WITHAM FOURTH DISTRICT
INTERNAL DRAINAGE BOARD

Biodiversity Action Plan

Board Approved:	**15th** June 2022
Next Review:	1st April 2027
Reference:	Environment/BAP2022
Prepared by:	Mr. E. Johnson
Position:	Chief Engineer

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1. Statement

This Biodiversity Action Plan (BAP) has been prepared by the Witham Fourth District Internal Drainage Board in accordance with the commitment in the Implementation Plan of the DEFRA Internal Drainage Board Review of 2007 for internal drainage boards (IDBs) to produce their own Biodiversity Action Plans. It demonstrates the Board's commitment to fulfilling its duty as a public body to conserve and enhance biodiversity under various legislation and policy including, but not limited to, the Environment Act 2021 the Natural Environment and Rural Communities Act 2006, the Environment Agency's 25 Year Environment Plan and Water Framework Directive.

Importantly, it reflects the Board's aspiration to maximise the support it provides to biodiversity, particularly UK priority species and habitats, and the wider environment in general through its day-to-day activities, by setting clear objectives, actions and targets. Many routine maintenance activities have benefits for biodiversity and the wider ecosystem in our lowland agricultural operating area in the south Lincolnshire Fens; not least our Water Level Management Plan (WLMP) and routine flood defence works on drains and sewers. This BAP will help maximise biodiversity benefits from our activities, positive management regimes, and demonstrate our contribution to the Government's UK BAP targets.

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

……. Date …….

Name: Mr. Peter Richardson

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.

You can contact us about this Biodiversity Action Plan by writing to the following address:

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Further information on the Board activities is available on this website: www.w4idb.co.uk

2. Executive Summary

2.1 Introduction

Assisted by other agencies, parties and partners, the Board has conducted a biodiversity audit of the drainage district and identified those species and habitats that would benefit from particular management regimes or actions. Following the audit of the Board's environmental aspects the BAP was developed using information collected from a selection of the over 700km of drains and sewers that the Board maintains. It identifies objectives set out in a Procedural Plan for the continued conservation and enhancement of biodiversity within the drainage district and goes on to describe targets and appropriate actions and outcome measures that will deliver these objectives. The BAP will be an evolving document that will be reviewed and updated regularly, and it covers the entire Witham Fourth District Internal Drainage Board (IDB) drainage district.

2.2 Species & Habitats: An Overview

Species Action Plans and Habitat Action Plans identified by the audit will uphold the biodiversity of the drainage district now and in the future. Key localised factors such as geology, topography and hydrology determine the formation of habitats and dictate their survival in the landscape today, and those species that colonise different soil types and conditions. In particular, it is hoped that implementing the BAP will contribute to the achievement of the Lincolnshire BAP (LBAP) and national targets for UK BAP priority species and habitats. Species and habitats not listed in the UK BAP that are locally significant have also been considered in the Board's BAP.

2.3 Routine & Capital Works: An Overview

An important element of the BAP is to examine the methodology of routine maintenance or capital works and to consider if there are any practical and economical alternatives to take into consideration if appropriate measures and Standard Operating Procedures are in place. Without proper environmental consideration for actions within the Board's jurisdiction and statutory powers, this may have serious consequences affecting ecology and habitat, and potentially, the wider environs beyond its boundary. However, this scenario is unlikely, given that the existing management techniques have been in place for many years without incident or criticism.

2.4 Preparing for the future: How the BAP Process Contributes

Inevitably, continued commercial development in the drainage district has consequences affecting land drainage, the immediate environment and possibly wider landscape and ecology. The Board's Engineering office already builds in a 20% increase in design capacity for any schemes and has done so for a number of years. Determining the detrimental affects of any potential development concerning surface and treated water discharge or culvert consent is done by conducting or recommending a full ecology survey and/or an Environmental Impact Assessment. This is crucial to minimise any potential impact by developments or during routine maintenance or heavy engineering schemes undertaken by the Board. In order to maintain a natural balance during its works, particularly as most is seasonally dependant, the work is approached with a Best Practicable Option. However,

wildlife has a seasonal cycle too and all measures are taken to ensure that programmed works limit any impact.

2.5 Drainage Ditches

A drainage ditch might not immediately be seen as an important habitat, but remember that the Fenland drainage and main river network has been artificially created and does not emulate a natural watercourse or river environment. Their main function is for land drainage and flood defence and there must always be a balance of maintaining an efficient drainage network to protect people, property and businesses, with environmental considerations. Biodiversity has its place in Board maintained watercourses and every effort is made to ensure the landscape is managed sympathetically to accommodate and promote biodiversity where possible.

Since 2008, c10 km of Board managed drain and c400m of sewer have been designated as Local Wildlife Sites following ecological surveys. These account for 6.8% of the main drain network and reflect past and present positive environmental management undertaken by the Board. It is important to highlight that these watercourses were singled out for survey, whereas many other watercourses exhibit similar diverse habitats that are seen as locally important sites to the Board and public alike. Biodiversity is thriving across the Board's drainage district and the BAP can build on the positive diversity already established. These areas are shown in Appendix A

2.6 BAP Overview

- As a partner in the Lincolnshire BAP, the Board is well placed to comment on positive or negative environmental management regimes. Furthermore, it has an Environment Committee to oversee practice and policy, and feed into the wider Lincolnshire Association of Drainage Authorities Environment Committee.
- Strong relationships developed with our BAP partners and others have led to wider connections and sources of data to add to the BAP.
- Eight Sites of Nature Conservation Importance (SNCI) are within the district and the boundaries of three abut Board maintained sewers.
- Crucial to the BAP is the present Water Level Management Plan which is fit for purpose and requires no change.
- Board maintained artificial drainage networks form connecting corridors for wildlife and habitat, and provide an effective method of flood defence.
- Water quality in the Board's district has significantly improved in the past 20 years and trends shows this to be continuing with respect to reducing nutrient and pH levels with increased dissolved oxygen. This directly reflects the overall improving health of the Board's drainage network and wider catchment.
- It is anticipated that biomass in the Board's main drains has increased by at least 40% in recent years and fish stocks and the size of specimens are increasing each year.
- It is demonstrated how geology and topography directly influences the species and habitats within the drainage district.

- Important aspects of the historic environment are maintained by the Board.
- The Board was part of the syndicate of Lincolnshire IDBs that won the Lincolnshire Environmental Award 2009 for 'Operation Barn Owl'. Owl numbers have markedly increased in the past 25 years and there remains plenty of scope to build on this success.
- In 2020 the Board introduced the use of the ESRI Arc GiS Collector tool, this allows all operatives to log sightings of target species and invasives in the filed through their mobile devices.

With very few exceptions, target species and habitats already occur, so targets and Procedural Action Plan objectives recommend the Board continue to operate as it does now. While the BAP is meant to highlight any weaknesses and gaps on which to improve, there is little to comment on in detail. The Board recognises that there is always room for improving biodiversity and make every effort to ensure it meets its targets. The overall conclusion is that current environmental management regimes are maintaining and enhancing diversity, and largely being implemented by skilful and experienced operatives and staff with pride in the drainage district. Furthermore, the Board's ratepayers contribute a significant addition to this BAP being in Entry and Higher Level countryside schemes, with many proactive in the "Linking the Environment and Farming" initiative. The area today is therefore as healthy and diverse than it has ever been since land drainage. Perhaps the overwhelming success of the BAP is that for the first time in the Board's history, a near complete picture of the diversity and positive environmental initiatives and regimes the Board has in the drainage district. Hopefully it will enlighten others and encourage other partners and stakeholders to join the work of the Board.

3. Introduction

3.1 What is Biodiversity and why is it important

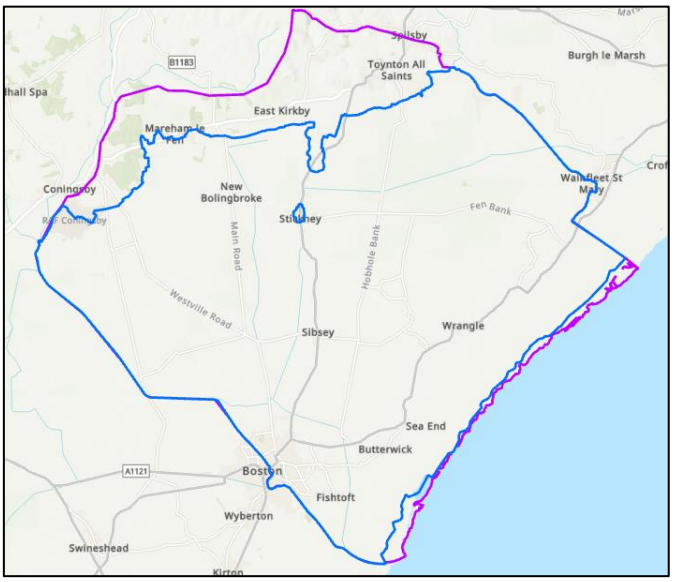
Biodiversity can be defined simply as “the variety of life” and encompasses the whole spectrum of living organisms, including plants, birds, mammals and insects. It includes both common and rare species, as well as the genetic diversity within and between species. Biodiversity also refers to the habitats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

Biodiversity is part of our natural capital, a vital resource providing:

- Supply of ecosystem services including water, water quality, nutrients, climate change mitigation, flood mitigation, carbon storage and pollination;
- Life resources including food, medicine, energy and raw materials;
- Improved health and well-being;
- Landscape and cultural distinctiveness, and wildlife corridors through arable dominated farmland
- Direct economic benefits from biodiversity resources and ‘added value’ through local economic activity and tourism;
- Educational, recreational and amenity resources;
- Preserving aspects of the historic environment and archaeology;
- Participating in, managing and maintaining a large area of Fenland landscape and habitat;
- Watercourses and those which are maintained by the Board are an effective method of flood defence for Boston Borough Council and East Lindsey District Council

This Biodiversity Action Plan is part of a much larger biodiversity framework that encompasses international, national and local levels of legislation and policy and which also include ecosystem services and climate change.

The following plan details the Board’s district in blue and extended area in purple.



3.2 Legislative Background

When carrying out its functions, the Board must pay particular regard to the effect on the environment. Some environmental legislation relates specifically to maintaining or restoring the condition of protected sites or protecting certain species, but there are also statutory duties for the Board to conserve and enhance biodiversity in and alongside the watercourses they manage and the wider landscape.

The Natural Environment and Rural Communities Act 2006 places a duty on the Board to conserve biodiversity. The Environment Act 2021 extends this duty on the Board to also enhance biodiversity and report periodically on its actions. Therefore, as a public authority, the Board must consider what action it can take, consistently with the proper exercise of its functions, to further the conservation and enhancement of biodiversity in England.

Below is a list of key environmental legislation (by no means an exhaustive list) relevant to the work of the Board:

- The Environment Act 2021
- Conservation of Habitats and Species Regulations 2017
- Eels (England and Wales) Regulations 2009
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- Natural Environment and Rural Communities Act 2006 (Section 40)
- The Environmental Impact Assessment (Land Drainage Improvement Works) (Amendment) Regulations 2017
- Land Drainage Act 1994
- Wildlife and Countryside Act 1981 (as amended)
- The Countryside and Rights of Way Act 2000
- The Protection of Badgers Act 1992
- Flood and Water Management Act 2010
- Salmon and Freshwater Fisheries Act 1975

3.3 Policy and Strategic Background

In 1992 at the United Nations Conference on the Environment and Development, commonly known as the Rio Earth Summit, the UK signed the Convention on Biological Diversity which pledged its commitment to contribute towards halting the worldwide loss of habitats and species and their genetic resources. At the 2010 biodiversity summit in Nagoya, Japan, the UK re-affirmed this commitment and the "Biodiversity 2020" white paper was developed setting out how those commitments would be put into action.

The 2010 report by Sir John Lawton "Making Space for Nature" set out that ecological networks were required in order to halt and reverse the declines seen in many threatened species and habitats. The report succinctly made clear that these ecological networks needed to be bigger, more frequent, better in quality, and more joined up in order to be successful in their ambitions.

The concept of Nature Recovery Networks featured in the Government's Biodiversity 2020 strategy (2011) and 25 Year Environment Plan (2018). The Environment Act 2021 and the development of Local Nature Recovery Strategies (LNRS) expands this concept by also taking into account the value of the ecological services provided by non-priority species and habitats such as the carbon sequestration of wetlands, the flood alleviation of tree-planting in the uplands and the wellbeing benefits brought about by green space. As such, this BAP presents the actions planned by the Board to support both priority and non-priority species.

International reports such as by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) have found that climate change in particular is considered to be one of the biggest threats to our biodiversity now, and in the future. Supporting the continuity, connectivity and quality of habitat through management, restoration and expansion may help even the less mobile species to adapt more easily to climate change. This BAP presents the actions the Board can take to support climate resilience for biodiversity.

3.4 Purpose

This BAP has been produced to demonstrate how the IDB fulfils its legal obligations to conserve and enhance biodiversity and sets out targets and actions that contribute to local, national and international strategies and policies.

While the IDB has a statutory duty to have regard for the environment whilst carrying out their functions, for example on or within drainage assets such as watercourses and their banks, the IDB has also to give consideration to how they can contribute to the enhancement of the wider environment.

It is not within the scope of this document to set out the IDBs' objectives and actions in relation to wider environmental topics, such as reducing carbon emissions or reducing waste. However, strategies to address such topics may be mentioned in connection to the enhancement of habitats and species, such as peatland restoration and carbon sequestration.

The opportunity to work together to support and enhance biodiversity in partnership with other organisations is sought wherever possible, as the IDB recognises the additional value working in such ways can bring to the overall objectives.

The intention is that biodiversity is fully integrated into the Board's activities, policies and procedures such as annual maintenance programmes, capital works projects, training and communications.

3.5 Vision

The IDB's vision is for a drainage district where thriving wildlife is an integral part of delivering efficient and effective water-level management

3.6 Aims

The aims of this BAP are:

- To ensure that habitat and species targets from the UK BAP and the 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 continue to develop and maintain effective local partnerships to ensure that programs for biodiversity conservation are maintained in the short and long term;
- To raise awareness nationally and locally within the IDB district of the need for biodiversity conservation, and where applicable, to provide guidance and encouragement 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 Board's operations;
- Monitor and report on progress in biodiversity conservation;
- Input data, and monitoring and recording progress to the Biodiversity Action Reporting System;
- Contribute biodiversity records to the National Biodiversity Network;
- Contribute to the ADA Vision that IDBs have an essential role with local partnerships and local authorities in preparation for the Flood and Water Management Bill and Water Framework Directive;
- Extol the virtues of biodiversity in the IDB district;
- Compliment and contribute to the LBAP and BAPs produced by neighbouring Black Sluice and Lindsey Marsh IDBs; and
- Demonstrate that local government administrative and designated wildlife site boundaries do not impede biodiversity across the wider environs of the drainage district

4. The BAP Process

4.1 The Biodiversity Audit

Witham Fourth District IDB has conducted a biodiversity audit of its drainage district and identified those habitats and species that would benefit from particular management or actions by the IDB. The first audit was carried out in the period 2005-10, a desktop update has been completed as part of this review and survey work is ongoing to periodically update records.

This BAP focuses on nationally important priority habitats and species, that is to say those that have been deemed of 'principal importance' in England under the NERC Act 2006. However, those that are not national priority species or habitats, but may be locally significant (ie included within the LBAP) have also been considered. Invasive non-native species have also been included.

The information gathered, which is presented in later sections, has been used to develop the Board's Biodiversity Action Plan.

4.2 Objectives, Targets and Actions

For each habitat and species, objectives have been identified. The action plan then details individual actions required to achieve the objectives, and associated monitoring and reporting of progress and impact. The objectives express the Board's broad aims for benefiting a particular habitat or species. The related targets have been set to focus programmes of action and to identify outcomes that can be monitored to measure achievement. For each target an indicator has been set, which is 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 deemed to be achievable and are considered to be proportionate and practicable given the resources available.

Procedural targets and actions have also been considered allowing the Board to measure the way in which it considers and incorporates biodiversity across the whole range of its operations, and any special projects. These may involve changes to administrative, management and operating procedures, but these should not be radical.

4.3 Implementation, Monitoring and Reporting

The Habitat Action Plans (HAPs) and Species Action Plans (SAPs) set out how the IDB intends to implement and deliver actions in these plans and detail any partnership with other interested parties, organisations, land owners, tenants, and/or individuals.

Monitoring is the on-going process of regularly collecting and analysing relevant information to make sure the actions within the Plan are positively contributing towards the targets and to capture any additional benefit achieved. The Plan sets out how and when this monitoring will take place, for example, to regularly review the progress of actions against the plan at Board meetings throughout the life of the plan.

The frequency and type of information reported is also defined by the Plan and includes the publication of progress reports in the public domain via the IDB's website and in accordance with the duty set out in the Environment (Bill) Act 2020.

The overall plan will be updated at least every 5 years but as this is a dynamic document it may change more frequently. For example, in the light of routine monitoring, changes may be necessary to ensure an objective can be met.

5. The Biodiversity Audit

5.1 The Witham Fourth Internal Drainage District

Centred on TF 34/52, the drainage district is sub-divided into 4 Districts, which are located immediately north of the lower reaches of the River Witham. It covers an area of 40,928 hectares or 409.28km² and contains 708km of Board maintained watercourses. These can be divided into 146.57km of arterial main drain and 529km of open sewer (small ditches), and 32km of piped sewer in predominantly urban areas. This equates to 283 hectares or 700 acres of mixed calcareous grass, rough grassland and herbs.

The area is shared between two Local Government Authorities, Boston Borough Council in the south and East Lindsey District Council to the north. Predominantly rural, the area is 90% Grade I and II high quality arable agricultural land with only *c*.4% of urban area, principally the town of Boston and regularly interspersed villages, notably along the nominally higher silt land known as the 'Tofts' or 'Townlands' that run parallel with The Wash coast straddling the A52.

Inland settlements in Wildmore, West and East Fens, are generally small, widely scattered and relatively recent, having been created since effective large scale land drainage in the early 19th century. Peripheral to the Board's area are four other IDBs: Black Sluice immediately south of the River Witham; the Witham First and Third in the west, and Lindsey Marsh to the north-east.

In essence, the district is a lowland basin or embayment at or just above sea level, encapsulated by the higher skirtland of The Wolds to the north and north-west, and the River Steeping to the north-east. The western boundary is demarcated by the River Bain immediately south of Tattershall to Dogdyke, then southwards along the canalised freshwater and part tidal River Witham to Britain's largest estuary, The Wash to the east.

The basin is bisected by Environment Agency maintained 'highland carrier' artificial navigations of the Stonebridge and Maud Foster Drains fed by the adjoining East and West Fen Catchwater Drains designed to take run-off from The Wolds.

The following outlines the key details of the District:

- Total area of the drainage district: 40,928ha
- Area of grade 1, 2 and 3 agricultural land: 40,928ha
- Area of urban land: 1,637ha

Assets for which the Board has operational responsibility:

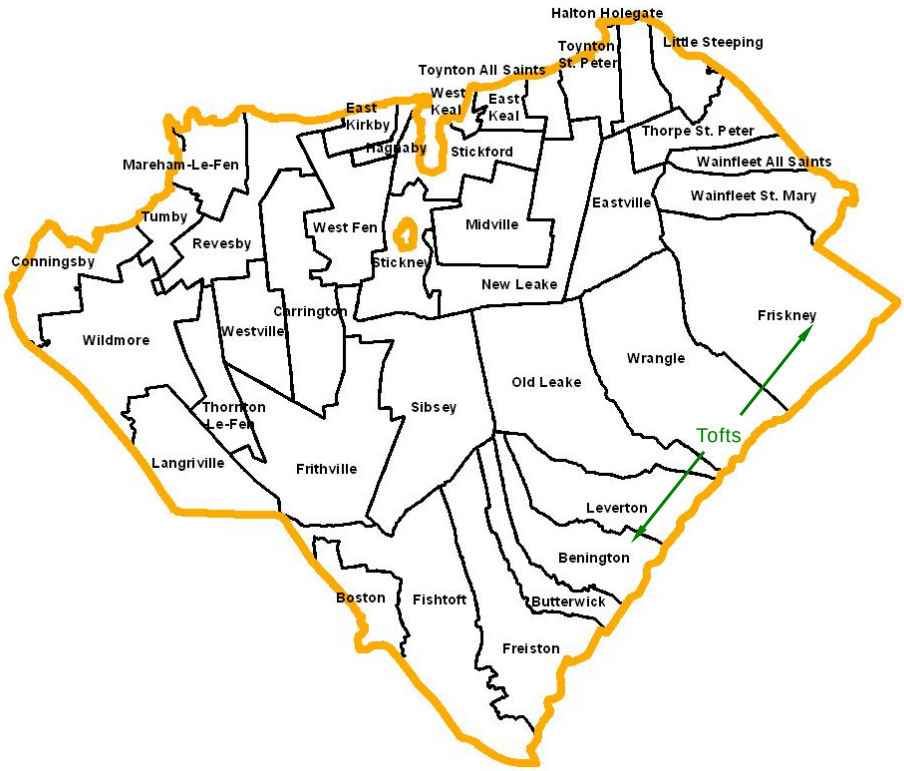
- Water level control structures: 30.No
- Watercourses (maintained): 708km
- Raised embankments: 0m
- Reservoirs: 0.No
- Sustainable drainage systems (SuDS): 0.No
- Pumping Stations: 9.No
- Culverts: c.2550.No

5.2 Map of the Audit Area

The area covered by the drainage district of the Board is shown below in Figure 1. Witham Fourth District IDB is contained within the red square and the map also shows other IDBs in Lincolnshire. Figure 2 below shows the drainage district in a larger scale and the parishes within it (listed overleaf).

Figure 1.

Figure 2.



The following table details the parishes wholly or partly within the Board's District

District 1 (Wildmore Fen)	District 2 (West Fen)	District 3 (East Fen)	District 4 (Court of Sewers)
Coningsby	Carrington	East Keal	Benington
Frithville	East Kirkby	Eastville	Butterwick
Langville	Frithville	Friskney	Freiston
Mareham le Fen	Hagnaby	Halton Holegate	Fishtoft
Revesby	Revesby	Little Steeping	Friskney
Thornton le Fen	Sibsey	Midville	Leverton
Tumby	Stickford	New Leake	Old Leake
Wildmore	Stickney	Sibsey	Wrangle
	Thornton le Fen	Stickford	* Tofts = higher silt berm

5.3 Soil and Surface Geology

Soil geology of the area is Jurassic Kimmeridge Clay partially capped by Later Quaternary (1.8 million years BC to 8,000 BC) deposits of glacially derived River Bain Sands and Terrace Gravels that form higher spurs and 'islands' and the north western skirtland. These sands and gravels provided a valuable mineral resource, large scale exploitation of which occurred by the construction of the numerous World War Two airfields in the vicinity, including Coningsby, Woodhall Spa and East Kirkby.

The drainage district basin is filled with a series of laminated Late Holocene (end of the last Ice Age, *c*.12,500 BC to present day) drift deposits of peat, later alluvium and silt. These deposits vary greatly in depth and consistency across the basin, as do their levels of truncation and desiccation since land drainage began.

Surface deposits are complicated by a dendritic pattern of Late Holocene former ancient tidal river channels known as roddons, generally formed of laminated denser fine silt. As a result of shrinkage of the surrounding peat since drainage began, their relict courses meander and permeate the basin causing subtle, yet significant, changes in localised microtopography.

Where roddons are cut by modern drains, the laminated silts are sometimes susceptible to geotetechnical failure cause by bed shear, especially where roads are positioned on drain banks whereby vibration from passing heavy vehicles causes soil particles to separate at the waterline.

Some roddons are many metres deep and stand a metre or more proud of the modern landscape, whereby these higher silt levees appear like huge trees when seen on aerial photographs or Light Detection and Ranging (LiDAR) images.

Several large roddons still form permanent boundaries in the Fen, notably some existing roads in the south-east around Fishtoft and Freiston, with others forming long established parish boundaries. Maps which show these features are given in Appendix B.

There are no Local Geological Sites (LGS) in the district.

5.4 Landscape Character

Natural England (NE) has divided the whole of England into a number of National Character Areas (NCA) based on characteristic landforms, wildlife and land use. For each NCA, there is a prepared profile that characterises the wildlife and natural features, identifies the influences that act upon those features, and sets objectives for nature conservation.

The drainage district falls entirely within the Fens NCA (No. 46) of which the following are key characteristics as defined by NE of the wider fens and the district:

- 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 (former silt levees of extinct tidal creeks) create local enclosure and elevation. Banks provide good grazing and grassland habitats.
- Modestly elevated 'islands' provide isolated higher ground for most settlement. A higher proportion of grassland, tree cover and hedgerows are associated with these.

- Settled Fens or 'Townlands', in an 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.
- Peat 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.
- Lincolnshire Wolds to the north providing a marked 'Upland' horizon.
- Woodland cover is sparse. Occasional avenues to roads, elsewhere isolated field trees have marked significance. Shelter belts including poplar, willow and Leylandii conifer hedges around farmsteads. Numerous orchards in Wisbech area.
- Fragments of relic wet fen areas at Wicken, Woodwalton and Holme; all in Cambridgeshire.
- 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. Bronze Age, Iron Age and Roman landscapes emerging from below the falling peat. Very rich archaeology especially on fen margins.
- Marshes directly adjacent to the Wash exhibit an exceptionally open aspect, broken only by a series of sea walls. Associated with 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 planting and harvesting. Horticultural glasshouses and general agricultural clutter a significant feature.

Boston Borough Council and East Lindsey District Council have published LCA which refer to their local authority areas.

As with much of the Fenland below 5m above sea level, the area can broadly be subdivided into three distinct soil landscapes:

- an intertidal saltmarsh fringe along The Wash
- a broad seaward swathe of reclaimed saltmarsh consisting of silt/fine sand
- a landward inner peat/alluvial fen bordering the higher skirtland on the uplands.

This largely uninterrupted silt land and inner fen has few small conurbations, dispersed dwellings and isolated farms. Today, the largely agricultural landscape is dominated by a familiar 'grid-like' pattern of rectilinear coaxial drainage ditches, dykes or sewers, interlinked with larger drains predominantly aligned north-south or east-west. Water coming into the drainage system is pumped or gravity transferred via control structures into larger drains before being discharged at Hobhole into the Haven or tidal River Witham and finally, into The Wash. As a lowland landscape, the inner peat East Fen can boast as being one of the youngest reclaimed fenland areas in England, with a majority having been only successfully drained in the first quarter of the 19th century.

5.5 Landscape Designations

There are no National Parks or Areas of Outstanding Natural Beauty (AONB) in the district.

5.6 Sites and Monuments

A gazetteer of known archaeological sites in the district is available from the HER database held by Lincolnshire County Council Archaeology Office.

Nineteenth century enlargement and re-parcelling of the cultivated agricultural landscape led to drastic changes and remodelling of the fen landscape into the one seen at present. Moreover, to a certain extent, the existing field system along the higher silt land bordering The Wash can now be demonstrated to conform to a 13th/14th century layout, with some parts almost certainly even earlier.

These earlier field systems survive in part as characteristic narrow strip fields or dylings, integrated into a wider landscape of rectilinear or trapezoidal embankments (or more properly dikes or dykes) and sewers. Reminiscent of the Dutch 'polder' system, this early chain of embanking encloses singular compartments of *c*.1-1.5km square areas set at right angles to the contemporary coastline and interior fen.

This embanking is integrated into more substantial contemporary seaward and interior landward flood defence banks, which we can only assume to have released backed up water at low tide via sluices and slackers, for which there is no surviving evidence. This is exemplified at Butterwick and immediately to the north, where an unusually linear north-south aligned 13th/14th century embankment can be traced for *c*.9.5km, incorporating Double Bank (the District Boundary between Boston and East Lindsey), and terminating at Lade Bank.

Throughout the medieval period, this drainage and embanking system on the silt in District 4 was maintained by the Court of Sewers (very early precursor to IDBs) to which approximately 40-50% of which is still maintained by the Board today.

Unique to the reclaimed coastline in Lincolnshire, the early field system on the silt is typified by sewers that enclosed raised long and broad corrugated straight strip fields or 'dylings', and lesser strip fields and water carriages known as 'dylands'. Both these field systems are more commonly associated with the Tofts, where they are incorporated into a wider rectilinear scheme of permanent embankments at right angles to The Wash and inner peat, fluvial silt and alluvial fen.

Dylings demonstrating longer use in the landscape, often separate from the medieval ridge and furrow corrugations with broad headlands that can frequently be seen to form a subtle reversed 'S' shaped curve, epitomised in a few remnant survivors of these field systems, notably at Boston Long Hedges, Old Leake, Wrangle, Friskney and Wainfleet Bank.

5.7 Tree Preservation Orders

Tree Preservation Orders (TPO) are not directly related to Biodiversity matters since they are made on individual trees, groups or woods for landscape and visual amenity reasons. Information held by the Board and other sources has not therefore been collated. TPO are only relevant where they occur adjacent to the Board's watercourses and they would be referred to on a site by site basis as appropriate. TPO information is held by East Lindsey District Council and Boston Borough Council.

5.8 Statutory Nature Conservation Sites

5.8.1 Internationally Designated Sites

The following internationally-designated conservation site, relevant to the water level management and/or maintenance activities of the IDB, is found within or adjacent to the drainage district.

Site name	Designation	Associated WLMP	Features Relevant to IDB
The Wash	Ramsar Site, Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest, Shellfish Waters Directive, National Nature Reserve	Witham 4th IDB WLMP	Borders the district immediately east of the primary sea bank. All water pumped or sluiced by the IDB enters the estuary so maintaining water quality is crucial in order to avoid an adverse effect. IDB managed and riparian watercourses harbour native and migratory birds that roost, breed and/or feed here and at the Freiston Shore RSPB Nature Reserve, so the IDB area provides a vital extension to this important site. Potential for future managed realignment schemes increasing habitat on the outmarsh. IDB outfalls need to remain open and unobstructed. Environment Agency to ensure primary sea defence integrity remains intact to avoid flooding. Maintain natural processes relating to land-locked saline lagoons that abut The Wash.

5.8.2 Nationally Designated Sites

There are no nationally-designated nature conservation sites within the drainage district.

5.8.3 Local Nature Reserves

The following Local Nature Reserves are relevant to the activities of the Board are found within the drainage district.

Site name	Associated WLMP	Features Relevant to IDB
Havenside Country Park LNR TF340427-TF361399 (also a Local Wildlife Site)	N/A	Neutral grassland predominantly along primary sea bank that forms a significant part of the south eastern IDB boundary.

5.8.4 Non-Statutory Conservation Sites

A number of sites have been identified locally as being important for wildlife. Whilst these designations are not statutory, the sites are important for their contribution to biodiversity, and planning policy requires that they are given consideration by the LPA in forming any decision. The following relevant Local Wildlife Sites (LWS) and Sites of Nature Conservation Importance (SNCI; a precursor to LWS) are within or bordering the district. See appendix A for plans of these sites.

Site name	Designation	Features Relevant to IDB
Friskney Decoy TF464562	Lincolnshire Wildlife Trust Nature Reserve & SNCI	An abandoned old duck decoy with open water, woodland, grassland, tall herbs and scrub. Water levels vary seasonally. An IDB maintained watercourse is along the southern boundary, so this site acts as an important habitat and refuge adjacent to the wildlife corridor of the drain.. IDB managed sewers along northern & western boundaries. LWT managed.
Boston Cemetery TF326455	LWS	Neutral grassland and mixed deciduous woodland
Cowbridge Lagoon TF330470	LWS	Static freshwater drain with neutral grassland and dense scrub on the drain batters.
Doves' Lane sewer near Butterwick TF385443-TF386440	LWS	Site for marsh-mallow (*Althaea officinalis*), a species of Local Conservation Concern & a nationally rare plant. IDB managed watercourse.
Frith Bank Drain TF300474-TF326471	LWS	Neutral grassland. South side only in the district. IDB managed.
Hobhole Drain Bank (lower) TF367415- TF364405	LWS	Neutral and calcareous grassland, and dense scrub of drain batters.IDB managed.
Hobhole Drain Bank (lower) Bakers Bridge to Benington Bridge TF365400-TF364459	LWS	Neutral and calcareous grassland, and dense scrub of drain batters.IDB managed.
Maud Foster Drain TF328471-TF331449	LWS	Neutral grassland. Environment Agency managed.
Upper Hobhole Drain headwater TF53913- 36122	LWS	Standing water, reed swamp/marsh/fen, dense scrub and scattered hedgerow trees. Headwater with little or no maintenance. IDB managed.
Witham Way Country Park TF317454	LWS	Neutral grassland.
Witham Way: Anton's Gowt to Boston TF330474-TF320450	LWS	Neutral grassland. Managed & maintained for drainage, amenity & recreation purposes.
Wrangle Brick Pits TF434523	LWS	Standing water and habitat mosaics. Created by owner for nature conservation purposes. The grassland and pits are managed by private landowner

		for wildlife; recreational use is limited. IDB sewer forms western boundary.
Eastern outfall of the Good Dike at Wainfleet St. Mary: Medieval engineered course of River Steeping away from East Fen. TF46555912-48125920	SNCI	Neutral and calcareous grassland, and dense scrub of drain batters. Extensive grazed pasture to the south in the vicinity of Wainfleet deserted medieval village. IDB managed.
Medlam & Newham Drain headwaters. TF30606031-30666018 & TF28725931-28585896	IDB sites	Standing open water, reed swamp/marsh/fen, dense scrub and scattered hedgerow trees. Headwaters with little or no maintenance. IDB managed.
Yellow Rattle Meadow TF3400858304	SNCI	Meadow, managed by private landowner. IDB managed sewer is northern boundary.
Stickney Meadow & Railway Cutting TF3419957698	SNCI	Meadow.
Stickney Fields Complex TF3469957399	SNCI	Meadows. Managed by private landowner. IDB managed sewer is northern boundary.
Stickney Picnic Site TF3470257702	SNCI	Meadow. Managed by private landowner.
Middle Holt TF2650158137	SNCI	Mixed deciduous woodland. Managed by private landowner.
Little Birk Wood TF2669758907	SNCI	Mixed deciduous woodland and standing water. Managed by private landowner.
Far Holt TF2687557777	SNCI	Mixed deciduous woodland. Managed by private landowner.
Hagnaby Lock TF340595	Local site.	Seasonally waterlogged grassland.. Environment Agency managed.

In 2008, Boston Borough Council commissioned consultants to undertake an ecological survey of its district; with East Lindsey District Council undertaking a similar survey the same year. These surveys revealed a number of locally important ecological sites on several Board main drains, notably the Upper & Lower Hobhole, southern bank of Frith Bank, Cowbridge Drains, and a Board maintained open sewer, and these were subsequently designated as Local Wildlife Sites. These can be seen in Appendix A

In summary, the surveys noted high quality diversity of mixed calcareous grass, rough grassland and herbs with scattered to dense scrub along the bank batters, while the aquatic habitat was relatively poor in comparison, and this seems to be a reasonable trade-off for flood defence purposes.

The headwater habitat of the Upper Hobhole Drain consists of good swamp habitat with grass snake, common toad and a large population of reed warblers. The Board has been encouraged by the Local Authorities and the Lincolnshire Wildlife Trust to continue to positively manage Board maintained

watercourses in the same manner as currently practised to ensure the continuation of this biodiversity.

The open sewer near Butterwick is notable for the presence of the scarce marsh mallow (Althaea officinalis) along a 400m stretch. Two more sites for this species have been found, at Benington Sea End (TF418/467) and Leverton Highgate (TF418/498).

5.9 Habitat Audit Summary

The habitat audit summary lists the UK priority habitats that occur within the drainage district and are identified as likely to be influenced by the Board's activities. Also listed are habitats deemed to be of local importance and/or featured in local nature strategies that occur in the drainage district.

Finally, brief notes are included on the potential for the Board to maintain, restore or expand its important habitats. Information on habitats of relevance occurring within the drainage district was obtained from the following sources:

- Ecological surveys of the drainage district undertaken by the Board partners and consultants
- Protected species surveys of the drainage district undertaken by the Board, partners and consultants
- Lincolnshire Wildlife Trust
- Lincolnshire Environmental Records Centre
- Lincolnshire Naturalists Union
- Board members, operatives and members of the public reporting to the Environment Officer
- Published and unpublished archive on the IDB area and those wider Fenland and UK environs

The habitat audit summary below lists the broad habitat types and UK BAP priority habitats that occur within the Board's district, as identified by the information gathering exercise. Also listed are habitats deemed to be of local importance and/or featured in the LBAP that occur in the Board's district.

Habitats that are of potential importance for the Board, where water level management or other Board activities may be of benefit, are identified. Finally, brief notes are included on the potential for the Board to maintain, restore or expand its important habitats.

Ten habitats were identified: berms, lowland calcareous grassland, neutral grassland, hedges, reedbeds, saline lagoons, static freshwater drains (standing open water), swamp/marsh/fen, ponds, and native mixed broad-leaved and wet woodland.

National Priority Habitat	National Status & Extent	Local Priority Habitat	Local Status and Extent	Habitat of Importance for IDB	Extent, status and Location of Habitat of Importance within drainage district	IDB Potential for Maintaining, Restoring or Expanding Habitat (high/medium/low)
Ditches & drains (standing open water)	Common and widespread	Rivers, canals & drains	c700km of Board managed watercourse in the district	IDB main drains & IDB & riparian watercourses	Throughout the district	Maintain & improve watercourses as necessary. Habitat restoration by appropriate bank management & mudding as required
Lowland calcareous grassland	Largely restricted to localities with chalk and limestone geology	Calcareous grassland	Of limited and local occurrence	Calcareous grassland of drain banks	Restricted to the banks of the larger drains	Habitat maintenance and restoration by appropriate bank management
Neutral grassland	Common and widespread	Neutral grassland	Common and widespread	Neutral grassland of drain banks	Throughout the district	Habitat maintenance and restoration by appropriate bank management
Hedges, lowland mixed deciduous woodland	Common and widespread	Hedges, lowland mixed deciduous woodland	Deciduous woodland and hedges scattered only; wet woodland rare	Wet woodland	Wet woodland on main drain headwaters, notably Hobhole & Newham Drain. Mixed deciduous woodland	Maintain condition and manage as required. Allow to expand as required where feasible

and wet woodland		and wet woodland			typically along sections of one drain bank	
Ponds	Common and widespread	Ponds, lakes & reservoirs	Widespread across IDB district	Ponds	Widespread across IDB area (246 counted in audit)	Private landowners in conjunction with IDB and other bodies
Fen, swamp & reed bed	Local and limited; some very large reedbeds	Fen, swamp & reed bed	Swamp and reedbed widespread across IDB district as marginal vegetation to larger drains; fens rare	Fen, swamp & reed bed	IDB main drains, & IDB & riparian watercourses	Maintain condition. Modify watercourses as required and create additional low level berms where feasible
Saline lagoons	Rare	Saline lagoons	Wrangle	Saline lagoons	District 4 fronting The Wash, set inland from the primary sea bank	Maintain condition. IDB and to EA monitor
Berms	Present on larger watercourses throughout the UK	Fen, swamp & reed bed	Present on some of the larger rivers and other watercourses throughout Lincolnshire	Fen, swamp & reed bed where berm is wet; neutral grassland where dry	Present on some of the larger drains throughout the district	Habitat maintenance and restoration by appropriate bank management. Incorporate berms into the watercourse banks when drainage channels are being redesigned.

The following section provides more information on the status and location of some of the above habitats within the drainage district that are of importance to the IDB and may benefit from water level management or other activities.

5.9.1 Mixed Deciduous Woodland and Wet Woodland

Mixed deciduous and non-deciduous woodland is predominantly confined to the more acidic free draining gravel and sand terraces of the fen skirtland to the north-west around Coningsby. Occasional conifers do occur in small, isolated copses or spinneys, especially in recent times, as they provide all year round cover for game, having been planted by gamekeepers.

Many isolated copses are interspersed across the area, often triangular in shape and tucked into field corners. Cartographic studies clearly demonstrate that many appear after the early nineteenth century Enclosure Acts shortly after draining the East and West Fens. Perhaps they developed naturally as cordoned off wetter spots in the freshly drained fields and left to their own devices to grow or they are a deliberate plantation.

Nowadays, each drain or sewer re-profiling scheme has a specific Environmental Impact Assessment (EIA) and all aspects of such works are considered very carefully prior to commencement. In this predominantly mechanised world, where possible the Board tries to alternate which side a sewer or drain is cleaned out, whereas for the larger drains, it tends to be from one designated side only.

Along some sections of bank and drain where undergrowth, bushes and trees do not inhibit the drainage, this has been allowed to grow with minimal management. Nowhere more apparent is this process exemplified than along the Hobhole Drain, of which part of the southern end is designated a LWS, and is also an important roosting site for long-eared owls.

Since a management agreement with the Board and LWT in 1988, the Trust has managed a 5ha section of the western bank. Here, through careful woodland management in the form of pollarding and coppicing, the regenerative qualities of such management are evident. Hawthorn, ash and to a lesser extent, elder predominate in the woodland along this drain, becoming denser at the southern end. Outside the bird breeding season, local volunteers of the LWT have a rolling long term programme, including pollarding and coppicing between Nunns Bridge and Hobhole Pumping Station.

Although traditional methods are adopted for the production of faggots, routine woodland management requires the occasional use of hydraulic jaws attached to a 360º machine capable of cutting through 300mm thick timber, and for more general use, chainsaws, flails, loppers, reapers and billhooks. The ultimate choice of equipment to be used is carefully decided by the Board's operatives to suit the task. The two District Foremen, Works Manager and Chief Engineer who know the area well and understand the sensitivities of woodland management collaborate ahead of such schemes with senior management.

Every effort and consideration is taken into account to keep to the bare minimum any adverse environmental impact. Before commencement of works, all sites are inspected by a qualified ecologist, evaluated, deliberated and consulted with the relevant authorities/partners and as required, adjacent landowners. Such works are programmed over winter when trees are dormant.

A Woodland Management Policy has been prepared by the Board and is available on request. The Board does not undertake work on any trees during the bird nesting season unless for extreme urgent reasons such as damage or obstructions.

As a consequence of 19th century drainage, the resulting upcast from the excavated drains formed embankments. Over time, these became naturally colonised by varied vegetation, including bushes and trees.

Inevitably, management is needed to control their growth, particularly in respect to inhibiting the drainage function of the banks, and restricting access for routine maintenance such as dredging or checking slackers, sluices, culverts and keeping outfalls clear at all times. Until relatively recently, such maintenance work was undertaken by hand, comprising quite a manual ordeal. Where possible the Board off-set this work with tree planting projects elsewhere in the District.

5.9.2 Hedges

The Board uses hawthorn as a renewable resource for making faggot bundles. This is routinely gathered over winter mechanically and by coppicing straight side branches, which are then bound with twine and used to stem subsidence, stabilise banks to prevent slippage, and deter fretting or wave erosion that undercuts banks at the waterline.

While hedgerow planting is undesirable along Board maintained sewers for access and maintenance purposes, the Board manage in rotation considerable lengths alongside riparian watercourses with owners pleased to have their hedges managed every few years at no cost, therefore the Board manage a considerable proportion of the riparian drainage district's hedgerows, so enhancing the area's hedgerow biodiversity. The Board has strict By-law distances on hedge/shrub planting along Board maintained watercourses and culverts.

The following pictures detail faggots used to stabilise a drain bank and habitat mosaic on Mill Drain, with standing open water, grassland and woodland.

5.9.3 Habitat Overview

The woodland and hedges, when pieced together with the other important Board habitats of standing open water, different grasslands, ponds, saline lagoons, fen, swamp and reed bed, contribute to a landscape which has a mosaic of habitats. This is an important factor whereby typically at least two or more habitats occur on Board maintained watercourses, allowing for species associated with these habitats to co-exist.

Refer to Appendix C for an overview plan of habitats and species recorded by the Board within the district.

5.10 Species Audit Summary

This species audit summary includes priority and other species including Invasive Non-Native Species (INNS) that occur within the drainage district and are identified as likely to be influenced by the Board's activities.

Also listed are species deemed to be of local importance and/or identified by local nature strategies. Finally, brief notes are included on the potential for the Board to improve the status of the species in the drainage district. 15 species were identified: barn owl, bees and bumblebees, bee orchid, European eel, kestrel, marsh mallow, otter, peregrine falcon, reed bunting, southern marsh orchid, water vole, kingfisher, bats, grass snake and Witham orb mussel.

Refer to Appendix C for an overview plan of habitats and species recorded by the Board within the district.

The following pictures detail some the species found in the Board's district.

Barn Owl

Kestrel

Peregrine Nest Site at Lade Bank

Bee Orchid

Common & scientific name	National Status	Local Status	Location of Species of Importance within drainage district	IDB Potential for Maintaining or Increasing Species Population or Range
Water vole	UK BAP Priority Species. NERC Act Section 41 species. Long term national decline but with a few remaining strongholds	Lincs BAP Priority Species. The Lincolnshire population is significant in national terms, , despite the national trend, and water voles remain widespread and the population is one of the most successful in the UK.	Widespread in rural areas on many Board & riparian watercourses	Maintain current population. Create additional habitat where possible. Undertake mink control. Resist infilling of open watercourses, and complete annual surveys of some watercourses each year.
Barn owl	Wildlife & Countryside Act Schedule 1 species	Lincolnshire BAP Priority Species. Fairly common resident bird in Lincolnshire and also a partial migrant.	Board & riparian watercourses	Continue to manage boxes every year on Board watercourse banks; diversify of box type to encourage other birds
Bees & bumble bee	Some species are UK BAP Priority Species. National decline	Some species are Lincolnshire BAP Priority Species. Decline in the county matching national decline	Board & riparian watercourse banks	Maintain current bank management regime to encourage existing colonies to spread.
Bee orchid	Common and widespread. Not a UK BAP Priority Species	Common and widespread. Not a Lincolnshire BAP Priority Species. A non-BAP species of importance within the drainage district	Widely dispersed on drain banks in Districts 3 (East Fen) & 4 (Court of Sewers)	Manage grassland sensitively and at optimum time where possible. Remove scrub and noxious weeds as necessary to enhance grassland habitat.

European eel	UK BAP Priority Species. The Eels (England & Wales) Regulations 2009	Lincs BAP Priority Species. Eels are present in all Lincolnshire rivers, however numbers entering freshwaters from the sea have declined dramatically. It has been estimated that over 90% of recruitment to national stocks by elvers swimming up rivers has been lost in the last 20 years.	Widespread on many Board & riparian watercourses	Board to look into feasibility of installing eel/fish passes at water level control structures and seek guidance from ADA and the EA at a national level. Board to look at implementing fish and eel passage into all pumping station refurbishments. Board to continue with new operational regime at HHPS through silver eel migration.
Marsh Mallow	Not a UK BAP Priority Species.	Not a Lincs BAP Priority Species. Species of Conservation Concern associated with the Lincolnshire Coastal Habitat Action Plans. A non-BAP species of importance within the drainage district	Present at the Board maintained sewer 4/23 near Butterwick	Maintain current sewer management regime to encourage existing colony to spread. Collect/disperse seed in other suitable locations. Possible scope for introducing marsh mallow moth (*Hydraecia osseola hucherardi*) a UK BAP priority species into the area
Peregrine Falcon	Not a UK BAP Priority Species. Wildlife & Countryside Act Schedule 1 species	Not a Lincs BAP Priority Species. A non-BAP species of importance within the drainage district	Known nest sites peripheral to Board. Regular sightings across area and suspected nest sights on tall buildings in Boston	Nest tray erected in 2008 on disused chimney at the Board main plant depot at Lade Bank Pumping Station in East Fen

Otter	UK BAP Priority Species. Formerly widespread throughout the UK, otters underwent a rapid decline from the 1950s to 1970s and was effectively lost from midland and south-eastern counties of England by the 1980s. Populations remained in Wales, south-west England and much of Scotland, where sea loch and coastal colonies comprise one of the largest populations in Europe. The decline has now been halted and sightings are being reported in former habitats, due to natural spread and/or releases.	Otter is no longer a Lincolnshire BAP Priority Species, because it is now known to occur in most if not every river catchment in the county and it is likely to continue to spread. A non-BAP species of importance within the drainage district	A 2009 survey showed that otters were known from watercourses peripheral to the area but now they may occupy the Board's area	Encourage otters into the area. Create 2 artificial holts in Wildmore and East Fen.
Southern marsh orchid	Common and widespread in southern UK.Not a UK BAP Priority Species	Not a Lincs BAP Priority Species. A non-BAP species of importance within the drainage district. Locally common and widespread except for the Fens	Rare in the drainage district and only known from the Cowbridge Drain berm between West Fen Sluice and A52	Maintain current bank and batter management regime to encourage existing colony to spread
Kestrel	Common and widespread in UK. Not a UK BAP Priority Species Kestrel is protected under the Wildlife and Countryside Act	Not a Lincs BAP Priority Species. A non-BAP species of importance within the drainage district. Common and widespread	Widespread in rural areas	*See barn owl above

Reed bunting	UK BAP Priority Species. Reed bunting is protected under the Wildlife and Countryside Act	Lincs BAP Priority Species. Reed bunting is a common resident and passage Lincs bird, although there has been a decline in recent years.	Widespread on many Board & riparian watercourses	Extend population by increasing lengths of reed fringe. Implement additional berm habitat and/or develop existing
Witham orb mussel	UK BAP Priority Species	Not a Lincs BAP Priority Species	Recorded from drains near to water transfer points from the River Witham; however, believed by the EA to be extinct	On the drains near the water transfer points from the River Witham, continue with phased annual mudding/dredging works
Kingfisher	Not a UK BAP Priority Species. Wildlife & Countryside Act Schedule 1 species. Widespread in UK except N Scotland	Not a Lincs BAP Priority Species. Widespread in Lincolnshire	Probably widespread in the drainage district using the watercourses for feeding but possibly limited by availability of suitable perches and lack of breeding sites	Provision of 3 to 4 new nesting sites each year. Survey sites annually to update records.
Grass snake	Grass snake is a UK BAP Priority Species. Grass snakes are protected under Schedule 5 of the Wildlife and Countryside Act. Grass snakes are throughout England but becoming scattered to the north. They are found in lowland parts of Wales and are only scattered in the lowlands in Scotland.	Grass snake is not included in the Lincolnshire BAP. Grass snakes are widespread in Lincolnshire, including the Fens.	Grass snakes are probably widespread throughout the drainage district.	Provision of 3 to 4 new nesting sites each year. Survey sites annually to update records.

Bats	Some species of bats are UK BAP Priority Species. All species of bats are protected under The Wildlife and Countryside Act, as amended by The Environmental Protection Act 1990, and The Conservation Regulations 1994. Bats are widespread in the UK	All bat species are grouped as Priority Species in the Lincolnshire BAP. Bats are widespread in Lincolnshire	Bats are probably widespread throughout the drainage district, using the watercourses for foraging and commuting, and possibly roosting in culverts.	Provision of 6 new nesting sites each year. Survey sites annually to update records.
British Hedgehog	The British Hedgehog is not a nationally recognised BAP target species, However, this animal is now in rapid decline widely across the UK.	The British Hedgehog Preservation Society have classified this species as vulnerable to extinction and are call on the UK Government to allow it protection on schedule 5 on the Wildlife and Countryside Act	Hedgehogs are part of the ecosystem. The most important thing about hedgehogs is that they are an indicator species. They act as a barometer for the health of our local environment. A thriving hedgehog population indicates a plentiful supply of invertebrates, good diversity of habitat and connectivity of the natural environment.	Look into opportunities for expand the populations by increasing habitat. Consider new habitats when planning work and consider the impacts of our operations of existing populations.
European Badger	The European Badger is not a nationally recognised BAP target species. However, they are legally protected from cruelty by The Protection of Badgers Act 1992 and schedule 6 of the Wildlife and Countryside Act 1981	The European Badger is widespread in Lincolnshire and supports the ecosystem through controlling vermin and spreading seeds.	The European Badger is widespread throughout the District with many sets and set entrances located in Board maintained watercourses.	The Board will not look to expand populations or create any habitats for this species. The Board's employees are all licenced (CL27) to interfere with setts for drainage maintenance operations. Employees will continue to collect sett locations on ArcGis Collector.

Swans (Mute, Bewick's & Whooper)	Swans are not a nationally recognised BAP target species. However, they are legally protected from cruelty by The Protection of Birds Act 1954 and protected under the Wildlife and Countryside Act 1981	Swans are widespread in Lincolnshire waterways.	Swans are widespread in Lincolnshire and the Board's main drains provide ideal habitat for them to breed. Nest site and signets are commonplace in the district	The Board will not look to expand populations or create any habitats for this species. Employees will start to collect nest locations on ArcGis Collector.

5.11 Invasive Non-native Species Summary

The following table details a summary of the invasive non-native species affecting the district.

Common & scientific name	Location within IDB if known	Year first recorded	Local status / Extent within drainage district	IDB potential for controlling species population or range
Japanese Knotweed	Coningsby, Freiston, Old Leake, Midville, Butterwick, Freiston Shore	Not known	Widespread clusters in residential and urban areas	Control by injecting glyphosate into stems, in Board maintained watercourses only.
Crangonyx floridanus is a small omnivorous, freshwater amphipod	Fishtoft	2014	Widespread	None
Physella acuta a species of small, left-handed or sinistral, air-breathing freshwater snail,	Butterwick	2014	Widespread	None
Spire Snail	Widespread	1999	Widespread	None
Gammarus tigrinus a small gammarid amphipod	Cowbridge Drain	1990	Widespread	None

Cord Grass	Widespread coastal areas	2005	Widespread coastal areas	None
Sweet-flag	Wainfleet St Mary	2017	Isolated pockets	None
Giant hogweed	Skirbeck, Fishtoft,	unknown	Isolated pockets	None
American Signal Crayfish	Bellwater Drain	2008	Widespread along the drain	None
American Mink	Lade Bank, Wainfleet, Hobhole	2015	Isolated pockets	Mink control programme

The following pictures detail example of the non-native invasive species present in the Board's district.

American Signal Crayfish

Giant Hogweed

American Mink

5.12 Water Level Management Plans (WLMP)

Water Level Management Plans (WLMP) provide a means by which the water level requirements for a range of activities in a particular area, including agriculture, flood defence and conservation, can be balanced and integrated.

Seven pumping stations with a combined total pumping capacity is 59.9 cumecs are capable of discharging 5,175,360m³ per 24 hours if required serve the area's catchments and maintain the WLMP. This includes several smaller sub-catchments fronting The Wash served by individual pumping stations that outfall directly into The Wash, whereas a majority of drained water coming into the IDB low level drainage system feeds into larger drains.

Water in Wildmore and West Fens is transferred by gravity via control structure at Cowbridge Sluice into the Lower Hobhole Drain, while water in the very low lying East Fen is pumped into the Lower Hobhole at Lade Bank. At the Hobhole Drain outfall, water is discharged by pumping or gravity sluicing, depending on tides, into the Haven or tidal stretch of the River Witham and finally into The Wash and North Sea.

The Board approved the current WLMP on 23 September 2009. As the area takes a considerable amount of run-off and groundwater from a wider catchment than defined by the drainage district and the seasonal water levels are shown in the table below.

Summer is defined as May 1st to September 30th and Winter from October 1st to April 30th.

Catchment	Summer Level in metres (ODN)	Winter Level in metres (ODN)
West & Wildmore Fens	+0.18 to -0.15	-0.80 to -1.0
East Fen: Upper Hobhole Drain	-1.25 to -1.50	-2.10 to -2.50
Lower Hobhole Drain	-0.70 to -1.0	-1.80 to -2.20

6. Habitat Action Plan

6.1 Introduction

This action plan comprises of the objectives, targets and actions that the Board has identified for each habitat to be included within the BAP. The following sections contain action plans for each of the habitats that have been prioritised by the Board.

6.2 Habitat Action Plan 2022 to 2026

The following Table details the Board's habitat action plan for the next five years.

Target Ref		W4IDB Actions	Year	Delivery Lead	Indicators	Reporting
Reed Beds	H1	Identify areas where a fringe of reeds long along Board watercourses can be maintained.	2022 to 2026	W4IDB	Continue with alternate flail mowing of Drain Banks yearly to create reed fringe recorded in metres.	Annual
Lowland Calcareous Grassland	H2	Habitat restoration by appropriate IDB bank & batter management biannual flail mowing of banks.	2022 to 2026	W4IDB	Restored habitat created along the watercourse by continuing with alternate flail mowing of Drain Banks yearly, recorded in metres.	Annual
Native Woodland & Hedges	H3	Maintain condition of hedges for faggot cutting c,2km per year Plant new trees to off-set annual bushing works. c.50 trees per year Maintain woodland condition along drain banks using established bushing techniques. C.5km per year Re-fuse hedge planting Byelaw applications along Board maintained watercourses.	2022 to 2026	W4IDB	Hedges maintained for faggots recorded in metres. Number of trees planted recorded per tree. Woodland maintained recorded in metres.	Annual
Berms	H4	Incorporate berms into the watercourse banks when drainage channels are being redesigned.	2022 to 2026	W4IDB	New berm created recorded in metres.	Annual

Watercourses	H5	No net loss of watercourse within the district. Continue with current watercourse management practices. Restrict culverting where possible.	2022 to 2026	W4IDB	Length (m) of watercourse not culverted and other option used. Watercourses maintained, recorded in metres.	Annual
Invertebrate Shelter	H6	Create 1No. shelter for invertebrates such as spiders, beetles and solitary bee's.	2022 to 2026	W4IDB	Number of new shelters created.	Annual
Grass Snake Nesting Sites	H7	Create 3 to 4No. new compost heaps of wood and rotting vegetation yearly for grass snakes to nest in.	2022 to 2026	W4IDB	Number of new compost heaps created.	Annual
Wildflower Meadows	H8	Develop sites 0.5ha on Board owned land for pollinator projects to enhance habitat for pollinator species.	2022 to 2026	W4IDB	Area created, recorded in square metres.	Annual
King Fisher Nesting Boxes	H9	Establish at least 4No. sites per year for constructing King Fisher nesting boxes.	2022 to 2026	W4IDB	Number of new nesting sites created.	Annual
Bat Nesting Boxes	H10	Establish at least 6No. sites per year for erecting bat nesting boxes.	2022 to 2026	W4IDB	Number of new boxes erected.	Annual
Owl & Kestrel Nesting Boxes	H11	The Board have 29No. established boxes. The Board do not propose to erect anymore. Only maintain the existing boxes	N/A	W4IDB	Inspect twice yearly once with Wildlife Conservation Trust and record number of Owls and Kestrels nesting.	Annual

7. Species Action Plan

7.1 Introduction

This action plan comprises of the objectives, targets and actions that the Board has identified for each species to be included within the BAP. The following sections contain action plans for each of the species that have been prioritised by the Board.

7.2 Species Action Plan 2022 to 2026

The following Table details the Board's species action plan for the next five years.

Target Ref		W4IDB Actions	Year	Delivery Lead	Indicators	Reporting
European Eel	S1	Continue with sluicing and pumping plans at Hobhole and Lade Bank Pumping Station and Cowbridge Sluice, to better utilise the Dark Moon Phase through the autumn Eel migratory periods. Develop plans to install eel passage at structures prohibiting Eel and Elver passage. Incorporate Eel passage into all pumping station refurbishment plans.	2022 to 2026	W4IDB	Number of projects completed per year	Annual
Owl & Kestrel	S2	Check, clean, bed and maintain existing 29No. boxes yearly. Bed top compartment with 6mm pea gravel and the main lower compartment to be lined with 100mm of bark chippings. Survey with Wildlife Conservation Trust yearly. Update GIS records.	2022 to 2026	W4IDB	Number of boxes maintained and repaired. Number of Owls and Kestrels sighted.	Annual

Water Voles	S3	Continue with current channel maintenance practices to safeguard water vole habitat. Run flail heads 100mm above ground. Continue with Mink Control Plan. Ecology surveys of 50km of watercourse yearly. Collect sighting data on ArcGis Collector and update GiS record.	2022 to 2026	W4IDB	Number of water vole sightings	Annual
Otters	S4	Construct 1No. Otter Holt in the 5 year period. Survey existing holts and update records. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of Otter sightings	Annual
Kingfisher	S5	Establish at least 4No. sites per year for constructing nesting boxes. Survey existing nesting sites and update records. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of new nesting sites. Number of Kingfisher sightings	Annual
Grass Snakes	S6	Create 3 to 4No. compost heaps of wood and rotting vegetation yearly for grass snakes to nest in. Survey existing nesting sites and update records. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of new nesting sites. Number of Grass Snake sightings	Annual

Bats	S7	Establish at least 6No. sites per year for erecting nesting boxes. Survey existing nesting sites and update records. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of new nesting sites. Number of Bat sightings	Annual
British Hedgehog	S8	Look into opportunities for expanding the populations by increasing habitat. Consider new habitats when planning work and consider the impacts of our operations on existing populations. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	N/A	N/A
European Badger	S9	The Board will not look to expand populations or create any habitats for this species. The Board's employees are all licenced (CL27) to interfere with setts for drainage maintenance operations. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of Badger sightings	Annual
American Mink	S10	The Board will increase its Mink control programme, partnering with Wildlife Recovery East. 5 mink control rafts to be deployed in the District Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of sightings. Number of Mink destroyed.	Annual

Swans	S11	The Board will look to expand populations and create new habitats for this species. Artificial nesting platforms will be introduced to mitigate against nest flooding when lift the water to summer levels. Collect sighting data on ArcGis Collector and update GiS records.	2022 to 2026	W4IDB	Number of nest site created	Annual

8. Implementation

The actions within the BAP will be executed via the following means:

1. The actions which can be delivered through adaptation or inclusions to general maintenance programmes will be identified and integrated accordingly into best practices. From this, maintenance schedules will be drawn up and completed activities communicated via returned job cards or similar.
2. Actions which require independent and additional execution and surveys or training will be identified, resources planned and engaged and/or planned in to the relevant resources' work schedules.
3. Actions which can be executed through capital works programmes will be integrated into the relevant project plans.
4. Actions which can be delivered through collaboration with partners will be formally agreed in writing with such partners with responsibilities, timescales and reporting requirements defined.
5. Actions which can be delivered through developer or consented works will be identified and integrated into project plans.

Species Action Plans and Habitat Action Plans resulting from the audit will uphold the biodiversity of the drainage district now and in the future. Key localised factors such as geology, topography and hydrology determine the formation of habitats and dictate their perpetuation in the landscape today, and those species that colonise different soil types and conditions. In particular, it is hoped that implementing the BAP will contribute to the achievement of local and national targets for UK BAP priority species and habitats. Species and habitats not listed in the UK BAP that are locally significant have also been considered.

An important element of implementation is to examine the methodology of any routine or capital works and consider if there are any practical and economical alternatives to take into consideration, and if appropriate measures and Standard Operating Procedures are in place. Without proper environmental consideration for actions within the Boards jurisdiction and statutory powers, this may have serious consequences affecting the area's ecology and habitat and potentially, the wider environs beyond its boundary. However, this scenario is unlikely given that the existing management techniques have been in place for many years without incident, making it highly unlikely that anything to upset this balance in the future.

Inevitably, continued commercial developments which take place in floodplains and the drainage district have consequences affecting land drainage, the immediate environment and possibly the wider landscape and ecology. Determining any detrimental affects of any potential development concerning surface and treated water discharge or culvert consent is by conducting or recommending an Environmental Impact Assessment beforehand. This is crucial to minimise any potential impact by developments, or during routine maintenance or heavy engineering undertaken by the Board. In order to maintain a natural balance during its works, particularly as a majority is seasonally dependant, it is approached with a Best Practicable Option. Of course, wildlife and ecology has a seasonal life cycle too and all measures are taken to ensure that programmed works limit any adverse impact.

9. Monitoring

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

10. Reporting

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 registered in the public domain.

The Board will report its BAP outcomes annually to The Association of Drainage Authorities for national use along with other UK Drainage Board's, and to the Board's Environment Committee in November. Additionally, the progress of delivering annual BAP targets will be reported to the Board at each Board meeting.

Appendix A

Appendix B

Appendix C