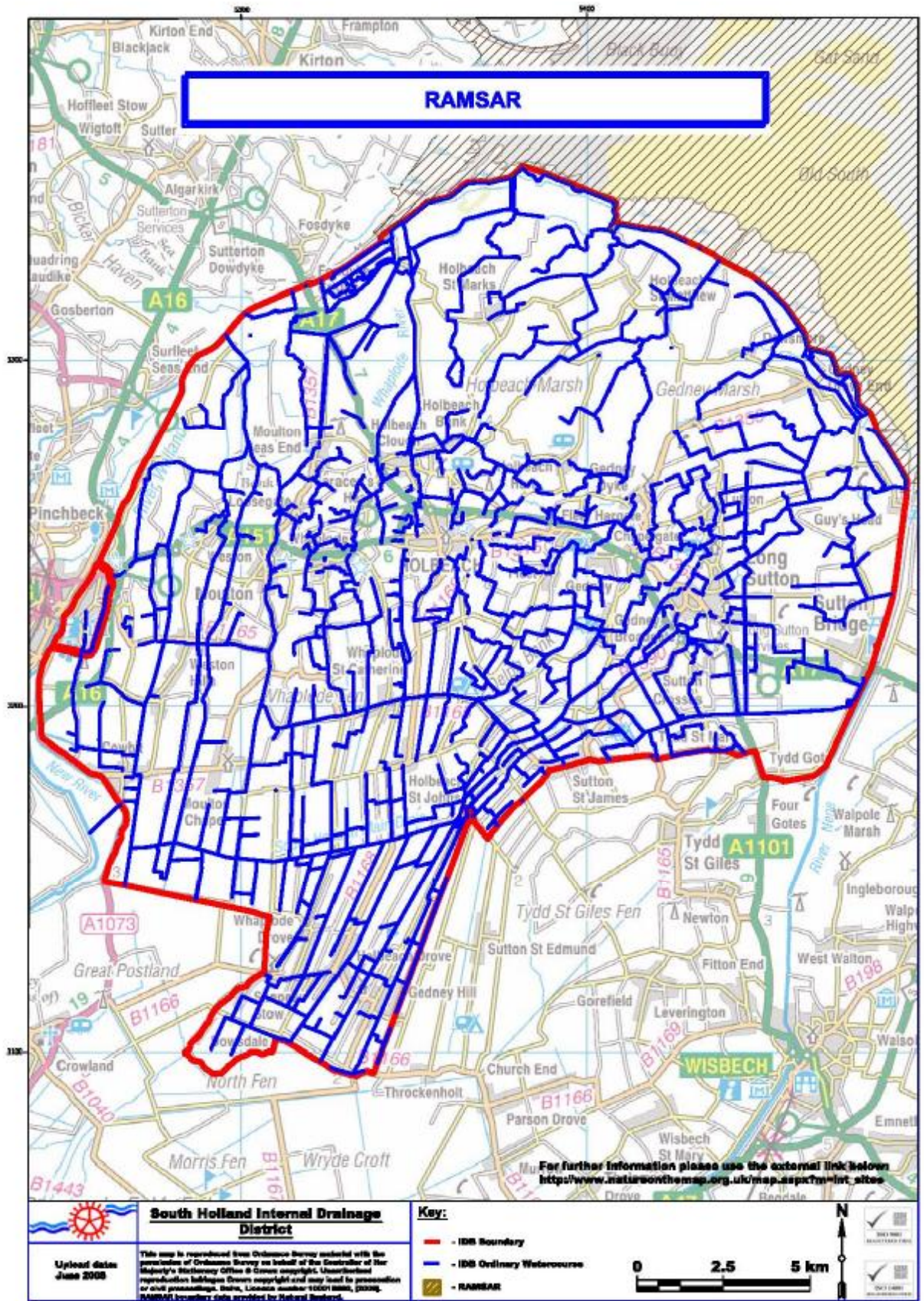
12.1.1 Map of Sites of Special Scientific Interest



12.1.2 Map of Special Areas of Conservation

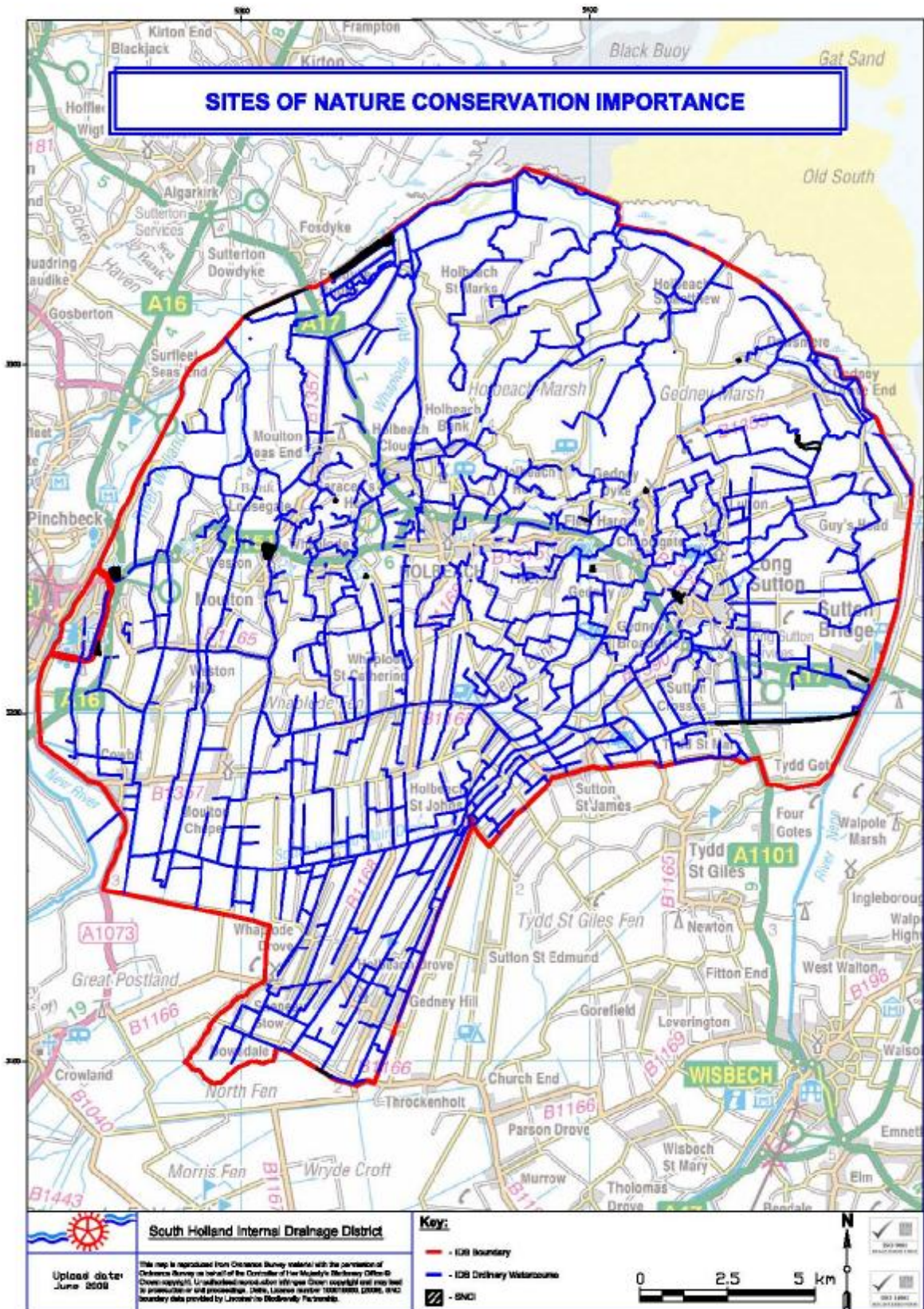


12.1.4 Map of RAMSAR sites



12.2 Appendix II: Non-statutory Local Sites

12.2.1 Map of Sites of Nature Conservation Importance



12.3 Appendix III: Acronyms Found Within the Document

AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
BARS	Biodiversity Action Reporting System
BCT	Bat Conservation Trust
BTCV	British Trust for Conservation Volunteers
BTO	British Trust for Ornithology
CLA	Country Landowners' and Business Association
EA	Environment Agency
EMP	Eel Management Plan
FWAG	Farming and Wildlife Advisory Group
GIS	Geographic Information System
Ha	Hectare
HAP	Habitat Action Plan
IDB	Internal Drainage Board
KLIDB	Kings Lynn Internal Drainage Board
LA	Local Authority
LBAP	Local Biodiversity Action Plan
LBP	Lincolnshire Biodiversity Partnership
LERC	Lincolnshire Environmental Records Centre
LNR	Local Nature Reserve
LNU	Lincolnshire Naturalists' Union
LWCS	Lincolnshire Wolds Countryside Service
LWS	Local Wildlife Site
LWT	Lincolnshire Wildlife Trust
NCA	National Character Areas
NE	Natural England
NERC	Natural Environment and Rural Communities
NFU	National Farmers' Union
NLC	North Lincolnshire Council
NNR	National Nature Reserve
RBD	River Basin District
RSPB	Royal Society for the Protection of Birds
SAC	Special Area for Conservation
SAP	Species Action Plan
SHIDB	South Holland Internal Drainage Board
SHDC	South Holland District Council
SMART	Specific, Measurable, Achievable, Relevant and Time limited
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TPO	Tree Preservation Order
WESG	Wash Estuary Strategy Group
WCP	Wildlife Conservation Partnership
WT	Woodland Trust