

The Wash

Biodiversity Action Plan

Ensuring The Wash remains a special place, for people and wildlife, for generations to come



the wash estuary

project



Acknowledgements

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- The Norfolk Biodiversity Partnership
- The Wash and North Norfolk Coast European Marine Site Management Scheme
- Wash Estuary Project Staff
- Water Management Alliance

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The Wash Estuary Project, in partnership with many, is working to promote the sustainable use of the area's resources while trying to maintain the balance that allows local communities to prosper and safeguard the cultural, historical and natural features of the area for future generations.

Front page photo credits: 'Winter Wash Sunrise' by Lloyd Curtis (top left); 'Moulton Tulips' by Alan Lambert (top right); *Sabellaria spinulosa* by Ian Reach (bottom left); common seal by Georgina Deacon (bottom right).

Foreword

It is with much pleasure that I have the opportunity to write the foreword to The Wash Biodiversity Action Plan (BAP).

The Wash is an extremely important National and International estuarine system and is a highly designated site.

As you read this BAP you will realise the wide variety of habitats and species that are either directly or indirectly associated with The Wash. All too often the focus for The Wash relates to the aquatic elements. However, The Wash is a very hydrodynamic system and its relationship with terrestrial habitats can never be separated.

This BAP explores this interactive relationship but, of course, at some point The Wash will have an allocated boundary for administrative and operational purposes. However, habitats and species do not take account of boundary lines on a map.

To ensure that this BAP always remains relevant the work carried out has been linked, co-ordinated and integrated with other BAPs such as County, Local Authority and Internal Drainage Board Plans.

A dedicated team has worked very hard to produce this document and just as importantly included an Action Plan. It is the implementation and monitoring of these Actions that will protect and enhance Biodiversity in The Wash now and for future generations.

Paul Espin
CHAIRMAN

Wash Estuary Strategy Group

The Wash Biodiversity Action Plan

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Executive Summary

The Wash is the largest estuarine system in the UK. It has the UK's second largest area of mud and sand flats along with large expanses of saltmarsh (Murby 1997). The Wash hinterlands (for the purposes of this plan is defined as the terrestrial area from the high tide mark inland to the first major road network) are dominated by an agricultural landscape. The variety of habitats found in The Wash and its hinterlands support a wide diversity of species.

The Wash is locally, nationally and internationally important for a variety of plants, animals and habitats. It accommodates nationally and internationally important assemblages of migratory, breeding and non breeding bird species including dark-bellied brent geese (*Branta bernicla*), knot (*Calidris canuta*), dunlin (*Calidris alpina*) and oystercatcher (*Haematopus ostralegus*). The Wash contains a large breeding colony of common seal (*Phoca vitulina*) and the marine environment supports a range of marine communities which are of international importance including *Sabellaria spinulosa* (Ross worms), species of dense brittle star and lug and sand mason worms. In recognition of its importance to biodiversity nationally and internationally The Wash has been awarded numerous environmental designations (see section 1.3) (Wash & North Norfolk Coast European Marine Site Management Scheme 2011).

The Wash Biodiversity Action Plan (BAP) focuses on habitats and species that are found within The Wash and its hinterlands and are threatened locally, nationally and/or internationally. The aim of this BAP is to focus actions down to a local level and make the whole BAP process more manageable. Habitats and species that are threatened within The Wash and its hinterlands but are not UK BAP priorities have been considered for inclusion within this plan. This BAP will work alongside the Lincolnshire and Norfolk county BAPs and will ultimately be included in the National Biodiversity Action Reporting System (BARS). It will assist The Wash and North Norfolk Coast European Marine Site Management Scheme in the monitoring that is carried out within The Wash element of The Wash and North Norfolk Coast European Marine Site. In addition, it will assist the Wash Estuary Project in achieving their overall aim of ensuring The Wash and its hinterlands remains a special place, for people and wildlife, for generations to come.

The individual action plans are summarised at the end of this document in Appendix 5.



Photo credit: Common seal by RAF Holbeach (top left); dunlin by Neil Smith (top right); 'Looking at Norfolk across The Wash' by Simon Cooter (bottom left); plaice by Natural England (bottom right)

Overall Vision and Aims of The Wash Biodiversity Action Plan

Vision:

The Wash and its hinterlands will remain a special place, for people and wildlife, for generations to come.

Overall Aims:

- To manage, protect and enhance the biodiversity assets of The Wash and its hinterlands.
- To promote and raise awareness of the species and habitats making up The Wash and its hinterlands.
- To seek and secure resources to undertake data collection, good environmental management, species-specific work and to re-create habitats of wildlife importance.
- To ensure local community involvement in the management of our natural environment to encourage local pride.
- To champion The Wash and its hinterlands to ensure they remain special.

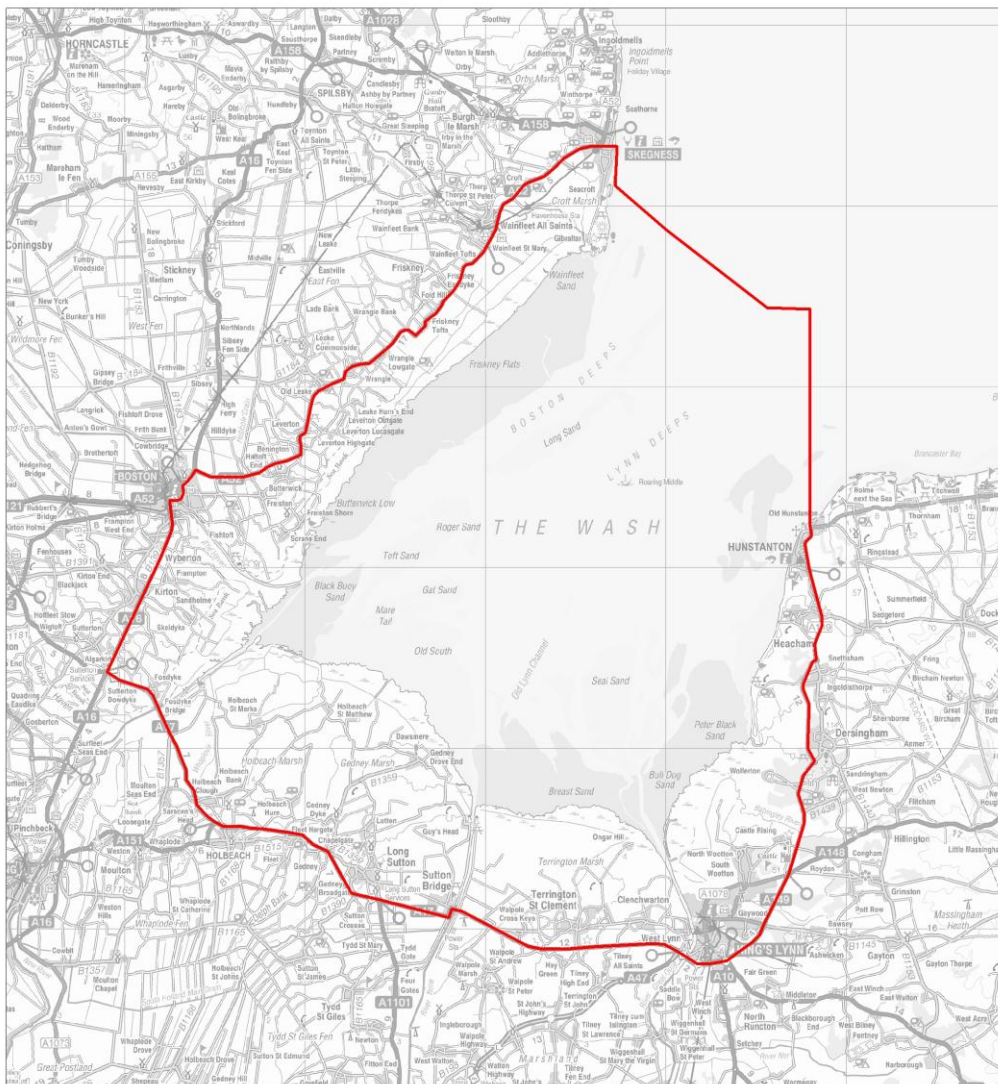


Photo credit: 'The Nene to The Wash' by Alan Lambert

Geographical Coverage of The Wash Biodiversity Action Plan

The Wash is an embayment of the southern North Sea on the east coast of England. It is approximately 20kms wide and 30kms long, bordering the counties of Lincolnshire and Norfolk. The hinterlands, for the purposes of this plan, are defined as the terrestrial area from the high tide mark inland to the first major road network. The rivers Steeping, Witham, Welland, Nene and Great Ouse all flow into The Wash. The North Sea has a significant impact on the species and habitats found within the marine and coastal areas of The Wash.

The map below identifies the boundary of The Wash Biodiversity Action Plan (BAP). The plan covers the marine and coastal areas of The Wash and a section of The Wash hinterlands. This boundary was identified by the Steering Group to ensure actions were focused down to a local level and that they could be achieved. They felt the first major road network around the hinterlands provided a distinctive boundary that can be followed by all. The first line sea defences are included within the terrestrial boundary, along with important surrounding terrestrial habitats. For example, farmland fields that dominate The Wash hinterlands are important for a number of water bird species that use The Wash. The marine boundary follows The Wash section of The Wash and North Norfolk European Marine Site designation. The Steering Group felt an appropriate point for the boundary to come ashore on the eastern edge of The Wash is at Hunstanton where the maritime cliffs end and the sand dunes form and on the northern tip of The Wash at Skegness to ensure Gibraltar Point was included because of its importance to the wildlife of the area.



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Fig 1. Map showing The Wash BAP boundary. ■ = Wash BAP boundary.

Section 1: Biodiversity in The Wash

1.1 Biodiversity

Biodiversity is short for biological diversity and refers to the variety of life on earth. The Convention on Biological Diversity (CBD) (1992) defined biodiversity as:

'The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems' (UK Biodiversity Action Plan 2010).

Biodiversity encompasses all of the flora and fauna of the earth including the genetic diversity within species, and the habitats and ecosystems that support this life.

We obtain a wide variety of ecosystem services from the natural world making it essential to our lives. The benefits include:

- Regulating services – e.g. climatic stability, regeneration of clean air and water, pollination, pest regulation and erosion control.
- Provision of services – e.g. food, fresh water, raw materials, energy and medicine.
- Supporting services – e.g. soil formation and retention, nutrient cycling, primary production, water cycling and provision of habitat.
- Cultural services – e.g. spiritual and religious values, inspiration for art, aesthetic values, recreation and tourism (DEFRA 2007; England Biodiversity Group 2011).

1.2 The Wash and its Hinterlands

The Wash is the largest estuarine system in the UK. It is a large, mostly shallow marine embayment that opens up into the southern North Sea. Deep channels occur and have been created through the scouring action of the tide as it leaves the embayment. Between these channels are a series of offshore sand banks. The physical and biological characters of The Wash are dominated by the marine processes associated with the North Sea, in spite of the freshwater influence provided by the draining of the Great Ouse, Nene, Welland Steeping and Witham Rivers. The Wash is of outstanding importance for wildlife and provides valuable natural resources that people have long exploited (Murby 1997; Environment Agency 2010).

The Wash has the second largest area of intertidal mud and sand flats in Britain, large expanses of saltmarsh and valuable coastal habitats that are of conservation significance, such as saline lagoons, shingle structures and sand dunes. The habitats within The Wash and its hinterlands support the largest numbers of migrating waterfowl in the UK and the intertidal habitats support the largest common seal (*Phoca vitulina*) colony in England. The Wash is an important spawning and nursery ground for several fish species. Its productive mudflats are rich in invertebrates and support significant shellfish populations. These provide an important food resource for many bird species as well as an important resource for local fisheries (Murby 1997).

The hinterlands consist of a mosaic of open agricultural land that is criss-crossed by an extensive network of rivers, dykes and drains. They are populated with different sized farmsteads, villages and towns. Some larger farmsteads and towns are found within this area, including King's Lynn and Boston. The terrestrial habitats of The Wash hinterlands are also important for biodiversity. Amphibians, birds, fish, invertebrates, mammals, reptiles and a wide variety of plants inhabit this area. Because of the variety of conditions found across The Wash and its hinterlands specialist species inhabit the area, adding to its biodiversity value.

The Wash and its hinterlands have traditionally been used for farming, fishing and shipping. The rich farmland yields a variety of crops, such as wheat, vegetables and bulbs. The Wash provides cockles, mussels, shrimps, lobsters and crabs for the local fishing industry and the commercial ports of Boston, Sutton Bridge, Wisbech and King's Lynn handle approximately 1600 ships a year. The Wash has also been used by the military since the 1890's. A weapons range at Holbeach serves the Royal Air Force (RAF) and the North Atlantic Treaty Organisation (NATO) (Wash Estuary Strategy Group 2004).

New technology for renewable energy generation is being installed outside of the marine area of The Wash and within The Wash hinterlands. For those being installed in the North Sea, the associated ancillary infrastructure such as export cabling, has and is being installed through The Wash. Due to the sensitive nature of The Wash the construction of such infrastructure is closely regulated by the statutory nature conservation agencies.

For a list of the UK BAP priority habitats and species that have been recorded in The Wash go to Appendix 1 and 2 respectively.

1.3 Recognition of the Importance of The Wash and its Hinterlands

The Wash and its hinterlands have received local, national and international designations in recognition of the areas importance to biodiversity. Fig 2 shows where the different designations occur around The Wash.

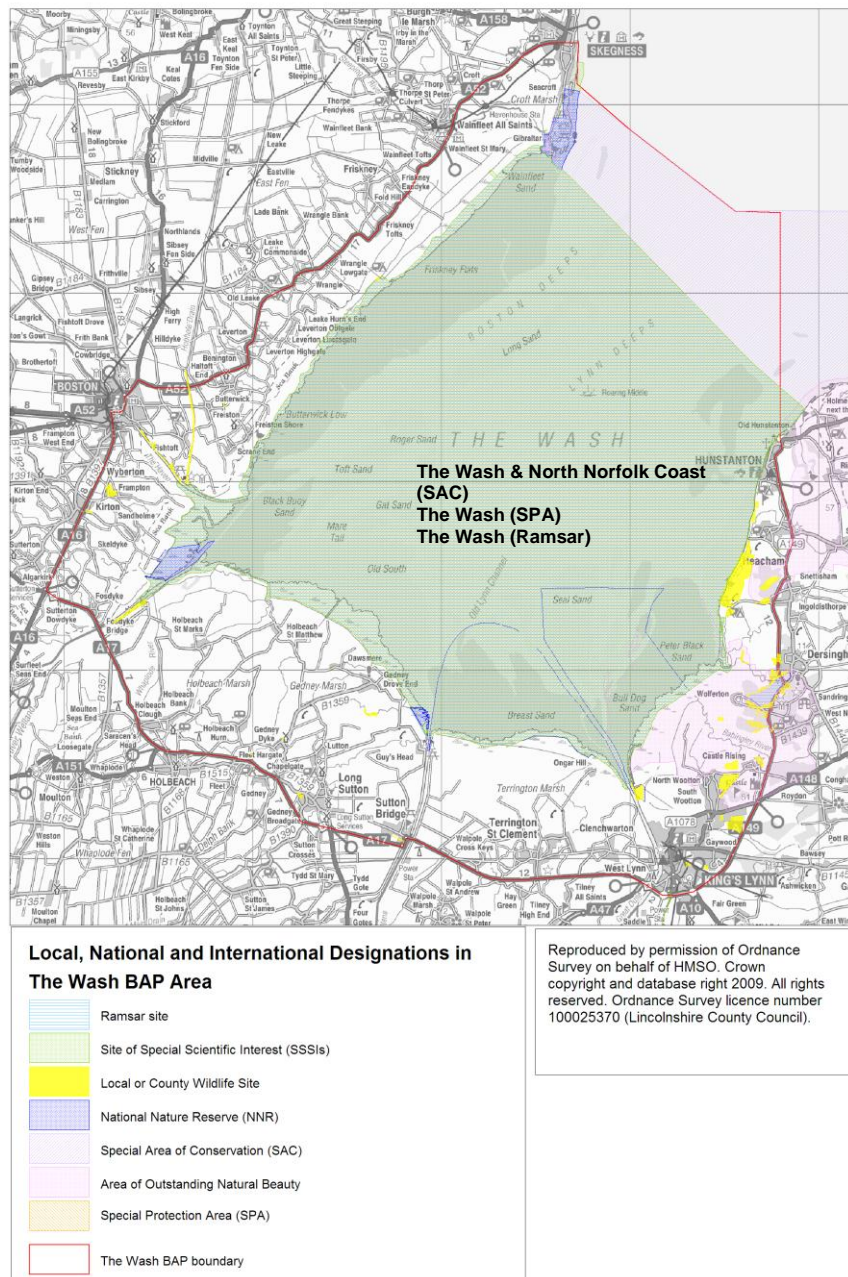


Fig 2. Map showing the various designations found within The Wash and its hinterlands.

On a local level, Local Wildlife Sites (LWS) and County Wildlife Sites (CWS) have been designated in The Wash hinterlands. This is a non-statutory designation which sites can receive on a county level in recognition of their importance to biodiversity. This designation provides the sites with a minimum amount of protection through national planning policy.

On a national level, Sites of Special Scientific Interest (SSSI) have been designated to reflect the exceptional biological interest of The Wash. The intertidal area near Frampton and between the River Nene and Wolferton Creek is designated as a National Nature Reserves (NNR) because of the mix of open deep water, permanent shallow water, mudflat and saltmarsh found there. The eastern edge of The Wash also forms part of the Norfolk Coast Area of Outstanding Natural Beauty (AONB) (Environment Agency 2010). These designations provide the sites with a much greater level of protection than the LWS and CWS designations.

On an international level, through the EU Birds and Habitats Directives ('79 & '92) and the Conservation (Natural Habitat, &c.) Regulations 1994 (replaced by the Conservation of Habitats and Species Regulations in 2010), important areas within The Wash and its hinterlands have been designated as Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar Sites. SACs and SPAs are strictly protected sites and as such provide The Wash with its highest level of protection. The Ramsar designation came much earlier than the SAC and SPA designations. The largest designated sites within the boundary of The Wash BAP area are The Wash and North Norfolk Coast SAC, The Wash SPA and The Wash Ramsar Site. These cover the entire marine area of The Wash. Others that fall within the boundary are part of the Saltfleetby Theddlethorpe Dunes and Gibraltar Point SAC, the Gibraltar Point SPA, the Gibraltar Point Ramsar Site, part of the Roydon Common and Dersingham Bog SAC and the Dersingham Bog Ramsar Site.

The Wash and North Norfolk Coast qualifies as an SAC for the following Annex I habitats (as listed in the EU Habitats Directive):

- Large shallow inlets and bays.
- Sandbanks which are slightly covered by seawater all the time.
- Mudflats and sandflats not covered by seawater at low tide.
- Samphire (glasswort) *Salicornia* spp. and other annuals colonising mud and sand.
- Atlantic salt meadows (*Glauco-Puccinellietalia*).
- Mediterranean and thermo-Atlantic halophilous scrubs (*Arthrocnemetalia fruticosae*).

And for the following Annex II species (as listed in the EU Habitats Directive):

- Common seal (English Nature 2000).

The qualifying features of The Wash SPA (under the EU Birds Directive) are as follows:

- Internationally important populations of regularly occurring Annex I bird species.
- Internationally important populations of regularly occurring migratory bird species.
- Internationally important assemblages of waterfowl, including the internationally important populations of regularly occurring migratory bird species (English Nature 2000).

Species such as the little tern (*Sterna albifrons*), common tern (*Sterna hirundo*), bar-tailed godwit (*Limosa lapponica*), pintail (*Anas acuta*) and oystercatcher (*Haematopus ostralegus*) are included in this (Environment Agency 2010).

The criteria making The Wash a Ramsar Site are as follows:

- It is a large shallow bay comprising very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels.
- The inter-relationship between its various components including saltmarshes, intertidal sand and mud flats and the estuarine waters. The saltmarshes and the plankton in the estuarine water provide a primary source of organic material which, together with other organic matter, forms the basis for the high productivity of the estuary.
- The assemblages of internationally important waterfowl.
- Species/populations occur at levels of international importance (JNCC 2008).

In addition to this The Wash and North Norfolk Coast have been designated as a European Marine Site (EMS) under European legislation and the UK Habitats Regulations. This imposes statutory obligations to safeguard the nature conservation interests of the area. Therefore, The Wash and North Norfolk Coast European Marine Site Management Scheme (WNNCEMS) has been developed to consider the impacts of regulated and un-regulated activities and manage them to ensure sustainable use. The Management Scheme also sets out agreed management actions for Relevant Authorities and updates them annually. Natural England (NE) provides conservation objectives and conducts condition assessments of the EMS site features and reports them to the Management Scheme to help prioritise management actions. Reports also go to the UK and EU Governments (Wash & North Norfolk Coast European Marine Site Management Scheme 2011).

The EMS (SAC and SPA), marine elements of the SSSIs and Ramsar Sites contribute to the UK's Marine Protected Area (MPA) network. The Marine and Coastal Access Act 2009 provided provision for the creation of a new type of MPA, called a Marine Conservation Zone (MCZ). The protection levels of MCZs will vary from site but they will all have conservation objectives that result in the favourable condition of the MCZ features with no further degradation. In addition, highly protected MCZs, known as Reference Areas (RAs) will be designated. Four regional projects have been working across the seas of England, Wales and Northern Ireland to recommend new MCZ sites (Natural England & JNCC 2010). The North Sea project, called Net Gain, recommended MCZs and RAs in the North Sea area to the UK Government in September 2011. No MCZs have been recommended within this BAPs boundary, but one at the entrance to The Wash, just outside of the boundary has been. A RA has been recommended within the boundary in the northern area of The Wash at Dogs Head Sandbanks because of the intertidal mudflats, subtidal sand, mud, mixed sediments, chalk, biogenic reefs and sands and gravel, and the *Sabellaria spinulosa* (Ross worm) reefs found there (Net Gain 2010).

All of this provides The Wash with a high level of protection against potentially damaging activities. Appropriate assessment under Regulation 61 of The Conservation of Habitats and Species Regulations 2010 is required for all plans and projects not directly connected with the management of the site to ensure its continued protection. However, flora and fauna do not remain within site boundaries, for example, SPA waterbirds use the non-SPA designated agricultural land within The Wash hinterlands for a significant proportion of the time. Therefore, biodiversity conservation outside of the protected areas needs to be taken into consideration as this BAP does.



Photo credit: 'Little Egrets Coming into Roost' by Steve Keightley

1.4 Conservation of the Natural Environment in the UK

The NEA was begun in 2009 and 'is the first analysis of the UK's natural environment in terms of the benefits it provides to society and continuing economic prosperity' (UK National Ecosystem Assessment 2011). Making Space for Nature/Lawton Review (2010) was produced to look at whether England's wildlife sites make up a coherent and resilient ecological network that is capable of adapting to the challenge of climate change and other pressures. The review concluded that the network is not a coherent and resilient ecological network capable of adapting to climate change and other pressures. It made recommendations to achieve this summarising them with four words: 'more, bigger, better and joined'. The review emphasises that this will not be an easy process but it can and needs to be done (Lawton *et al* 2010).

In June 2011 the UK Government published 'The Natural Choice: securing the value of nature', the first Natural Environment White Paper that has been published for over 20 years. The White Paper puts forward proposals for restoring nature's systems and capacities through the proper valuation of the economic and social benefits we receive from a healthy natural environment. It puts emphasis on landscape-scale habitat creation and management, the need for connectivity between habitats and the vital ecosystem services high biodiversity habitats provide (HM Government 2011). It uses evidence provided by the National Ecosystem Assessment (NEA) and Making Space for Nature/Lawton Review.

The 'Think Big' report (2011) further emphasises the move towards landscape-scale conservation from the Natural Environment White Paper. It also provides advice on how to implement the recommendations made by the 'Making Space for Nature' review using lessons already learnt from successful landscape-scale conservation projects (England Biodiversity Group 2011).

In addition to the above, 'Biodiversity 2020: A Strategy for England's Wildlife and ecosystem Services' was produced in June 2011. Again it builds on the Natural Environment White Paper providing a guide for how England will implement our international and EU commitments to biodiversity. The aim for the next decade is:

'to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people' (DEFRA 2011).

1.5 The Wash Biodiversity Action Plan

In view of the unique nature of The Wash and its hinterlands this BAP has been produced to ensure they are considered as one entity rather than with boundaries as other local BAPs (LBAPs) in the area do. This plan will bring together conservation work around The Wash and build on what has and is already being done. It has been written to work alongside and assist the other LBAPs in the area in achieving their targets within The Wash BAP boundary making the process more manageable in terms of scale and delivery. Focusing actions down to a local level has meant that only habitats and species important to The Wash and its hinterlands have been included in this plan. It will also allow local communities to see results happening in their area and encourage them and local businesses to become involved in biodiversity conservation in and around The Wash. This is a key principle of the 'The Natural Choice: securing the value of nature'.

The LBAPs that this BAP will work alongside are:

- The Lincolnshire county BAP (3rd edition released in 2011) (www.lincsbiodiversity.org.uk).
- The Norfolk county BAP (www.norfolkbiodiversity.org).
- Internal Drainage Board (IDB) BAPs
 - Black Sluice IDB (www.blacksluiceidb.gov.uk)
 - King's Lynn IDB (www.wlma.org.uk)
 - Lindsey Marsh IDB (www.lmdb.co.uk)
 - South Holland IDB (www.wlma.org.uk)
 - Welland and Deepings IDB – (www.wellandidb.org.uk)
 - Witham Fourth IDB – (www.wlma.org.uk)

The Wash BAP will also link in with the work of the developing joint Norfolk/Suffolk Local Nature Partnership (LNP), the potential Lincolnshire LNP and the WNNCEMS conservation objectives.

Within the Wash Estuary Project (WEP) The Wash BAP will help to deliver their aim of ensuring The Wash remains a special place, for people and wildlife, for generations to come. It will work alongside 'The Wash and Fens Green Infrastructure Plan' that WEP produced. The Green Infrastructure Plan can play a role in achieving BAP targets by indicating opportunities to conserve, enhance and connect habitats, which in turn will help associated species by increasing the available habitat for them to occupy. The Green Infrastructure Plan shows the location of existing habitats (UK BAP priority and others) and where further surveys need to be carried out to increase our knowledge of the habitats and species around The Wash. Surveys will help to determine locations for appropriate habitat enhancement or creation. The Wash BAP will be able to use the information contained within the Green Infrastructure Plan to assist in the setting of targets across The Wash and its hinterlands and in gathering baseline data on some of the priority habitats in The Wash. This will in turn feedback into the Green Infrastructure Plan providing it with updated information (Dunnett 2011).

For a list of the UK BAP priority habitats and species that have been recorded in The Wash BAP area go to Appendix 1 and 2 respectively.



Photo credit: East Lighthouse at Sir Peter Scott Walk, Sutton Bridge by Vivien Hartwell

Section 2: Implementation of The Wash Biodiversity Action Plan

Habitats and species included within this plan have been given individual action plans. They have been separated into marine, coastal and hinterland sections. A general action plans that will help a variety of habitats and species in the area has been included in section 4 of this document. With the help of the BAP Steering Group, objectives, targets and actions have been listed for each individual action plan. Potential partners have been listed alongside actions that they can carry out to help to achieve the targets of the plans. Dates have been set against the actions to provide a timescale in which they should be achieved. Throughout the life of this document new partners will be found to assist in carrying out actions listed in the plans. A lead partner has been assigned to each individual action plan. Their role will be to ensure actions are being carried out and if any plans are falling behind schedule they will help to make the potential partners aware of this.

As the overseer of The Wash BAP, the WEP will:

- Monitor the progress made towards achieving the targets listed in this BAP. The WEP will ask the Plan partners to report back on any actions they have carried out to achieve the targets listed in this plan on an annual basis. The WEP will then feed these back into the Biodiversity Action Reporting System (BARS).
- Continue to seek out partners to carry out actions.
- Review the action plans every 5 years enabling the plans to be updated as actions are achieved and new ones can be taken on; new information about the habitats and species of The Wash to be included in the plans; new habitat and species plans to be added if any start to decline in the future.

The BAP Steering Group is currently made up of the Norfolk and Lincolnshire Biodiversity Partnerships, The Wash IDBs, NE, WNNCEMS and EIFCA. As the Plan is developed, this group will be able to expand to incorporate new partners.



Photo credit: Dahlia anemone by Robert Irving (top left), sea lavender by Barrie Wilkinson (top right), large red damselfly by Vivien Hartwell (bottom left), Avocets by Neil Smith (bottom right)

Section 3: Habitat and Species Action Plans

3.1 Habitat and Species Selection

The landscape-scale approach to conservation emphasised by the Making Space for Nature/Lawton Review and the Natural Environment White Paper have been taken into consideration in The Wash BAP. Where possible species have not been given individual action plans, rather the habitat that they depend on has been. This will benefit all of the species using the habitat instead of single species as the species action plans would. Where appropriate species action plans have been included and some species have been grouped together under a single plan where actions will benefit a number of species collectively.

To decide which habitats and species should be given individual action plans within The Wash BAP a habitat and a species selection tables were produced. Selection criteria for inclusion in The Wash BAP were:

- habitat and species presence in The Wash BAP boundary;
- habitat and species importance at a local, national and international level;
- whether the Steering Group felt the habitat or species would gain added value by being included in The Wash BAP;
- habitat and species presence in the Lincolnshire and Norfolk BAPs.

The tables also include the final decision with reasoning on which habitats and species have been included in this BAP. Special circumstances were taken into consideration, such as species that had not been recorded in the BAP area for a considerable length of time. This information was noted in the reasoning column of the tables. To view the habitat and species selection tables go to Appendix 3 and 4 respectively.

It would not have been practical to have action plans for all of the 33 UK BAP priority habitats and 197 UK BAP priority species which have been documented as occurring in The Wash and its hinterlands (see Appendix 1 and 2). Those that were considered to have action plans in this BAP were those already covered by the Lincolnshire and Norfolk BAPs and other habitats and species considered to be important to The Wash and its hinterlands by those working around The Wash.

For all of the habitats and species general monitoring and recording of their presence in The Wash BAP boundary should and needs to be carried out to gather further information about the biodiversity of the area. For example, the species table in Appendix 2 shows dates for the last recorded sightings of UK priority species in The Wash BAP boundary. Some species have not been recorded since the late 1800's. This may be because they no longer occur in the area or may simply be because no one has recorded their presence with the Local Records Centres. General information like this will aid in the understanding of what biodiversity is in The Wash and its hinterlands and will assist with the production of future LBAPs by enabling us to determine how well the habitats and species are coping. For those found to be declining, if deemed appropriate, an individual action plan can be written to aid their conservation. Because the majority of the habitats and species in the boundary of this BAP do not have individual action plans, three action plans covering common areas of action have been included in section 4. These deal with the conservation of more habitats and species than just the individual habitat and species action plans in section 3.



Photo credit: Common Shore Crab (*Carcinus maenas*) by Andy Horton

3.2 Marine Habitats and Species

Introduction

The oceans provide important social, economic and environmental goods and services including a regulated atmosphere, food, sources of power (oil, gas, wind, tidal and wave power), building materials (aggregates), transport routes, maritime employment and opportunities for recreation (Natural England 2010^c).

The seas belonging to the UK cover more than three times the area of its land. They vary in depth and temperature and the seabeds have a varied geology ranging from rocky granite reefs to mobile sandbanks. A significant proportion of the UK's total biodiversity is found in its seas including many National and European protected and important species and undersea features (Natural England 2010^b).

The UK Government's vision for the seas is for:

'clean, healthy, safe, productive and biologically diverse oceans and seas' (DEFRA 2009).

The marine plans for The Wash cover the entire Wash embayment between Skegness on the northern tip of The Wash and Old Hunstanton on the eastern side of The Wash. The marine boundary follows The Wash section of The Wash and North Norfolk Coast EMS.

The Wash has the second largest area of intertidal mud and sand flats in Britain. They provide an important feeding area for many water bird species and support the largest colony of common seal in England (Murby 1997). The marine area supports many important habitats such as the *Sabellaria spinulosa* (Ross worm) reefs and blue mussel (*Mytilus edulis*) beds that make it possible for further species to inhabit the area by binding the sediment together (BRIG 2010). Significant commercial cockle, mussel, shrimp, lobster and crab fisheries are found in The Wash and it is an important nursery area for fish including cod (*Gadus morhua*), sole (*Solea solea*), herring (*Clupea harengus*), species of skate, bass (*Dicentrarchus labrax*), plaice (*Pleuronectes platessa*) and dab (*Limanda limanda*).

Habitat action plans in this section of The Wash BAP are:

- Blue mussel (*Mytilus edulis*) beds on sediment
- Intertidal mudflats
- *Sabellaria spinulosa* (Ross worm) reefs.

These habitats are marine features that the MCZs will be designated to protect.

Species action plans in this section of The Wash BAP are:

- Common seal (*Phoca vitulina*).
- Harbour porpoise (*Phocoena phocoena*).



Photo credit: 'Wash Waves' by Paul Gray

3.2.1 Blue Mussel Beds on Sediment

Description

Blue mussel beds are composed of dense aggregations of the blue mussel (*Mytilus edulis*) from various age classes. This habitat includes intertidal and subtidal blue mussel beds that form on a variety of sediment substrata such as sand, cobbles, muddy sand and mud. They can be found in a range of conditions from open coasts to estuaries, marine inlets and deeper offshore habitats. The UK priority habitat description does not include artificially created mussel beds such as the cultivated mussel lays that are an important component of The Wash fisheries or mussel beds which occur on rock and boulders. Therefore, they have not been included in this action plan.

Blue mussel beds perform an important role in the healthy functioning of the marine ecosystem. They play a role in coastal sediment dynamics; act as a food source for over-wintering waders; play an important role in nutrient cycling and bind the sediment together and in doing so provide a habitat for a range of species that would otherwise not be able to inhabit the sediment (BRIG 2010).



Photo credit: Blue mussels by Eastern Inshore Fisheries & Conservation Authority

Local Status and Distribution

Heavy fishery exploitation combined with disease and poor weather conditions caused the intertidal mussel stocks in The Wash to collapse during the 1990's. Restrictive management measures have assisted in their recovery during the 2000's. Although mussel populations fluctuate naturally, a number of policies and conservation objectives are now in place to try to ensure these ecologically important stocks do not collapse again.

Eastern Sea Fisheries Joint Committee's (ESFJC) (now known as Eastern Inshore Fisheries and Conservation Authority (EIFCA) following The Marine and Coastal Access Act 2009) annual surveys of natural mussel beds in The Wash have shown that overall biomass is generally stable, although at the level of individual beds there is often annual fluctuation. In general, larger beds are relatively stable and have shown increased stock levels, whereas smaller beds are more variable and prone to losses in stock (often due to higher vulnerability to erosion during storm events) (Jessop 2009).

In autumn 2010, ESFJC identified significant declines in mussel abundance, beyond normal fluctuation. These declines were not caused by fishing activity, as mussels were found to have died in situ rather than having been removed from their beds, but the cause of mortality has not been identified. The declines in mussel abundance in The Wash have prompted investigations into possible biological and environmental causes. This situation has illustrated the vulnerability of shellfish beds to factors beyond human control, despite best practice in managing activities to maintain the integrity of these features (personal comm. with EIFCA 2010).

Current Threats in The Wash

- **Water quality.** *M. edulis* bioaccumulates pollutants in seawater, possibly leading to sublethal (might not kill the mussel but may ultimately affect their growth and the success of the population) and lethal responses.
- **Coastal developments** (such as dredging, and cable/pipe-laying) can physically damage mussel beds. Such projects are scrutinised before consent is granted to ensure conservation features such as mussel beds are protected from significant damage.
- **Food availability.** Mussel populations could decline if food sources become limited, for example, through competition with other filter-feeding bivalves such as razor shells, or if riverine nutrient inputs decline significantly. This issue is not well understood in The Wash.
- **Parasites.** Mussel populations can become stressed if naturally occurring parasites are present; though harmless to humans, these can weaken the individual mussel's resilience. It is thought that this could lead to significant mortalities in the mussel population under certain conditions.
- **Shellfish fisheries.** Targeted removal of mussels using mobile fishing gear can physically damage the beds and smother remaining beds. However, fishery proposals are assessed and strict regulations are applied to the fishery to prevent such damage. The Wash fishermen have agreed management policies with fishery regulators and NE to ensure their activities do not lead to the loss of mussel beds in The Wash (Eastern Sea Fisheries Joint Committee 2008; BRIG 2010).

Blue Mussel Beds on Sediment Action Plan

Objectives

- Maintain a sustainable population of blue mussel beds in The Wash

Targets

- Maintain a blue mussel bed distribution of 368 ha in The Wash

Actions

- Lead partner – **EIFCA**

Action	Potential Partner	Date
Support research into methods for encouraging the expansion of existing blue mussel beds or the development of new beds e.g. encouraging collaboration between The Wash and the Wadden Sea for such research.	EIFCA, NE	2015
Support the fishing industry (fishermen and local processors) to obtain Marine Stewardship Council (MSC) certification for The Wash mussel fishery.	EIFCA, NE	2015
Ensure mussel cultivation activities do not damage, disturb or destroy interest features of The Wash by evaluating impacts of mussel cultivation via appropriate assessment process before new lays are granted. Carrying capacity research is ongoing and relates to this action.	EIFCA, NE	Ongoing
Continue to monitor mussel stocks and implement measures leading to a sustainable fishery.	WNNCEMS, EIFCA, NE	Ongoing
Support research into factors affecting mussel populations e.g. food availability and carrying capacity research, hydrodynamic studies and parasite studies.	EIFCA, NE, EA, CEFAS	Ongoing

3.2.2 Intertidal Mudflats

Description

Mudflats are composed of silt and clay sediments with a high organic content that have been deposited in sheltered intertidal areas, particularly estuaries and inlets. They are linked by physical processes to, and may be dependent on, other coastal habitats such as soft cliffs and saltmarshes. They are commonly found within the natural progression of the coastline between subtidal channels and saltmarshes (BRIG 2010). They are also influenced by biological, chemical and physical processes, including species predation, nutrient cycling and tidal movements, respectively. However, the tide affects the majority of processes. For example, in high tides fish are the main predators and at low tides it is birds (Hiscock *et al.* 2006). Mudflats dissipate wave energy reducing erosion to saltmarshes, damage occurring to coastal defences and flooding of low-lying land. In addition, they play an important role in nutrient chemistry.

Compared with mobile sandbanks, for example, mudflats are relatively stable habitats although the upper layer of sediment may be removed depending on the cohesion of the sediment and wave action. Mudflats can be roughly divided into an upper layer of oxygen rich sediment with a black, anoxic (low oxygen) layer beneath. This is caused by the compact nature of the sediment and its high organic content which limit the amount of oxygen that can reach the lower sediment deposits (Hiscock *et al.* 2006).

Mudflats have a high biological productivity and abundance of organisms. However, the species diversity is low. The predominant species are invertebrates and are mainly tube-dwelling polychaetes that live in the sediments (BRIG 2010). The nature of the sediment affects the species and distribution of the infauna that inhabit the mudflats. The sediment buffers them against large changes occurring to the habitat. Many of the species are restricted to the oxygenated upper layer of the sediment but tube-dwelling species can penetrate deeper into the anoxic layer with irrigated burrows or by building burrows that extend into the oxygenated layer (Hiscock *et al.* 2006). Mudflats are important nursery areas for flatfish and provide feeding and roosting sites for wintering and passage birds (BRIG 2010).



Photo credit: Mudflat by Bryan Howling

Local Status and Distribution

The Wash has the second largest area of intertidal mudflats in Britain, approximately 9000ha (based on fig 3), and supports the largest numbers of migrating waterfowl of any site in the UK (Murby 1997). They are inhabited by a rich variety of invertebrate species and provide good conditions for shellfish to live. Both supply food for the birds that use The Wash (Environment Agency 2010).

Mudflats, along with coastal saltmarsh, play an essential role in flood defence around The Wash by absorbing incoming wave energy and reducing the strength of the waves as they reach the sea defences (Environment Agency 2010). Sea level rise and the increased frequency of storm events predicted to occur because of climate change (IPCC 2007) will make their flood defence role more important for the future protection of The Wash hinterlands.

NE's condition assessment (2008^b) of this feature in The Wash and North Norfolk Coast SAC found that loss of intertidal mudflat extent and unfavourable changes to topography may be occurring in certain areas of The Wash, especially the western side. This is due to the accretion of saltmarsh over the mudflats and mudflat erosion. The condition assessment (2008^b) assessed the intertidal mudflats within the SAC as being in an unfavourable declining condition overall.

Current Threats in The Wash

- **Sea level rise and increased storminess** may result in the eventual loss of mudflats through coastal squeeze. Sedimentation patterns within the embayment may be altered and this will affect the mudflats, especially along the western side of The Wash.
- **Barrage schemes** (such as for water storage, tidal power and flood defence) threaten the integrity of the ecological value of mudflats in estuaries and enclosed bays.
- **Diffuse and point source discharges** from agriculture, industry and urban areas can affect invertebrate communities by producing abiotic areas or algal mats. Embedded fauna may be removed and sediments destabilised making them vulnerable to erosion.
- **Fishing** for particular species can alter the mudflat community structure and fishing activities can damage the mudflat substratum. The stable nature of mudflats can prolong their recovery. EIFCA policies ensure potentially damaging fishing gear is not used on the mudflats in The Wash.
- **Human disturbance** affects associated species such as roosting and feeding birds.
- **Introduction of new or non-native species.** The non-native Pacific Oyster currently inhabits mudflats in The Wash. A rapid increase in this species population can smother intertidal habitats including mussel beds. Their distribution needs to be monitored.
- **Estuarine dynamics.** Within estuaries, mudflats deposited in the past may erode due to changed estuarine dynamics and remobilised sediment may be redeposited elsewhere in the same littoral sediment cell (Natural England 2008^b; BRIG 2010)

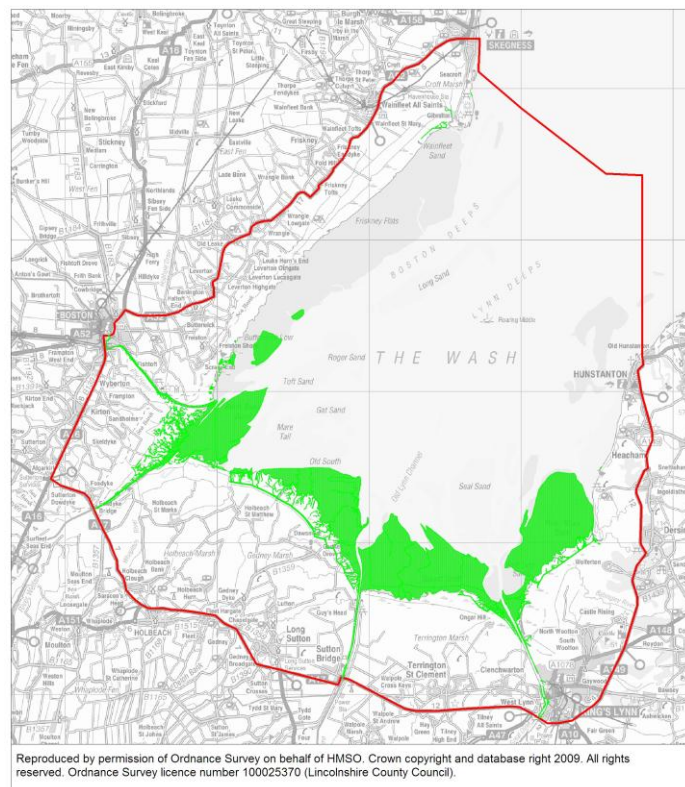


Fig 3. Map showing the distribution of intertidal mudflats. ■ = intertidal mudflat habitat; ■ = Wash BAP boundary.

Intertidal Mudflats Action Plan

Objectives

- Maintain the quality of the existing resource through appropriate management

Targets

- Achieve favourable or recovering condition (SSSI) of intertidal mudflats by appropriate management

Actions

- Lead partner – **NE**

Action	Potential Partner	Date
Monitor the extent of intertidal mudflats in The Wash.	NE, WNNCEMS	Ongoing
Carry out intertidal benthic surveys using cores to monitor the extent and distribution of biotopes in The Wash.	NE, WNNCEMS	Ongoing
Ensure that natural tidal movements are not impeded and that there is continued presence of muddy creeks.	NE	Ongoing

3.2.3 *Sabellaria spinulosa* (Ross Worm) Reefs

Description

Sabellaria spinulosa is a small, sedentary, suspension feeding, tube building polychaete worm. It can grow individually or together and form dense (usually subtidal) aggregations where the tubes are fused together. These are known as reefs. This action plan does not deal with the individual worms. Initially, the reef is created upon a solid substratum such as rocky substrates, gravel or shell fragments. Once it is established this solid substratum is no longer required for further worms to settle and less stable sediments are subsequently colonised. The worms' planktonic larvae are stimulated to settle on living or old *S. spinulosa* tubes rather than in new areas. *S. spinulosa* worms require a turbid environment to live because they build their tubes using sand particles that are held in suspension in the water column. The tubes are fragile but solid structures and can be several centimetres thick.

S. spinulosa reefs can stabilise pebble and gravel habitats and make it possible for other species to inhabit these otherwise uninhabitable areas, including epibenthic species and specialised 'crevice' infauna. Other species, like flatfish and shrimp, are attracted to the reefs to feed on the associated species. These types of reefs are the most important in terms of conservation value because of the biodiversity they attract and allow to inhabit previously unsuitable areas.

S. spinulosa is naturally common around Britain because it has few requirements: it is tolerant to pollutants and requires turbid water. Where conditions are favourable (favourable hydrodynamic conditions) the worms can form an extensive crust that can cover large areas of the seabed. These well developed, stable reefs are relatively uncommon. It is this reef that is of the greatest conservation value. Less stable, often annual 'crusts' are more widespread but are not included in the UK BAP description. Site monitoring studies have identified the *S. spinulosa* reef features are not permanent and their distribution can vary annually, making it difficult to monitor the extent of reefs over long time periods (Murby 1997; Holt *et al* 1998; Jones *et al* 2000; Jessop 2009; BRIG 2010).



Photo credit: *Sabellaria spinulosa* by Ian Reach

Local Status and Distribution

Well developed *S. spinulosa* reefs occur in The Wash (Solandt 2008). These reefs have been considered to be the most stable *S. spinulosa* reefs in the UK (Jessop & Stoutt 2006 from Lincolnshire Biodiversity Partnership 2011). Their distribution has been found to vary within areas that are known to support this feature.

NE's condition assessment (2008^b) of The Wash and North Norfolk Coast SAC found *S. spinulosa* reefs to be in an overall favourable condition in the SAC. The central core areas of reef are at risk from trawling for pink shrimp and potentially from seed mussel dredging so future prospects are good if fisheries management measures are put in place to protect the reef from towed gears (Natural England 2008^b).

Current Threats in The Wash

- **Disturbance** is the main threat to this habitat, especially with regards to fisheries. Disturbance mainly occurs from the activities of towed gear fisheries such as dredging for mussels, trawling for shrimp and potting. Mobile fishing equipment can break off parts of the reef. These broken parts will no longer be inhabited by the worms, which are unable to rebuild the broken tubes. Associated species are also affected. Within The Wash, the pink shrimp beam trawl fishery is likely to have the greatest impact on the reefs, although this fishery currently operates at a very low level. Beam trawling for brown shrimp is a main fishery in The Wash, but this fishery does not generally operate in areas supporting *S. spinulosa* reef. Mussel dredging could damage this feature if carried out in reef areas.
- **Substratum changes** (such as substratum character and sediment availability) can impact on the ability of the worms to build their tubes. This may occur through coastal developments such as the laying of cables and pipes. Even though the worms require a turbid environment to live an excess of sediment can smother them and alter the substratum they are building their tubes upon. Maritime structures can also alter hydrodynamics, which can reduce sediment availability (Natural England 2008^b; BRIG 2010).
- **Pollution**. Changes in water quality are not known to affect this species. However, the associated biota may be affected (Holt *et al* 1998; Jones *et al* 2000).

***Sabellaria spinulosa* Reefs Action Plan**

Objectives

- Maintain the extent and quality of *Sabellaria spinulosa* reefs in The Wash subject to natural change

Targets

- Establish a baseline for existing extent and condition of *Sabellaria spinulosa* reef in The Wash
- Maintain the extent of *Sabellaria spinulosa* reef in The Wash (based on baseline figure) subject to natural change
- Ensure shrimp fishing activity does not adversely affect *Sabellaria spinulosa* reef features throughout the site

Actions

- Lead partner – **EIFCA**

Action	Potential Partner	Date
Obtain baseline data on the distribution of <i>Sabellaria spinulosa</i> reefs.	EIFCA, NE, JNCC, Wind farm developers, CEFAS	Ongoing
Identify management measures for <i>Sabellaria spinulosa</i> reefs.	EIFCA, NE, Fisheries industry	Ongoing
Once management measures have been identified set actions to implement them.	EIFCA, NE, Fisheries industry	Ongoing
Work with potential partners to continue sustainable fishing.	WNNCEMS	Ongoing
Carry out surveillance work to monitor the <i>Sabellaria spinulosa</i> reef.	NE, WNNCEMS	Ongoing

3.2.4 Common/Harbour Seal (*Phoca vitulina*)

Description

The common seal is one of two seal species that breeds along the UK coast. The other is the grey seal (*Halichoerus grypus*). Common seals are grey to brownish grey in colour and have dark spots. They have a rounded head with no visible ears and have 'V' shaped nostrils. They can be distinguished from grey seals by their smaller size and shorter muzzle. Common seals can live between 20-30 years with the females living longer than the males (Special Committee on Seals 2008).

In the UK, some of the more important haul out areas for common seals are on the sheltered sandflats and rocky shores of The Wash and certain areas of the Scottish coast. They may share these sites with grey seals. Haul out areas are used for resting, pupping and moulting. Adult seals tend to remain faithful to their favoured haul out sites from year to year. For many years, the Sea Mammal Research Unit (SMRU) has monitored the haul out sites used by common seals in The Wash, by conducting aerial surveys during the moulting and pupping seasons.

Common seals may spend several days feeding at sea. They feed on a variety of prey including sandeels, whiting, flatfish, octopus and squid. They will travel up to 50km away from their haul out site to feed and can dive to depths of 450m. Pupping takes place in June and July and pups can swim several hours after birth. The females care for the pups while the males fight between themselves to increase their chances of breeding once the pups have weaned. In August the seals moult and spend much of their time ashore.

The UK common seal population represents about 5% of the world population. Common seals are protected by the Conservation of Seals Act (1970) during their breeding season, although seals causing damage to fishing gear, or taking fish from nets, may be killed under licence. The Act also allows seals to be fully protected when required. Common seal pups used to be hunted for their skins, particularly in Shetland and The Wash. The common seal is listed in Annex II of the EU Habitats Directive (Special Committee on Seals 2008).



Photo credit: Common seal by Georgina Deacon

Local Status and Distribution

Common seals use the intertidal flats of The Wash as resting, moulting and pupping grounds. The largest seal colony in England occurs in The Wash and North Norfolk coast, making up approximately 7% of the total UK population (JNCC 2011).

Since 1988, the common seal population in The Wash has suffered from two outbreaks of phocine distemper virus (PDV). The outbreak in 1988 reduced the population by approximately 50%. After this the population increased, however, a second epidemic in 2002 reduced the population by approximately 22% and it has failed to recover since (Thompson *et al.* 2005). Between 2005 and 2009 the pup production of common seals in The Wash has increased. However, the moult population continued to decline after the 2002 epidemic (Thompson 2009). Because of this NE's condition assessment in 2008^b assessed the common seal population of The Wash and North Norfolk Coast SAC as being in an unfavourable declining condition overall. However, the 2010 update to the condition assessment has noted some improvement in the population and has now assessed the population as being unfavourable recovering (Natural England 2010^a).

Current Threats in The Wash

- **Diseases** (such as PDV) periodically affect seals. PDV can kill off large numbers of the population.
- **Environmental contaminants** (such as toxic substances at sea and marine debris). Through their diet seals bioaccumulate pollutants such as heavy metals and polychlorinated biphenyls (PCBs) which are persistent in the environment. Female common seals feeding on fish with high levels of PCBs may fail to breed. Pollution could hinder the recovery of some seal populations which have been reduced by disease. Seals are also sensitive to debris such as small plastic fragments that they may ingest or get caught around their neck if large enough.
- **Environmental change** (such as the effects of fishing and climate change). Sea level rise may result in the loss of important intertidal haul out sites used by common seals. Declines in fish stocks caused by climate change and over-fishing could bring about declines in seal numbers, although there is no evidence of over-fishing affecting food availability for seals in The Wash.
- **Disturbance**. Noise and physical disturbance caused by human and industrial activities, such as tourist and boating activities, can affect seals. They may become habituated to prolonged disturbance but they still remain sensitive to new disruptions. Disturbed seals may move to less productive sites or become stressed and use more energy. Female seals are particularly susceptible during pupping. Licenced fishing activities in The Wash are periodically assessed to evaluate their potential for disturbing seals using haul-out sites, particularly during the pupping and breeding season.
- **By-catch**. Seals can become tangled in fishing nets and drown, although there is no evidence that this is a widespread occurrence in The Wash (Harris *et al.* 1995; Thompson *et al.* 2005; Natural England 2008^a; Lincolnshire Biodiversity Partnership 2011).

Common/Harbour Seal Action Plan

Objectives

- To maintain and enhance the range of the common seal population in The Wash

Targets

- Maintain and enhance the current range of the common seal in The Wash
- Maintain and enhance the population of common seals in The Wash

Actions

- Lead partner – **NE**

Action	Potential Partner	Date
Raise awareness of the common seal in The Wash through publicity materials and events. Ensure they are not disturbed through this action.	WEP, WNNCEMS, BDMLR, NBIS, LWT	Ongoing
Ensure common seals are taken into consideration in management activities at designated areas of The Wash.	NE	Ongoing
Ensure seal watching trips do not disturb the seals.	NE, WNNCEMS	Ongoing

3.2.5 Harbour Porpoise (*Phocoena phocoena*)

Description

The harbour porpoise is the smallest and most common marine mammal found in UK waters. It is limited to the temperate and subarctic waters in the northern hemisphere, favouring shallower coastal areas. The harbour porpoise is dark grey in colour and has a white underside. It has a small, triangular dorsal fin on the centre of its back, and has a small, rounded nose with no beak. They grow no longer than 2m and those in the North Sea reach no more than 1.6m (Reid *et al.* 2003; Norfolk County Council 2007).

Harbour porpoise usually occur in groups of three or less. On rare occasions they are seen in larger groups, which are uncoordinated gatherings and do not form a school. This most likely happens at good feeding sites. They feed on a variety of small fish species, squid and occasionally crustaceans that are near to or on the seabed (Reid *et al.* 2003). Females have a gestation period of 11 months and calves are usually born in June and July, remaining dependant upon their mother for up to 10 months (BDMLR 2009).

The harbour porpoise is listed on Appendix II of CITES, Appendix II of the Bern Convention, Annexes II and IV of the EC Habitats Directive and on Appendix II of the Bonn Convention. It is covered by the terms of the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS), a regional agreement under the Bonn Convention. It is also protected by Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA).



Photo credit: Harbour porpoise by Nic Davies/www.wildshot.net

Local Status and Distribution

The national and local status of the harbour porpoise is unknown and due to the transient nature of this species a regional assessment is unsuitable.

There has been some evidence of a national decline in harbour porpoise numbers since the 1940's, especially in the North Sea and English Channel (UK Biodiversity Action Plan 1999). A "SCANS" survey (Small Cetacean Abundance in the North Sea and Adjacent Water), was carried out in 1994 and again in 2005 by the SMRU. The 1994 survey supplied the first population estimates for this species around the UK. The 2005 survey collected further data but covered a larger area. The population estimate from the same survey areas in 1994 and 2005 were very similar and the population is considered to be stable. The distribution of this species had changed with the main concentration from the North Sea moving from the northwest in 1994 to the southwest in 2005 (Hammond 2006).

Sightings and strandings have been recorded around The Wash. Strandings have occurred at Skegness, Gibraltar Point, Hunstanton and Snettisham (Natural History Museum 2011). Anecdotal sighting records and stranding data indicates that harbour porpoises were previously more common in Norfolk waters and the population declined during the middle part of the twentieth century (Norfolk County Council 2007).

Current Threats in The Wash

- **Environmental contaminants** (such as toxic substances at sea, marine debris and disease) from human activities can influence the reproductive potential of harbour porpoises making them more susceptible to diseases by suppressing their immune system. Cetaceans are very susceptible to bioaccumulation.
- **Environmental change** (e.g. effects of fishing and climate change). Declines in fish stocks caused by climate change and intensification in fishing practices can bring about declines in harbour porpoise numbers. There is no evidence of fishing activity limiting food supplies for harbour porpoise in The Wash.
- **Disturbance.** Both noise and physical disturbance caused by vessel activities affect harbour porpoise. Boats can physically injure and kill porpoises if they collide, while the noise from engines and sonar devices affects their echolocation abilities leading to disorientation and possibly deafness. Increases in vessel use may lead to harbour porpoises moving into different, less productive areas of the sea (UK Biodiversity Action Plan 1999; Norfolk County Council 2007). Noise emanating from offshore construction (including renewables, oil and gas) has the potential to affect harbour porpoises if not adequately mitigated (personal comm. with Centrica).

Harbour Porpoise Action Plan

Objective

- Gain a better understanding of harbour porpoise numbers and distribution in The Wash

Targets

- Obtain baseline information on the harbour porpoise that use The Wash

Actions

- Lead partner – **WEP**

Action	Potential Partner	Date
Monitor harbour porpoises in The Wash by setting up effort based surveys at 3 sites around The Wash using the Sea Watch Foundation methodology.	WEP, WNNCEMS	2015
Raise awareness of harbour porpoise in The Wash through publicity materials and events. Ensure they are not disturbed through this action.	WEP, WNNCEMS, BDMLR, NBIS, LWT	Ongoing
Distribute cetacean sightings card and information on how to survey for cetaceans.	WEP, EIFCA, NBIS, LBP, LWT	Ongoing

3.3 Coastal Habitats and Species

Introduction

The UK coastline is one of the longest in Europe, at over 12,400 km. It is varied and dynamic (JNCC 2010^a), especially in The Wash where it incorporates five river estuaries. The coastal habitats within The Wash are subject to natural change in quality and extent. They are submerged for varying lengths of time by the tide and are subject to freshwater inputs from the rivers and saltwater inputs from the North Sea.

The Wash has several important coastal habitats including large expanses of saltmarsh, saline lagoons, coastal vegetated shingle, sand dunes and maritime cliffs. These habitats, along with the others found in The Wash, support internationally and nationally important numbers of birds by providing roosting, feeding and breeding sites. The saltmarshes like the intertidal mudflats are rich in invertebrates. The low chalk cliffs on the eastern side of The Wash at Hunstanton are composed of weak rock and provide an important breeding site for Fulmer (*Fulmarus glacialis*). They are the only undefended area of The Wash coastline. From Hunstanton to the south there are sandy beaches backed by a natural shingle ridge that is maintained. The beaches turn into mudflat the further seaward they become (Environment Agency 2010). The gravel pits at Snettisham are an important high-tide roost for waders (JNCC 2001). Round on the northern tip of The Wash is Gibraltar Point National Nature Reserve (NNR). It is an important site because in addition to supporting bird species it is the only site within The Wash that is inhabited by the UK BAP priority species, the natterjack toad (*Epidalea calamita*).

Coastal habitats provide multi-functional benefits to society. For example, saltmarshes and sand dunes aid in nutrient cycling, flood risk management and carbon sequestration. Sea level rise and the increased frequency of storm events predicted to occur because of climate change (IPCC 2007) will make the flood defence role played by these habitats more important for the future protection of The Wash hinterlands.

The Wash Shoreline Management Plan (SMP) and the Flamborough Head to Gibraltar Point SMP (2009) will play an important role in the management of coastal habitats around The Wash. Depending on the management options and policies used in the plan they have the potential to lead to changes in the form and function of intertidal habitats, levels of flooding and management regimes (Environment Agency 2010).

Habitat action plans in this section of The Wash BAP are:

- Coastal saltmarsh
- Coastal sand dunes
- Saline lagoons.

The species action plan in this section of The Wash BAP is:

- European eel (*Anguilla anguilla*).



Photo credit: Fulmer by Neil Smith

3.3.1 Coastal Sand Dunes

Description

Coastal sand dunes develop where there is an adequate supply of sand (sediment within the size range 0.2 to 2.0mm) in the intertidal zone and where onshore winds are prevalent. The critical factor is the presence of a sufficiently large beach plain whose surface dries out between high tides. The dry sand is blown landwards and deposited above the high water mark where it is trapped by specialised dune-building grasses which grow up through successive layers of deposited sand. Sand dunes form in relatively exposed locations, and in a number of physiographic situations.

Sand dune vegetation forms a number of zones which are related to the time elapsed since the sand was deposited, the degree of stability which it has attained, and the local hydrological conditions. Embryonic and mobile dunes occur mainly on the seaward side of a dune system where sand deposition is occurring and very few plant species are supported. The most characteristic plant is Marram grass (*Ammophila arenaria*). Semi-fixed dunes occur where the rate of sand accretion has slowed but the surface is still predominantly bare sand. The number of plant species increases in these dunes but Marram grass is still common. Fixed dune grassland forms largely close to swards where accretion is no longer significant, the surface is stabilised and some soil development has taken place. Dune slack vegetation occurs in wet depressions between dune ridges. It is often characterised by creeping willow (*Salix repens* ssp. *Argentea*) and a number of moss species. The more stable, older dunes in The Wash area are inhabited by vegetation such as sea buckthorn (*Hippophae rhamnoides*), which is native to the area.

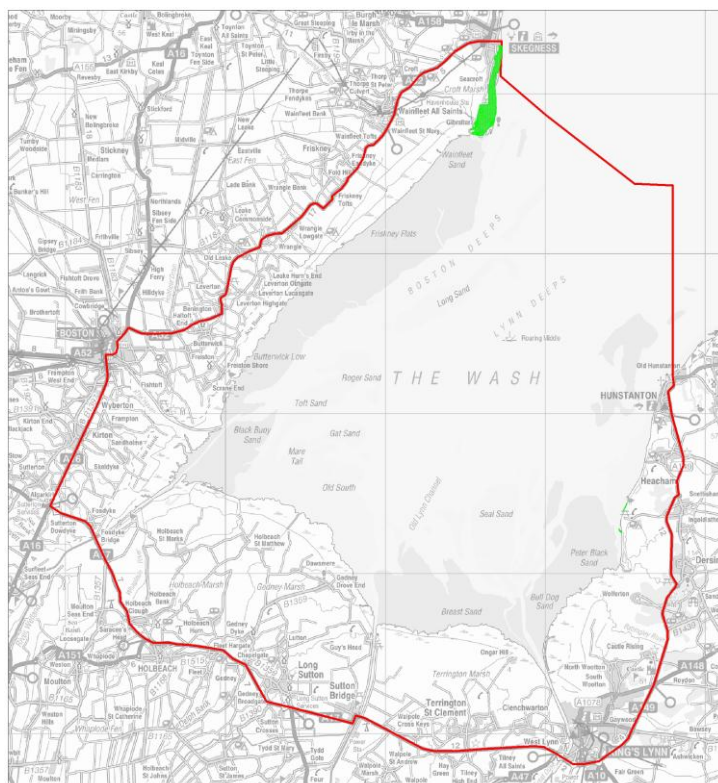
Sand dunes can support a diverse invertebrate fauna, particularly butterflies, moths, burrowing bees and wasps (BRIG 2010).

Local Status and Distribution

Coastal sand dunes are found on opposite sides of The Wash embayment between Skegness and Gibraltar Point, and between Snettisham and Hunstanton.

Much of the sand dune area in the northern part of The Wash is within the Gibraltar Point NNR and is covered by Ramsar Site, SPA and SAC designations. This is a zone of accretion where an extensive sand dune system has been developing over several centuries, gradually extending southwards in a series of parallel ridges running approximately north to south. These dunes are subject to sensitive management within the limitations of their use. Erosion of the sand dune in front of the Seacroft marsh at Gibraltar Point is putting the upper saltmarsh behind at risk (Natural England 2008^b).

The dunes at Hunstanton are not covered by a designation and are found within tourist areas.



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Fig 4. Map showing the sites that have been recorded as having BAP quality coastal sand dunes. ■ = coastal sand dune habitat; ■ = Wash BAP boundary.

Current Threats in The Wash

- **Coastal squeeze** brought about by sea level rise and the inability of the habitat to retreat inland because of fixed coastal defences. This can lead to the loss of coastal sand dunes.
- **Beach nourishment** to restore sand beaches between Mablethorpe and Skegness is having an impact on dune formation at Gibraltar Point.
- **Inappropriate levels of grazing.** Grazing is necessary to maintain fixed dune communities. However, overgrazing and undergrazing can have damaging effects. Undergrazing is a more widespread problem leading to invasion by coarse grasses and scrub. Rabbits are effective in maintaining a short turf and grazing by livestock is needed to keep extensive areas under control.
- **Recreation.** Dune systems are used for activities such as walking and parking cars. Excessive uses like these can cause local erosion of the dunes. Breeding birds and other wildlife may also be disturbed, especially by dogs.
- **Colonisation by sea-buckthorn**, which is naturally occurring but an aggressive coloniser, reduces open, species-rich sand dune communities. However, it is important to maintain a healthy population of this nationally scarce species.
- **Falling water tables** (brought about by activities such as agriculture and housing developments). Dune slack communities depend on high winter water tables. Specialised dune slack species are adapted to cope with yearly fluctuations but a long-term fall in the water table can lead to a loss of the typical dune slack plants and invasion by scrub and coarse vegetation.
- **Sea-defence and stabilisation.** Dune systems are affected by sea-defence works, or artificial stabilisation measures such as sand fencing or marram planting. While careful dune management measures can help counteract severe erosion, engineered defence systems usually reduce biodiversity in dunes.
- **Dredging** may disrupt coastal processes and remove sediment sources which are required for the formation and maintenance of sand dunes.
- **Natural dune erosion and formation.** Dunes can be highly mobile and natural patterns of erosion and accretion occur. There is a natural trend towards greater stability with increased distance from the sea (Simpkin 2006; Natural England 2007).

Coastal Sand Dunes Action Plan

Objective

- To maintain existing areas of dune systems allowing natural processes to continue
- To protect any currently undesignated sites from development

Targets

- Obtain baseline data on the extent and condition of coastal sand dune habitat in The Wash
- Maintain the current extent and condition of coastal sand dune habitat in The Wash (based on baseline figure)
- Achieve favourable condition (SSSIs) or favourable management (LWSs/CWSs) for designated coastal sand dunes in The Wash

Actions

- Lead Partner: **NE**

Action	Potential Partner	Date
Undertake desk based study and surveys to find the extent and condition of coastal sand dune habitat in The Wash.	WEP, LBP, NBIS, RSPB, NE, LWT	2015
Promote and encourage the creation of semi-natural habitats behind dune systems to buffer from adjacent land use and allow landward movement of dunes.	NE, LWT, NWT	2015
Implement beach management strategies that encourage protection of the seaward fronts of dune systems from unsustainable development activity.	NE, EA, LAs	Ongoing
Ensure that all relevant parties, including landowners and managers, are informed of the importance of coastal sand dunes and of appropriate management.	NE, RSPB, LWT, NWT	Ongoing

3.3.2 Coastal Saltmarsh

Description

Coastal saltmarshes in the UK comprise the upper, vegetated portions of intertidal mudflats, lying approximately between mean high water neap tides and mean high water spring tides. For the purposes of this action plan the lower limit of saltmarsh is defined as the lower limit of pioneer saltmarsh vegetation (but excluding seagrass *Zostera* beds) and the upper limit as 1m above the level of highest astronomical tides to take transitional zones into account. Saltmarshes are usually restricted to comparatively sheltered locations in five main physiographic situations: in estuaries, in saline lagoons, behind barrier islands, at the head of sea lochs, and on beach plains. The development of saltmarsh vegetation is dependent on the presence of intertidal mudflats.

Saltmarsh vegetation consists of a limited number of halophytic (salt tolerant) species adapted to regular immersion by the tides. A natural saltmarsh system shows a clear zonation according to the frequency of saltwater inundation. Species at the lowest level can withstand regular immersion by tides, while transitional species of the upper marsh can only withstand occasional inundation. On traditionally grazed sites, saltmarsh vegetation is shorter and dominated by grasses. This adds diversity to the sward structure accommodating more invertebrate species.

Saltmarsh habitat is important for wading birds and wildfowl. It acts as high tide refuges for birds feeding on adjacent mudflats, as breeding sites for waders, gulls and terns and as a source of food for passerine birds particularly in autumn and winter. In winter, grazed saltmarshes are used as feeding grounds by large flocks of wild duck and geese. Saltmarshes are important habitats for many rare invertebrates, particularly in areas with high structural and plant diversity and where freshwater seepages provide a transition from fresh to brackish conditions. Saltmarshes provide sheltered nursery sites for several fish species and can export nutrients to nourish neighbouring mudflats (BRIG 2010).



Photo credit: Freiston by Tammy Smalley

Local Status and Distribution

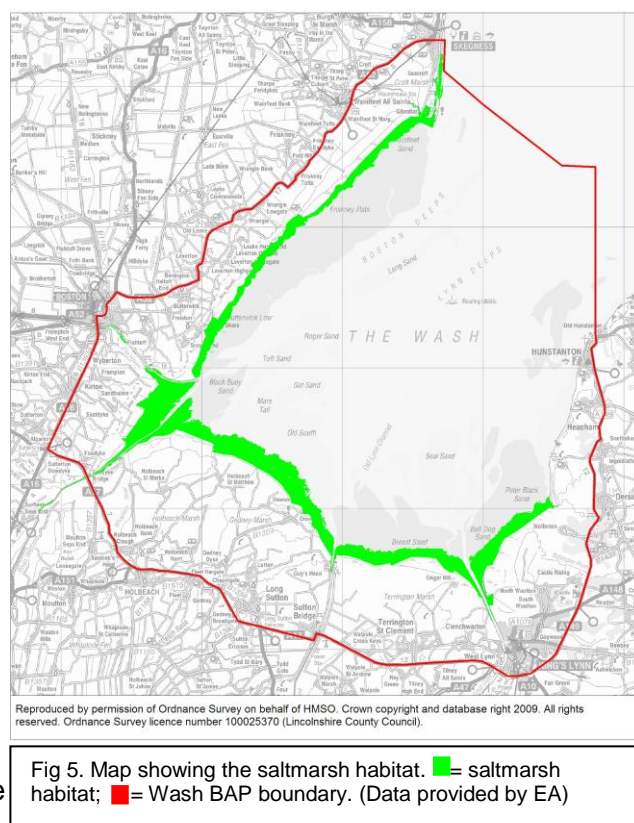
Since medieval times, many saltmarshes have been reduced in extent by land claim. In The Wash, this practice continued until the early 1980s when 858ha of saltmarsh were converted for agricultural use between 1970 and 1980 (BRIG 2010). In general, since the 1980s, the saltmarsh of The Wash has been and is accreting seawards at the expense of intertidal mudflats. Currently, there is saltmarsh coverage, to varying degrees, from the southern sections of Gibraltar Point north of The Wash through the whole western and southern shores to approximately Snettisham in Norfolk on the eastern side of The Wash (Natural England 2008^b). There are approximately 4901ha of saltmarsh (based on fig 5). It is adjacent to the grassland of the sea banks and behind these is arable and horticultural land. Because of this the upper and transitional saltmarsh zones are not present.

Currently, saltmarsh accretion is outpacing the rate at which the sea level is rising. The accretion is occurring across the whole of The Wash, with the most significant increase occurring on the south-western side, particularly between the Rivers Welland and Nene (Environment Agency 2010). In more recent years, the saltmarsh extent has increased in a proactive manner due to a managed realignment at Freiston Shore. The outer bank at this site was breached in 2002 and since the 80ha behind the outer bank has been developing into a healthy saltmarsh community. The saltmarsh around Frampton marsh and Kirton marsh is some of the oldest in The Wash. The marsh north of Boston and the River Witham, are relatively less established in terms of age and zonation.

Coastal saltmarsh along with intertidal mudflats play an essential role in flood defence around The Wash. These habitats absorb incoming wave energy, which reduces the strength of the waves as they reach the sea defences (Environment Agency 2010). Sea level rise and increased frequency of storm events predicted to occur because of climate change (IPCC 2007) will make the flood defence role played by these habitats more important for the future protection of The Wash hinterlands.

Current Threats in The Wash

- **'Coastal squeeze' and erosion** brought about by sea level rise and the inability of the habitat to retreat inland because of fixed coastal defences. This can lead to a loss of saltmarsh habitat.
- **Sediment supply** may be affected by coastal protection works, or by changes in estuary morphology caused by land claim, dredging of shipping channels and the impacts of flood defence works over the years. This can increase levels of erosion.
- **Eutrophication.** Pollution such as sewage effluent and agricultural fertiliser run-off can cause algal growth on saltmarshes.
- **Inappropriate grazing.** Grazing affects the structure and composition of saltmarsh vegetation by reducing the vegetation height and the diversity of plant and invertebrate species present. Intensive grazing creates a sward attractive to wintering and passage wildfowl and waders, whilst less intense grazing produces a tussocky structure which favours breeding waders. Some grazed saltmarshes have been abandoned, leading to the domination of the mid and upper marsh by rank grasses, especially around The Wash (Simpkin 2006; BRIG 2010).



Coastal Saltmarsh Action Plan

Objective

- To identify areas for the creation of saltmarsh through managed realignment if opportunities arise
- To maintain the quality of the existing resource through appropriate management and continue to allow natural coastal processes

Targets

- To maintain the current extent (approx. 4901ha, based on fig 5) of coastal saltmarsh in The Wash subject to natural change
- Achieve favourable condition (SSSIs) or favourable management (LWSSs/CWSSs) of coastal saltmarsh in The Wash

Actions

- Lead partner – **NE**

Action	Potential Partner	Date
When opportunities arise support the recreation of coastal saltmarsh habitat through managed realignment.	NE, RSPB, NBIS, EA, LWT	Ongoing
Work with landowners to produce management plans for coastal saltmarsh and continue to allow natural coastal processes.	NE, RSPB, landowners	2015
Carry out condition monitoring of coastal saltmarsh in The Wash and keep baseline information up to date.	NE, WNNCEMS, RSPB, EA	Ongoing
Ensure that all relevant parties, including landowners and managers, are informed of the importance of coastal saltmarsh and of appropriate management.	RSPB, LWT, NWT, NE	Ongoing

3.3.3 Saline Lagoons

Description

Saline lagoons are essentially natural or artificial bodies of saline water partially separated from the adjacent sea, but with some influx of sea water. They retain a proportion of their seawater at low tide and may develop as brackish, full saline or hyper-saline water bodies (BRIG 2010).

Lagoons can contain a variety of substrata, often soft sediments which in turn may support tasselweeds and stoneworts as well as filamentous green and brown algae. They provide an important habitat for waterfowl, marshland birds and seabirds and can contain invertebrate species rarely found elsewhere. The flora and invertebrate fauna present can be divided into three main components:

- those that are essentially freshwater in origin,
- those that are marine/brackish species,
- those that are more specialist lagoonal species.

The presence of certain indigenous and specialist plants and animals make this habitat important to the UK's overall biodiversity.

There are several different types of lagoons, ranging from those separated from the adjacent sea by a barrier of soft sand or shingle ('typical lagoons'), to those arising as ponded waters in depressions on soft sedimentary shores, to those separated by a rocky sill or artificial construction such as a sea wall. Sea water exchange in lagoons occurs through a natural or man-modified channel or by percolation through, or overtopping of, the barrier. The salinity of the systems is determined by various levels of freshwater input from ground or surface waters. The degree of separation and the nature of the material separating the lagoon from the sea are the basis for distinguishing several different physiographic types of lagoon (BRIG 2010).

Local Status and Distribution

There are several sites containing saline lagoons within The Wash BAP boundary that are of national and international importance.

Moulton Marsh is a Lincolnshire Wildlife Trust (LWT) Nature Reserve that lies just outside the boundary of The Wash SSSI (also the SAC, SPA and Ramsar Site) on the western side of The Wash. *Bamber et al.* (2003) recognised the high conservation merit of the saline lagoons at this site. They found coastal saline lagoon habitat supporting typical lagoonal communities, including the lagoonal sand shrimp (*Gammarus insensibilis*) which is a scheduled species under the WCA and seven other lagoonal specialist species. The lagoonal sand shrimp is also found at Lawyer's Farm Pond, a privately owned site in Holbeach.

There are four saline lagoons at Snettisham on the eastern shore of The Wash. Three lie within the boundary of The Wash SSSI (also SAC, SPA and Ramsar Site). The lagoons are separated from the sea by a reinforced shingle embankment through which sea water exchange can occur via percolation. They form an important component of the area, providing feeding, breeding and roosting areas for birds. The baseline for lagoon attributes at Snettisham was only set in 2005, within the last reporting period for the condition assessment. Therefore, the lagoons

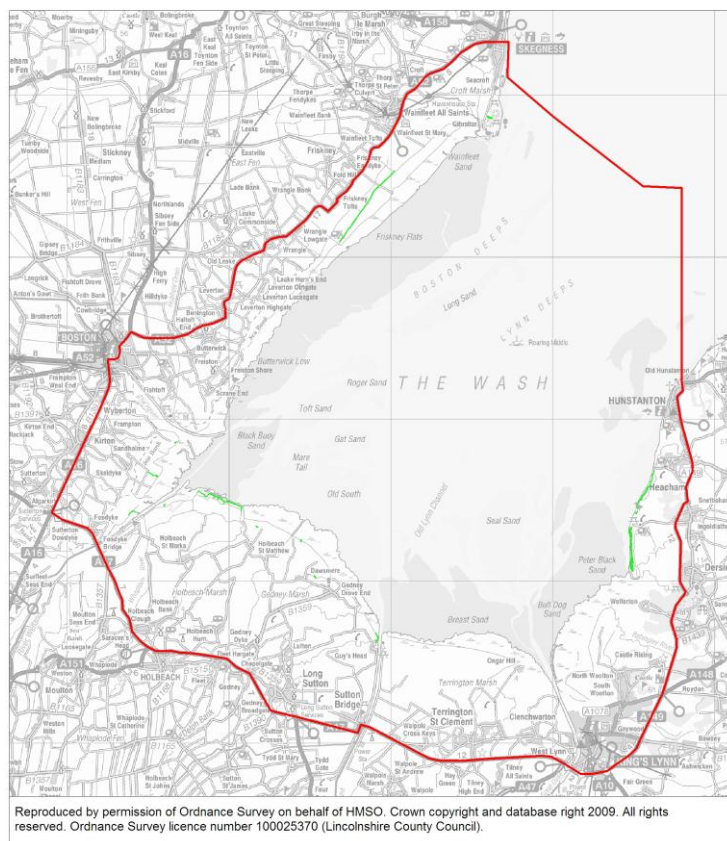


Fig 6. Map showing the saline lagoons that have been recorded as BAP quality habitats. ■ = saline lagoon habitat; ■ = Wash BAP boundary.

have not been formerly condition assessed as an interest feature of the SSSI. However, there are concerns over unregulated development on the shingle ridge, which may affect the extent and isolating barrier attributes. In addition, recent observations of seasonal algal blooms and a perceived decline in the abundance of specialist lagoonal species have prompted concern over the water quality. The lagoons are consequently considered to be in an unfavourable declining condition and are currently undergoing a water quality monitoring programme (NE, EA and RSPB). The lagoons were subject to full Common Standards Monitoring condition assessment in 2010 (Natural England 2008^b, 2009).

Managed realignment at Freiston Shore in 2002 formed 12 ha of saline lagoon habitat. These support breeding birds such as the avocet (*Recurvirostra avosetta*) and other lagoon wildlife (Simpkin 2006).

Current Threats in The Wash

- **Inappropriate management** for saline lagoon specialist species.
- **Natural development** into freshwater or terrestrial habitats as salinity changes.
- **Pollution** (e.g. from industrial run-off and nutrient enrichment from agricultural run-off) can have major detrimental effects. In particular nutrient enrichment may lead to eutrophication.
- **Artificial control of brackish and freshwater** to lagoons can greatly influence this habitat.
- **Sea level rise**. It has been estimated that 120ha of coastal lagoons in England may be lost in the next 20 years, mainly through sea level rise.
- **Coastal erosion**.
- **Coastal defence works** can prevent the movement of sediments along the shore and lead to a gradual loss of natural coastal structures. However, not all coastal defence works are detrimental because the maintenance of the reinforced shingle embankment at Snettisham is responsible for the continuation of its coastal features.
- **Phragmites encroachment** (Norfolk Wildlife Trust 2006; Simpkin 2006; BRIG 2010).

Saline Lagoons Action Plan

Objectives

- Maintain extent and condition of saline lagoons consistent with the development of a naturally functioning coastline
- Create or recreate saline lagoons when the opportunity arises through managed realignment and other coastal defence schemes

Targets

- Obtain baseline data on the extent and condition of the saline lagoon habitat in The Wash
- Maintain the current extent and condition of saline lagoon habitat in The Wash (based on baseline figure)
- Expand the extent of saline lagoons in The Wash (figure to be set once baseline obtained)

Actions

- Lead partner – **NE**

Action	Potential Partner	Date
Undertake desk based study and surveys to find the extent and condition of saline lagoon habitat in The Wash.	WEP, LBP, NBIS, RSPB, NE, IDBs	2015
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.	NE, IDBs, LAs	Ongoing
Ensure that all relevant parties, including landowners and managers, are informed of the importance of saline/brackish lagoons and ditches, and of appropriate management.	NE, RSPB, EA	Ongoing
Identify all suitable sites for saline/brackish lagoon creation/restoration.	NE, RSPB, EA	2015
Ensure that all suitable saline/brackish lagoons in The Wash are protected by appropriate designation, e.g. SPA, SSSI, LWS, CWS.	NE, WNNCEMS, RSPB, LAs	Ongoing

3.3.4 European Eel (*Anguilla anguilla*)

Description

European eels can grow to more than 1m in length. They have a snake like body with a lower jaw that is slightly longer than their upper jaw and has small blunt teeth. Their eyes are small and round and their bodies are usually dark brown, black or olive green with a lighter yellowish underside. The dorsal and ventral fins begin behind the gill slits and run the length of the body to meet at the tail.

The European eel is predominately nocturnal, spending the day under rocks, weeds or in soft sediments. They feed on virtually the whole aquatic fauna.

This species has a complicated life history and their spawning has not been observed. They are catadromus (they live in freshwater but breed in the sea) and mature eels are thought to spawn in the Sargasso Sea in the Atlantic Ocean. It is here the leaf-like leptocephalus larvae (first stage in development) are found drifting northeast with the Gulf Stream. They arrive in southern Europe in early winter and by spring or early summer they reach northern Europe. Here, in coastal waters the leptocephalus larvae metamorphose into glass eels (eel-shaped, transparent juveniles). They then migrate upstream into inland waters once the rivers reach 10-12°C. The glass eels then obtain green and brown pigments and become yellow eels. Yellow eels spend between two and twenty years in these rivers and undergo a final transformation into silver eels when they darken, their bellies whiten and their eyes grow bigger. Silver eels migrate back into the Atlantic Ocean to spawn. They do not feed during this migration and it is thought that after spawning they die (Avant 2008; Fishbase 2009; ICES 2009).

The European eel is listed on Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and is listed as critically endangered on the IUCN Red List of Threatened Species. It is also a marine feature that MCZs will be designated to protect.



Photo credit: European eel (glass eels) by Environment Agency

Status and Distribution

The European eel has undergone a sharp decline over the whole of its European range. In the mid-1980's the number of new glass eels entering rivers declined to 10% of its former levels and since 2000 this has dropped to between 1 and 5%. The recruitment rate is low and is continuing to decline as older eels are lost. This decline may continue for at least two decades (EIFAC/ICES 2006). The abundance of the European eel stock (all stages glass eel, yellow eel and silver eel) is at a historical minimum and continues to decline (ICES 2010).

To enable stock recovery the European Union adopted Council Regulation No 1100/2007EC. The UK Eel Regulations Statutory Instrument came into force in January 2010, allowing the UK to implement EC Council Regulation (1100/2007). Under this, we must take actions to halt and reverse the decline in the European eel stock, aiming to meet a target of 40% escapement for the number of mature adult eels leaving each river basin to return to spawn at sea. The Environment Agency (EA) has prepared Eel Management Plans (EMP) for all River Basin Districts including Anglian; this sets out local targets and work plans (DEFRA 2010).

Current Threats in The Wash

- **Pollution, disease and parasites** can seriously impair their quality and reduce the fat content of individual silver eels. This may cause deformities in the eels and impact their condition, behaviour and reproductive success. Pollution can also make eels more susceptible to disease. An introduced parasite from Japan, *Anguillicoloides (Anguillicola) crassus*, may be affecting eels in the UK.
- **Fisheries.** The European eel is an important fishery across Europe. Eels are caught throughout their life. Glass eels are fished as they enter estuaries and rivers, yellow eels are caught whilst inhabiting rivers and silver eels are caught when they start their migration back out to sea to spawn. There has never been a commercial glass eel fishery in operation in the Anglian region.
- **Barriers to migration** such as dam constructions, weirs and sluices affect the natural migrations of eels. They can prevent eels from reaching favoured habitats and delay elvers upstream movements and silver eels downstream movements.
- **Habitat loss.** River modification has led to a restriction or loss of migratory routes and thus access to habitat. Land drainage practices have also led to habitat loss (EIFAC/ICES 2006, 2010; DEFRA 2010).

European Eel Action Plan

Objective

- Address the decline of the European eel and implement the EU Regulation through production and delivery of the Anglian River Basin Eel Management Plan

Targets

- Obtain baseline data on the population and distribution of European eel in the wetlands and coastal areas of The Wash by 2013
- Maintain and enhance the current distribution of the European eel in The Wash once the baseline has been set

Actions

- Lead partner – EA

Action	Potential Partner	Date
Implement the Anglian River Basin Eel Management Plan (with partners).	EA, IDBs, LBP, King's Lynn Conservancy Board, Boston Port	2012
As part of surveying or regulatory work collect information on eels, especially eel captures or observations in transitional or marine waters, to supplement the EA monitoring work.	IDBs, King's Lynn Conservancy Board, Boston Port, fishermen	Ongoing
EA, landowners and IDB to work together to join existing prioritised barrier lists and expand to include any other known barriers.	IDBs, EA, landowners	2012
Work with landowners to identify barriers to eel migration and help solve this issue.	IDBs, EA	2015

3.4 The Wash Hinterland Habitats and Species

Introduction

The Wash hinterland is shared between Lincolnshire and Norfolk and lies behind the coastal habitats surrounding The Wash. They are protected by grassed earth embankments and were once part of the natural coastal systems of The Wash. Both the hinterlands and sea banks are made up of many metres of sediments that have been gradually deposited since Mesolithic times (period between 10,000BC to 5000BC) due to a combination of estuarine and freshwater conditions reflecting periodic sea level rise and fall. Land reclamation has occurred periodically since medieval times when the coastline was further inland reaching parts of Cambridgeshire. The last land reclamations occurred in the 1970's and early 1980's in the northern area of The Wash between Freiston and Butterwick.

In general, the hinterlands are sparsely populated by rural communities and consist of a mosaic of open high quality agricultural land that is criss-crossed by an extensive network of rivers, drains and dykes. Farm margins, watercourses, buildings, gardens and allotments are examples of habitats available in the area (Wash Estuary Strategy Group 2004). Land use in the northern, western and southern hinterland area is dominated by agriculture, which is of national importance. Further east agriculture is still important but the land is of a lower quality and round towards Hunstanton land use becomes dominated by livestock grazing. Tourism related land use occurs on the eastern side around Hunstanton and at the northern tip around Skegness (Environment Agency 2010).

The wildlife that depends upon The Wash hinterlands for their survival includes amphibians, birds, fish, invertebrates, mammals, plants and reptiles. For a list of the UK BAP Priority habitats and species that have been recorded in The Wash go to Appendix 1 and 2. Protected areas have been designated around the hinterlands and they are shown in fig 1 (pg 8).

Habitat action plans in this section of The Wash BAP are:

- Coastal and floodplain grazing marsh
- Reedbeds
- Ponds
- Rivers and drains.

Species action plans in this section of The Wash BAP are:

- Bats grouped plan – Barbastelle (*Barbastella barbastellus*), Brown Long-eared (*Plecotus auritus*), Noctule (*Nyctalus noctula*), Soprano Pipistrelle (*Pipistrellus pygmaeus*)
- Farmland birds grouped plan – Corn bunting (*Emberiza calandra*), Grey partridge (*Perdix perdix*), Lapwing (*Vanellus vanellus*), Linnet (*Carduelis cannabina*), Marsh harrier (*Circus aeruginosus*), Montagu's harrier (*Circus pygargus*), Reed bunting (*Emberiza schoeniclus*), Skylark (*Alauda arvensis*), Tree Sparrow (*Passer montanus*), Turtle Dove (*Streptopelia turtur*), Yellowhammer (*Emberiza citrinella*), Yellow Wagtail (*Motacilla flava*).



Photo credit: 'Potatoes' by Alex Knowles

3.4.1 Coastal and Floodplain Grazing Marsh

Description

Grazing marsh is defined as periodically inundated pasture or meadows with ditches, which maintain the water level, containing standing brackish or freshwater (BRIG 2010). Grazing marshes occur where rivers and coastal floodplains experience high water levels during the winter (Natural England 2008^a). Grazing marshes are used for grazing and can be cut to produce hay and silage.

Grazing marshes are important habitats for wildlife. Those that are the least affected by intensive agriculture and other threats have the best biodiversity. Grazing marshes can contain rich assemblages of water beetles and are important for declining wetland breeding birds including UK BAP priority species such as the lapwing (*Vanellus vanellus*) and curlew (*Numenius arquata*) and wintering bird populations including Bewick swans (*Cygnus columbianus*), whooper swans (*Cygnus cygnus*), geese and ducks, especially the wigeon (*Anas penelope*). Ditches can be rich in plant and invertebrate species and can be used by rarer species like the water vole (*Arvicola terrestris*) (UK BAP priority species). Grazing marshes may have additional features such as seasonal water-filled hollows and permanent ponds with emergent swamp communities, which can add to the biodiversity of the habitat. For example, bitterns (*Botaurus stellaris*) may use these pools and ditches for feeding.

It is estimated that there are approximately 300,000ha of grazing marsh in the UK, with the largest proportion in England. Loss of grazing marsh has been significant in the last 60 years (Simpkin 2006).

Coastal and floodplain grazing marsh is not recognised within the EC Habitats Directive explicitly, but some of its constituent grassland habitats are represented in two of the grassland communities listed in Annex I to the Directive. In addition, wetlands are recognised for their international importance for birds, and examples of all the listed habitats are classified as SPAs under the EC Birds Directive.



Photo credit: Grazing cattle by Simon Cooter

Local Status and Distribution

Coastal and floodplain grazing marsh is mainly found from Snettisham to Heacham on the eastern side of The Wash and at Frampton and Freiston on the western side.

Current Threats in The Wash Hinterlands

- **Agricultural intensification** and conversion to all-arable systems leads to improved drainage which lowers the water table and negatively affects grazing marsh.
- **Decline in traditional livestock farming** leading to arable conversion and other changes in land use, and loss of the grassland mosaic.
- **Lack of traditional land management** especially extensive grazing and hay systems, coupled with water levels that are maintained for arable not grassland production.
- **Pollution** caused by agricultural run-off seriously affects wetland ecosystems. Ground water supplies can become polluted through siltation, toxic chemicals and eutrophication.
- **Sea-level rise** resulting in saltwater flooding and seepage can make the habitat more brackish or coastal (Simpkin 2006).

Coastal and Floodplain Grazing Marsh Action Plan

Objective

- To halt the ongoing decline in grazing marsh and ensure sensitive management of surviving habitat
- To encourage pastoral farming within the grazing marshes

Targets

- Obtain baseline data on the extent and condition of coastal and floodplain grazing marsh in The Wash
- Maintain the extent and condition of grazing marsh in The Wash (based on baseline figure)
- Restore grazing marsh in The Wash where opportunities arise

Actions

- Lead partner – **RSPB**

Action	Potential Partner	Date
Prepare an inventory of current and potential grazing marsh in The Wash to provide baseline data.	NE, LBP, NBIS	2015
Survey grazing marsh in The Wash and assess whether it is being managed appropriately.	NE	2015
Identify and promote opportunities for grazing marsh restoration and creation.	NE, RSPB, EA, LBP, NBIS, LWT, NWT	2015
Carry out breeding and winter bird surveys on coastal and floodplain grazing marsh in The Wash.	RSPB, NE, WNNCEMS	Ongoing
Surveillance/monitoring to ensure current grazing regimes are effective for wildlife.	NE, RSPB, WNNCEMS	2015

3.4.2 Ponds

Description

Ponds are permanent or seasonal, natural or man-made bodies of water that are up to 2ha in size and hold water for a minimum of 4 months of the year (Norfolk Wildlife Trust 2010). Ponds included in the UK BAP habitat description also meet one of these criteria:

- Ponds that meet the criteria under Annex I of the Habitats Directive.
- Ponds that support species of high conservation importance: Ponds supporting Red Data Book species, UK BAP priority species, those protected under WCA Schedule 5 and 8, Habitats Directive Annex II species, a Nationally Scarce wetland plant species, or three Nationally Scarce aquatic invertebrate species.
- Ponds that support exceptional assemblages of key biotic groups: Ponds supporting exceptional populations or numbers of key species. Based on (i) criteria specified in guidelines for the selection of biological SSSIs (currently amphibians and dragonflies only), and (ii) exceptionally rich sites for plants or invertebrates (i.e. supporting ≥ 30 wetland plant species or ≥ 50 aquatic macroinvertebrate species).
- Ponds of high ecological quality: Ponds classified in the top Predictive System for Multimetrics (PSYM) category (“high”) for ecological quality (i.e. having a PSYM score $\geq 75\%$).
- Other important ponds: Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context e.g. pingos, duneslack ponds, and machair ponds (BRIG 2010).

Ponds are important habitats for wildlife. Approximately 4000 invertebrate species inhabit freshwater habitats and over half are found in ponds (Natural England 2008^a). All of the UK’s native amphibian species including some UK BAP priority species require ponds at some stage in their lifecycle. Temporary ponds are important for more specialist and rarer species. The number and type of species inhabiting ponds in their different succession stages varies. For example, great crested newts (*Triturus cristatus*) prefer to inhabit ponds that are towards the middle of their natural succession (Langton *et al.* 2001).

Ponds are widespread throughout the UK. However, they have declined by over 75% in the past 100 years. High-quality ponds are now highly localised, especially in the lowlands (Simpkin 2006; BRIG 2010). The ‘Million Ponds Project’ started in 2008 and aims to address the loss of ponds and decline in freshwater wildlife by creating an extensive network of ponds across the UK using clean water (Pond Conservation 2010).



Photo credit: Toad in a pond by Vivien Hartwell

Local Status and Distribution

There is currently a lack of information on the distribution and quality of ponds within The Wash hinterlands.

Current Threats in The Wash Hinterlands

- **Direct loss of ponds** due to development, agriculture and infilling because of perceived dangers to the public. This can lead to a loss of associated terrestrial habitats such as buffer zones in agricultural land and an increase in isolated ponds.
- **Pollution** (chemical and organic sources) can critically damage pond wildlife and create management problems. Ponds are vulnerable to pollution because their small size restricts their ability to dilute pollutants. Sources of pollution include run-off from fertilised fields, run-off from roads and septic tanks.
- **Non-native species** that have been introduced to ponds may bring about detrimental changes to the habitat and can cause the loss of native species.
- **Neglect or poor management** can lead to succession and terrestriation of ponds. A lack of knowledge can damage ponds through use of inappropriate management actions such as over-deepening, over-zealous pond clearance and inappropriate stocking of plants or fauna. Ponds that are shaded by trees and scrub can have negative effects on the pond wildlife.
- **Arable farming.** Ponds in arable landscapes may lack a terrestrial buffer making them more susceptible to pollution and close ploughing can cause over-steepening of the sides and siltation to occur.
- **Fishery management** can affect the biodiversity of a pond if it is managed for sport species rather than native ones. Ponds may also suffer from higher levels of disturbance (Simpkin 2006; Norfolk Wildlife Trust 2010).

Ponds Action Plan

Objective

- To determine the extent, location and condition of ponds in The Wash
- To ensure ponds that are known to be in favourable condition are maintained in that state
- To enhance existing ponds in The Wash through appropriate management
- To create new wildlife ponds

Targets

- Establish a baseline for existing extent and condition of ponds within The Wash
- Maintain the current extent of ponds within The Wash (based on baseline figure)
- Increase the number of UK BAP priority ponds in The Wash

Actions

- Lead partner – **WEP**

Action	Potential Partner	Date
Undertake desk based study and surveys to collect baseline data on the extent and condition of ponds around The Wash.	WEP, IDBs, LBP, NBIS, NE, EA	2015
Based on the results of the baseline data collected assess whether the highest quality ponds within The Wash are suitable for LWS/CWS designation.	LAs, NE, LBP, NBIS	2020
Based on the results of the baseline data identify those ponds of high quality that would benefit from management.	NE	2020
Once ponds are identified for management work, work with landowners and managers, to ensure habitat is maintained and enhanced in accordance with each site's primary habitat/species interest.	NE, IDB, LAs, BBC	2020
Develop a partnership with the Million Pond Project and others to establish new ponds where environmentally suitable and feasible.	WEP, IDBs, NE, RSPB, BBC	Ongoing

3.4.3 Reedbed

Description

Reedbeds are wetland habitats that are dominated by stands of common reed (*Phragmites australis*) where the water table is at or above ground level for most of the year. Reedbeds tend to incorporate areas of open water and ditches and are often isolated fragments of larger natural wetland habitats. They are of immense conservation value, supporting plants and animals that are specially adapted and reliant on this habitat for their survival. Small areas of wet grassland and carr woodland may be associated with this habitat.

Reedbeds are amongst the most important habitats for birds in the UK, supporting distinctive breeding bird assemblages including 6 Nationally Rare Red Data Birds; the bittern (*Botaurus stellaris*), marsh harrier (*Circus aeruginosus*), Cetti's warbler (*Cettia cetti*), Savi's warbler (*Locustella luscinioides*) and bearded tit (*Panurus biarmicus*). They provide roosting and feeding sites for migratory birds (including the globally threatened aquatic warbler, (*Acrocephalus paludicola*) and several raptor species use them as roost sites in winter. Five GB Red Data Book invertebrates are also closely associated with reedbeds including the reed leopard moth (*Phragmataecia castanaea*) and a rove beetle (*Lathrobium rufipenne*).

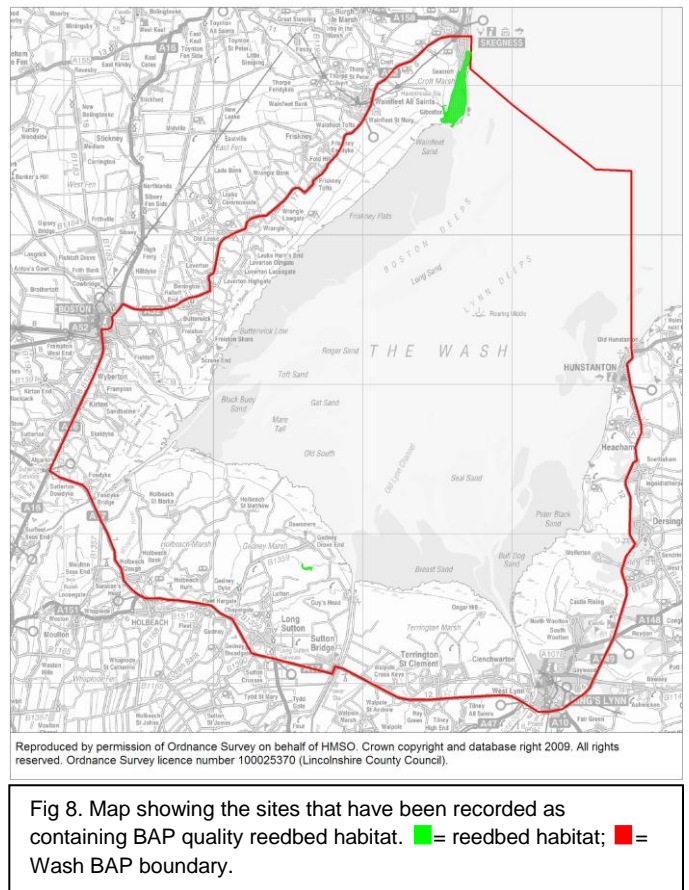
There are about 5000ha of reedbeds in the UK, with 900 or so sites contributing to this total. Only about 50 of these are greater than 20ha making a large contribution to the total area (BRIG 2010).

Local Status and Distribution

Reedbeds are sparsely distributed across The Wash hinterlands. Most are small and fragmented. They often occur in association with wet woodland, ponds and lakes, rivers and drains, fens and marshes, and saline lagoons. They tend to be small, although linear reed stands along some rivers can be quite extensive (Simpkin 2006). A major new extension to RSPB Frampton Marsh will result in the creation of more habitats such as reedbed at this nature reserve (RSPB 2011^a).

Current Threats in The Wash Hinterlands

- **Land drainage and land use** such as conversion to intensive agriculture have contributed to the loss of reedbed.
- **Lack of appropriate management** resulting in the drying out of reedbeds, scrub encroachment and natural succession to woodland.
- **Pollution** of freshwater supplies to reedbeds through siltation, toxic chemicals and nutrient enrichment can result in a change to the plant communities.
- **Abstraction** from aquifers and surface sources reduces spring flows and lowers water tables.
- **Coastal erosion** threatens reedbeds in coastal areas (RSPB 2005; Simpkin 2006).



Reedbed Action Plan

Objective

- To create a network of well-managed reedbeds

Targets

- Establish a baseline for existing extent and condition of reedbeds in The Wash
- Maintain the current extent and condition of reedbed in The Wash (based on baseline figure)
- Create new reedbeds as near as possible to existing sites on areas of current low nature conservation interest (figure to be set after baseline obtained)

Actions

- Lead partner – **RSPB**

Action	Potential Partner	Date
Undertake desk based study and surveys to produce an accurate baseline figure for the total area of reedbed in The Wash hinterlands.	WEP, LBP, NBIS, IDBs, RSPB, NE	2015
Identify priority sites for habitat recreation and expansion from baseline data.	NE, IDBs, EA	2016
Promote the maintenance of reedbeds and encourage management on appropriate sites.	NE, RSPB	Ongoing
Continue to target conservation management and habitat recreation using HLS and other grant schemes.	NE	Ongoing

3.4.4 Rivers and Drains

Description

Rivers are dynamic systems that are influenced by geology, topography, substrate, gradient, flow rate, altitude, channel profile, climate and catchment features. They are continually changing and creating new habitats. Humans have interfered with the dynamic nature of rivers by building structures such as flood defences that stop them from changing. In addition canalisation, urban development, agricultural change and the historic removal of tree cover have all worked together to alter the seasonal patterns of flow and hydrograph form (Simpkin 2006; BRIG 2010).

Drainage ditches are an artificial habitat mainly comprised of slow flowing freshwater. They vary in size from small roadside ditches to wide agricultural drains and when connected make up a large, linear network of habitats. Drains provide a variety of functions for landowners and the wider community including water level management to reduce flood risk, irrigation, wet fencing, navigation, fisheries and recreation. In addition to this water level management through drains is critical to maintaining appropriate wetland conditions in the floodplain and providing habitats that support a variety of flora and fauna (Buisson *et al.* 2008; Cambridgeshire Biodiversity Action Plan 2009).

Rivers and drains have a variety of features and habitats that support a wide array of species and they provide wildlife corridors that enable these species to move between different habitats. Species supported include lichens, mosses, liverworts, barn owl (*Tyto alba*), otter (*Lutra lutra*) and water vole (*Arvicola terrestris*). The later two are UK BAP priority species. A diverse plant community is also supported. Shingle banks of rivers support spiders, ground beetles and flies, while pools support aquatic species. In lowland areas, rivers generally flow slower, have finer sediments and are dominated by coarse fish, aquatic plants and invertebrates (Natural England 2008^a; BRIG 2010).

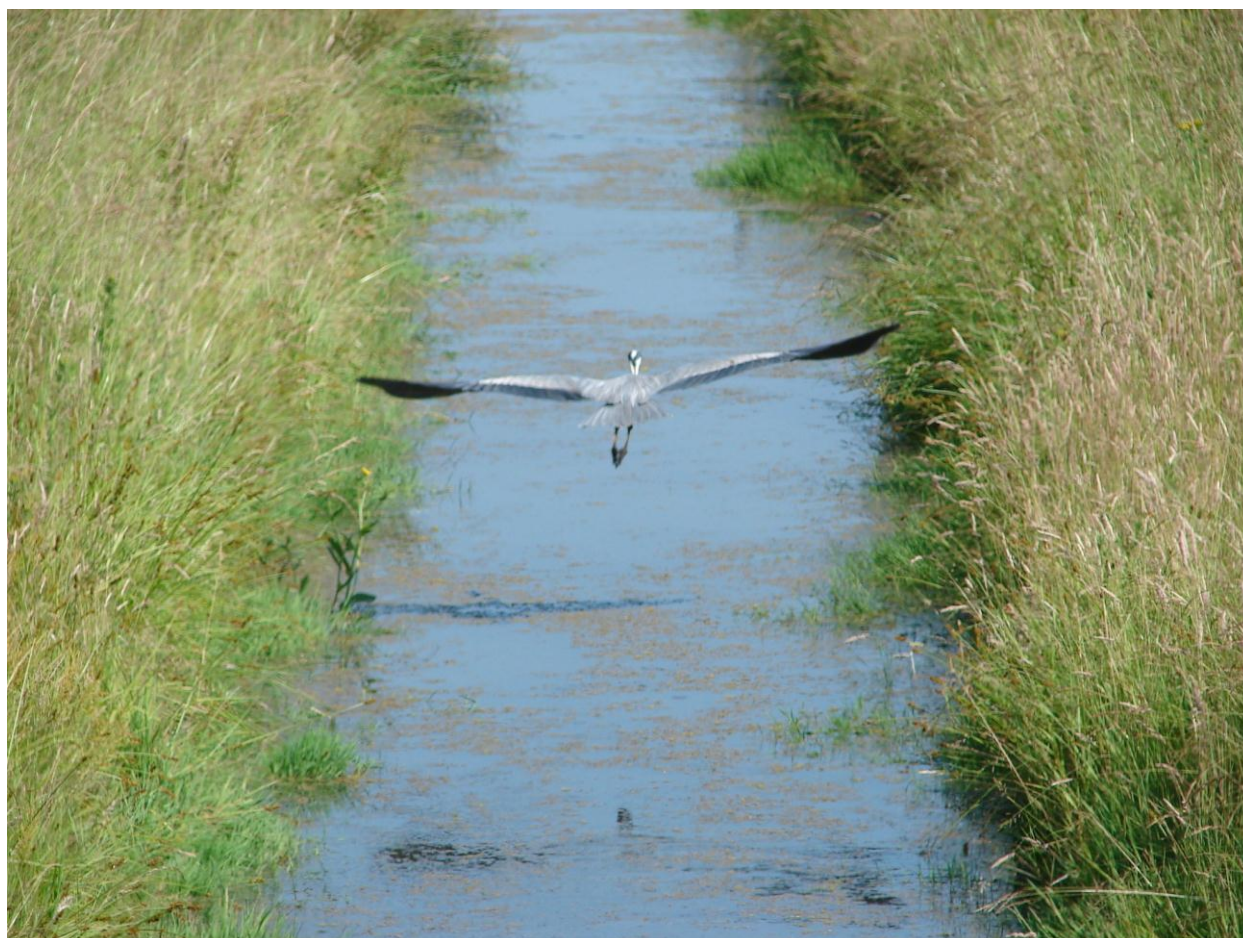


Photo credit: Grey heron in flight by George Dann

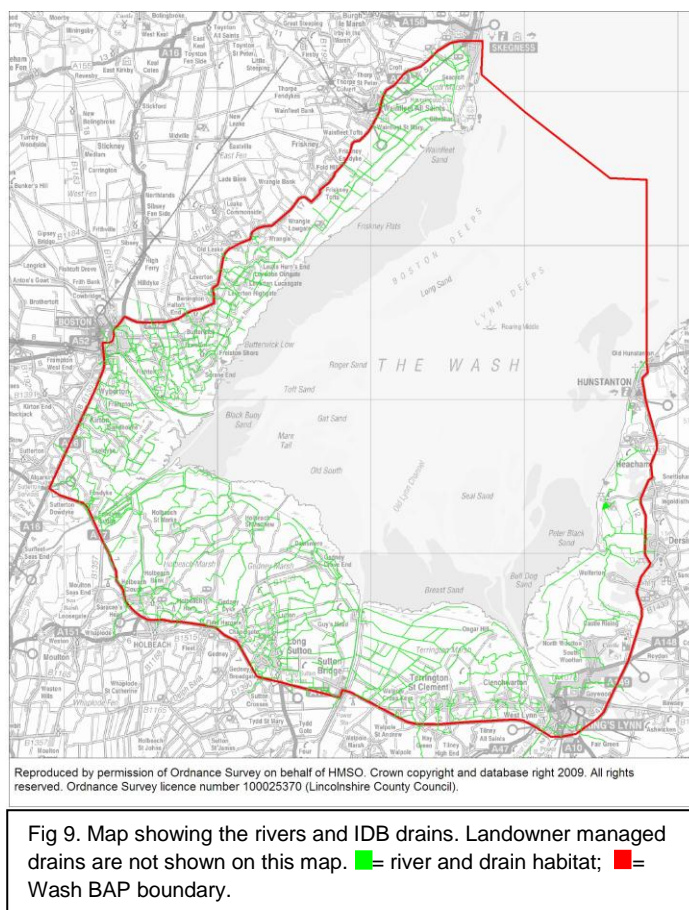
Local Status and Distribution

Five rivers flow into The Wash. These are the Great Ouse, Nene, Welland, Witham and Steeping. They have been subject to human intervention. Their outfalls have been trained and their channels dredged to ensure they are navigable (Environment Agency 2010).

The hinterlands are covered by extensive network of drains. Some are managed by landowners and others by the Black sluice, King's Lynn, Lindsey Marsh, South Holland, Welland and Deepings, and Witham Fourth IDBs. The EA also protects and maintains water resources and quality through statutory licencing.

The EA and the IDBs in Norfolk and Lincolnshire manage the rivers and drains that flow into The Wash. This will ensure that the wildlife corridors are maintained within and outside of this BAP's boundary and will help to improve the water quality of the rivers and drains before they reach The Wash and its hinterlands.

The EU Water Framework Directive will have a positive impact within The Wash area. It's objective is to 'achieve at least "good status" in all water bodies by 2015 or, provided that certain conditions are satisfied, seek to achieve the objective by 2021 or 2027' (Environment Agency 2009). In 2008, the EA produced River Basin Management Plans to implement this Directive. They have been produced to protect, and improve the water environment and contain issues affecting the water environment and the actions that need to be taken to deal with them (Environment Agency 2011). The Wash is covered by the Anglian River Basin Management Plan which is available from www.environment-agency.gov.uk.



Current Threats in The Wash Hinterlands

- **Land drainage and watercourse management** may impact watercourses particularly where there is an increase in arable production right to the edge of the watercourse resulting in the loss of the buffering habitat such as bankside vegetation; increased siltation; increased agrochemical input into the watercourse and increased algal blooms.
- **Water abstraction** especially for public water supplies and spray irrigation can cause low flow conditions potentially leading to deoxygenation and a deterioration of water quality, when organic materials e.g. algal blooms, are broken down by bacteria.
- **Chemical enrichment and pollution** will potentially damage water quality. Fertilizer enrichment and sewage discharges result in the deoxygenation of watercourses, especially when they have low flow conditions. Subsequently, serious fish deaths can occur. Long-term impacts from heavy metals and pesticides may also be an issue. For example, they may lead to sterility in otter and trout.
- **Flood defence structures** may prevent the migratory movements of fish and invertebrates.
- **Climate change** may bring drier summers and wetter winters to the East of England. This will affect the species composition of watercourses and may encourage invasive, non-native species to move into rivers and drains in The Wash hinterlands (Simpkin 2006; Environment Agency 2009).

Rivers and Drains Action Plan

Objective

- To maintain the current extent of rivers and drains
- To improve water quality, water resources and habitat diversity of rivers and drains
- To enhance the characteristic flora and fauna of rivers and drains

Targets

- Maintain the extent of rivers and drains in The Wash hinterlands
- Manage rivers and drains to promote use by flora and fauna

Actions

- Lead partner – **IDB**

Action	Potential Partner	Date
Control non-native species as appropriate on sites where organisations have that responsibility.	IDBs, RSPB, NE, EA, LWT, NWT	Ongoing
Ensure landowners are aware of and observe statutory requirements relating to spraying near drainage ditches and channels.	IDBs, EA, WNNCEMS	Ongoing
Encourage appropriate management to enhance wildlife value of rivers and drains.	IDBs, NE, RSPB, EA	Ongoing
Work with landowners annually to reduce the input of point and diffuse sources of pollution into watercourses.	NE, EA, IDBs	Ongoing

3.4.5 Bats Grouped Plan

Barbastelle (*Barbastella barbastellus*), Brown Long-eared (*Plecotus auritus*), Noctule (*Nyctalus noctula*), Soprano Pipistrelle (*Pipistrellus pygmaeus*)

Description

There are 18 species of bat inhabiting the UK, making up over a quarter of the UK's mammal species. Bats have undergone significant declines in the past century (Bat Conservation Trust 2011) and this action plan focuses on the four UK BAP priority bat species that are found within The Wash hinterlands. These are the barbastelle (*Barbastella barbastellus*), the brown long-eared (*Plecotus auritus*), the noctule (*Nyctalus noctula*), and the soprano pipistrelle (*Pipistrellus pygmaeus*). All bat species and their roosts are equally protected by the law and face similar conservation issues. Therefore, this plan will benefit the other bat species found around The Wash.

Bats are protected by the WCA and the Conservation of Habitats and Species Regulations (2010).

The barbastelle is one of the UK's rarest mammal species. It is a medium sized bat that is associated with woodland. They use old buildings and trees as summer roosts and underground sites and other suitable places such as hollow trees to hibernate in the winter. A significant factor in the rarity of this species may be the loss of deciduous woodland in the UK.

The brown long-eared bat is a medium sized bat. They can be distinguished from other bat species by their enormous ears which are $\frac{3}{4}$ the length of their body. Brown long-eared bats are associated with open woodland and parkland and are heavily reliant on buildings for roosts. This species has suffered badly from re-roofing in the Fens in the 1970s and 80s.

The noctule is the largest bat species in the UK. It is strongly associated with woodland and old pasture. They roost and hibernate in the holes of large trees. They occur in a range of habitats and feed in the open, often over trees. Many colonies appear to have disappeared over the last 25 years as suitable old trees have become scarce.

The soprano pipistrelle is one of the smallest bats in the UK. It was distinguished as a separate species to the common pipistrelle (*Pipistrellus pipistrellus*) in 1995 making population estimates for this species problematic. They often roost as colonies in cavity walls but also use bat boxes and trees (Simpkin 2006; Norfolk County Council 2009; Bat Conservation Trust 2011).



Photo credit: Brown long-eared bat by Ian Nixon

Local Status and Distribution

8 bat species have been found around The Wash. The ones not named in this plan so far are the common pipistrelle (*Pipistrellus pipistrellus*), Daubentons (*Myotis daubentonii*), Nathusius' pipistrelle (*Pipistrellus nathusii*) and the Natterers (*Myotis nattereri*).

The barbastelle is only found along the eastern edge of The Wash where it inhabits wooded areas.

Anecdotal evidence suggests that the brown long-eared bat species has suffered a massive decline in the last 40 years, with only a few domestic roosts known in spite of suitable buildings being surveyed over the past 10 years. Churches are this species stronghold around the northern and western areas of The Wash.

The decline in noctules around The Wash is thought to have started with the ploughing up of permanent pasture during World War Two. A steady decline has continued since then. There are anecdotal reports suggesting small numbers of these bats may forage over the saltmarsh of The Wash.

Soprano pipistrelles are widely distributed around The Wash. However, they have suffered a significant decline in the last 25 years because of home improvements such as cavity wall insulation. Along the northern and western areas of the hinterlands, roost sizes are now less than half of those recorded in the 1980s (personal comm. with LBG).

Current Threats in The Wash and its hinterlands

- **Reduction in insect prey** due to widespread pesticide use and deterioration of water quality.
- **Reduction in habitat quality and quantity** including hedgerows, old trees, ditches, drains, ponds, and riverside habitats.
- **Loss of all roost sites.**
- **Disturbance and destruction** of roosts (e.g. through building work, especially re-roofing). This results from ignorance or disregard of bats and legislation.
- **Alterations to bridges and culverts** that do not take the possible presence of bats into consideration (Simpkin 2006; Norfolk County Council 2009).

Bats Grouped Action Plan

Objective

- Maintain and enhance the current distribution of bats across The Wash and its hinterlands
- Gain a better understanding of how bats utilise habitats within The Wash and its hinterlands

Targets

- Determine whether bats use the saltmarsh in The Wash
- Determine what species use the saltmarsh in The Wash
- Create roost sites that bats can use in The Wash and its hinterlands

Actions

- Lead partner – **WEP**

Action	Potential Partner	Date
Continue to undertake surveys and investigate monitoring across The Wash with particular reference to the saltmarsh.	LBG, NBIS, NBSG	2015
Report on the results of the bat surveys.	LBG, NBSG	2016
Identify structures that could be converted into roost sites for bats.	LBG, IDBs, EA, NE	2013
Once possible roost site structures have been identified convert them to make possible roost sites for bats.	IDBs, EA, NE	2015
Monitor new roost sites.	LBG, NBIS	Ongoing

3.4.5 Farmland Birds Grouped Plan

Corn Bunting (*Emberiza calandra*), Grey Partridge (*Perdix perdix*), Lapwing (*Vanellus vanellus*), Linnet (*Carduelis cannabina*), Marsh Harrier (*Circus aeruginosus*), Montagu's Harrier (*Circus pygargus*), Reed Bunting (*Emberiza schoeniclus*), Skylark (*Alauda arvensis*), Tree Sparrow (*Passer montanus*), Turtle Dove (*Streptopelia turtur*), Yellowhammer (*Emberiza citrinella*), Yellow Wagtail (*Motacilla flava*)

Description

This is a grouped plan for farmland bird species that inhabit The Wash hinterlands.

Over the past 30 years farming practices have changed resulting in the loss of feeding and breeding habitats for farmland bird species. Some populations have declined by more than 50%. The greatest period of farmland bird declines occurred between the 1970's and the 1990's. Some birds are still declining. Recently certain bird populations have started to become stable and others are increasing. It is not known whether this will lead to population recoveries in these species. The table below shows the conservation status and legislation relating to the farmland bird species associated with this plan (RSPB 2011^b).

Bird Species	UK Red List Species	WCA	EC Birds Directive	Bern Convention	Bonn Convention	CITES
Corn Bunting	✓			✓		
Grey Partridge	✓		✓	✓		
Lapwing	✓		✓	✓	✓	
Linnet	✓	✓		✓		
Marsh harrier		✓		✓	✓	✓
Montagu's harrier		✓	✓	✓	✓	✓
Reed Bunting		✓		✓		
Skylark	✓	✓		✓		
Tree Sparrow	✓			✓		
Turtle Dove	✓			✓	✓	
Yellowhammer	✓	✓		✓		
Yellow Wagtail	✓			✓		



Photo credit: Reed bunting by Vivien Hartwell (Left), Yellowhammer by Neil Smith (right)

Local Status and Distribution

All of the bird species covered by this plan inhabit farmland in The Wash hinterlands. They use the habitats found on farms for feeding, breeding and roosting.

In some years Lincolnshire has a significant proportion of the UK's nesting populations of marsh harrier and Montagu's harrier on farmland around The Wash.

Corn buntings are mainly found along the southern and northern edges of The Wash.

Grey partridge are mainly found on the eastern and western sides of The Wash.

Turtle doves have a patchy distribution and are mainly found along the eastern and western sides of The Wash.

Lapwings, tree sparrows and yellow wagtails are distributed right across The Wash hinterlands.

Currents Threats in The Wash Hinterlands

- **Poor management of remaining hedgerows**, particularly over-frequent and too low trimming. This is a much-reduced threat with the introduction of cross compliance and agri-environment schemes. However, while these measures control the time of cutting and closeness of cultivations they do not cover all hedgerows. The hedge bottom is also important for birds and can be neglected. Hedgerows are affected by land use activities. For example, they are affected by spray drift from fields. Hedges need to be buffered from potentially damaging activities as do watercourses.
- **Reduction in diverse cropping**, reducing opportunities for nesting and foraging birds.
- **Reduction of food**. A reduction of sustained provision of insect rich habitat and winter seed food.
- **Reduced nesting habitat**. There has been a radical decline in the availability of safe in-field nesting habitat for birds due to a switch from spring to autumn sown cropping and a reduction in the use of fallow as an agronomic technique.
- **Accidental nest destruction** by normal agricultural operations, especially harvest of rape and barley. Marsh harrier and Montagu's harrier are vulnerable to this.

Farmland Birds Grouped Action Plan

Objective

- Maintain and enhance farmland bird populations in The Wash hinterlands

Targets

- Expand the populations of farmland birds in The Wash hinterlands

Actions

- Lead partner – **RSPB**

Action	Potential Partner	Date
Promote the Higher Level Stewardship Scheme to increase the uptake of farmland birds.	NE, IDBs, RSPB,	Ongoing
Encourage people to monitor the results of Higher Level Stewardship Scheme.	NE, IDBs, RSPB,	Ongoing
Promote voluntary participation in the Breeding Bird Surveys and other farmland bird surveys.	RSPB, WEP	Ongoing
Pass on the details of Marsh and/or Montagu's harriers which have 'vulnerable' nests in silage, rape, or barley crops to the RSPB Harrier Protection Scheme (via Jim Scot, RSPB Snettisham).	All	Ongoing
Promote and implement the farmland bird package(s) as a toolkit to reverse the long-term decline in farmland birds as part of Entry Level or Higher Level Stewardship agreements.	RSPB, NE, farmers	Ongoing

Section 4: Common Areas of Action

Introduction

This set of action plans covers common areas of action that will benefit many, if not all of, the habitats and species covered by this BAP. These plans will help deliver a greater understanding and protection of The Wash and its hinterlands, benefiting a larger number of habitats and species than those given individual action plans.

4.1 Research, Data Collation and Management

Description and Local Status

Knowledge about the ecology and distribution of the habitats and species within The Wash and its hinterlands helps to inform better management of biodiversity assets and better use of the limited available resources. In some cases there is a need for a baseline to be set so indicators can be developed for monitoring the success of delivering towards action plan targets.

Within The Wash and its hinterlands data is being collected through various processes including: condition assessments on the European and nationally protected sites; monitoring of shellfish fisheries; habitat and species mapping of prescribed areas to inform development; and numerous site or topic specific research projects by individuals and organisations. Even with all this data there is still a need to collate, analyse and disseminate the data in a format that is easily understandable and can be accessed by the majority of people. This will also help to identify remaining gaps in our knowledge.

Generally, there is more readily available data for the terrestrial environment than the marine environment. However, this data is often in disparate datasets or the result of one individual's efforts and knowledge which is not easily accessed or known of. In some instances, actual species population estimates are still not available. There is a need to bring all data together resulting in fuller, standardised datasets that are accessible to all, ensure the effective use of resources and identifies where our knowledge is lacking. This can be achieved through the two record centres that relate to this plan:

- Lincolnshire Environmental Records Centre (LERC)
- Norfolk Biological Information Service (NBIS).

Reporting on the national monitoring system for the UK BAP process is carried out through the Biodiversity Action Reporting System (BARS). BARS is a web-based system that enables lead partners and local partnership co-ordinators, nationally and locally, to enter information towards achieving action plan targets. For local plans BAP targets are reported annually and for the national plans they are reported every three years.



Photo credit: WESG

Research, Data Collation and Management Action Plan

Objectives

- To acquire data on habitats and species in The Wash and its hinterlands to feed into the Lincolnshire and Norfolk environmental records centres
- To establish a co-ordinated programme for the survey and monitoring of species and habitats

Targets

- Establish a biodiversity survey and monitoring programme to fill identified gaps in knowledge

Actions

- Lead partner – **WEP**

Action	Potential Partner	Date
Promote the importance of general recording of habitats and species within The Wash and sending the records into the appropriate Local Records Centre.	All	Ongoing
Identify gaps in knowledge and target resources towards survey of priority habitats and species.	All	Ongoing
Carry out general habitat and species surveys in The Wash.	All	Ongoing
Ensure data is collated on a regular basis to track progress towards achieving BAP targets.	All	Ongoing

4.2 Policy, Planning and Legislation

Description and Local Status

The main piece of legislation relating to nature conservation in Great Britain is the WCA. This is supplemented, along with others, by the Countryside and Rights of Way (CROW) Act 2000 and the Natural Environment and Rural Communities Act 2006 (in England and Wales). (JNCC 2010^e). The WCA implements European legislation: the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive) (JNCC 2010^d). For more information on this go to www.jncc.defra.gov.uk.

The Conservation of Habitats and Species Regulations 2010 consolidates and updates amendments made to the Conservation (Natural Habitats &c.) Regulations 1994 in England and Wales. They are the principal means by which the EC Habitats Directive is implemented. They provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites (JNCC 2010^c). For more information go to www.jncc.defra.gov.uk.

Two pieces of major legislation relate to the marine environment. The EU Marine Strategy Framework Directive and the UK Marine and Coastal Access Act 2009. The Marine Strategy Framework recognises the ecosystem approach to managing the seas of Europe which supports the sustainable use of marine goods and services. The overall aim of this Framework is to achieve 'Good Environmental Status' across Europe's marine environment by 2020 (JNCC 2010^b). The UK Marine and Coastal Access Act 2009 will help to achieve DEFRA's vision for the seas. The Act is made up of the following 8 key elements:

- a Marine Management Organisation (MMO),
- a strategic marine planning system,
- a streamlined marine licencing system,
- marine nature conservation,
- fisheries management and marine enforcement,
- migratory and freshwater fisheries,
- coastal access,
- coastal and estuarine management (JNCC^f).

For more information go to www.jncc.defra.gov.uk.

Following EU recommendation in 2002 the Department for Environment, Food & Rural Affairs (DEFRA) developed national policy that resulted in an English Strategy for delivering Integrated Coastal Zone Management (ICZM) (DEFRA 2008). For more information on ICZM go to www.defra.gov.uk.

The EU Water Framework Directive will have a positive impact within The Wash area. It has been translated into UK law through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. It is presently resulting in an ecosystem approach to managing the UK's water resources (includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile). 'The Water Framework Directive sets an objective of aiming to achieve at least "good status" in all water bodies by 2015 or, provided that certain conditions are satisfied, seek to achieve the objective by 2021 or 2027' (Environment Agency 2009). The EA produced River Basin Management Plans in 2008 to protect, and improve the water environment. They contain issues affecting the water environment and the actions that need to be taken to deal with them (Environment Agency 2011). The Wash and its hinterlands are covered by the Anglian River Basin Management Plan which is available from www.environment-agency.gov.uk.

In The Wash hinterlands agricultural land is important. The Environmental Stewardship Scheme encourages environmental management on agricultural land. There are different levels to the Scheme and these will have different effects on biodiversity. They should all ultimately benefit biodiversity. For more information go to www.naturalengland.org.uk.

Considerable success has been achieved locally to align fisheries management with conservation objectives. Management policies have been developed by the fishing industry, EIFCA and NE, to

ensure the main Wash fisheries, which target cockles and mussels, are conducted with regard to the site's ecological sensitivities. Work is also in progress to protect biogenic reefs, which enhance the area's biodiversity, from impacts of The Wash's third main fishery – the trawl fishery targeting shrimps.

Enforcement of terrestrial wildlife protection legislation is currently the role of the wildlife police officers and NE. The police cover the species offences, whilst NE deals with SSSI or Habitat Regulation offences. In terms of policing the marine environment this currently falls to organisations such as the MMO and the Inshore Fisheries Conservation Authority (IFCA), like EIFCA in The Wash. The MMO deals with the enforcement of fishery quotas, marine planning and licensing amongst other activities. For more information go to www.marinemanagement.org.uk

In terms of terrestrial planning, Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS9) 'sets out the Government's national policies of the protection of biodiversity and geological conservation through the planning system' (Crown copyright 2006). The proposed *Planning Policy Statement: Planning for a Natural and Healthy Environment*, has been produced to consolidate and streamline planning policies relating to biodiversity, ecological conservation, landscape and soil protection, heritage coastline, open space, sport, recreation, green infrastructure and floodlighting of sports and recreational facilities (Department for Communities and Local Government 2010). Local development frameworks (LDFs) and Local Plans inform planning in the local area (districts or boroughs). When looking at planning applications planning authorities judge the applications in accordance with national, regional and local development plans unless material consideration deem otherwise (this is current as of March 2011).

Marine planning is a new area, for which the MMO has overall responsibility. The East Inshore area, which includes The Wash, was selected to be one of two pilot areas for the development of marine plans, which will be progressed between 2011 and 2013. Local authorities and stakeholders will be involved in this process.



Photo credit: 'Floating' by Brian Lee

Policy, Planning and Legislation Action Plan

Objectives

- To achieve sustainable use of the land and sea, which will conserve and enhance biodiversity in The Wash and its hinterlands
- Embed the ecosystem approach in planning and development at all levels, including those frameworks that channel resources for both the sea and land

Targets

- Promotion of habitats and species in The Wash in LDF, SMP, Catchment Management Plans and other plans and policies as appropriate

Actions

- Lead partner – **WEP**

Action	Potential Partner	Date
Ensure UK BAP priority habitats and species are appropriately referred to in all policy documents.	All	Ongoing
Encourage use of relevant Codes of Conduct for reducing human impact on local marine wildlife.	EIFCA, NE, WNNCEMS	Ongoing
Ensure development plans give adequate protection to all designated sites within The Wash and its hinterlands.	All	Ongoing

4.3 Education, Raising Awareness and Public Involvement

Description and Local Status

Raising awareness and understanding of the natural environment, biodiversity issues and conservation in a wider audience will help to achieve the targets set out in this BAP. Generating local ownership of the area and educating the public about issues affecting the biodiversity of The Wash and its hinterlands will help achieve more for biodiversity.

Public engagement is already being achieved by various organisations that promote biodiversity and its value through events and interpretative material. There are also some dedicated environmental educational centres and nature reserves which are open to the public and/or group visits around The Wash hinterlands, including:

- Skegness Natureland Seal Sanctuary
- Gibraltar Point Education and Visitor Centre (LWT), near Skegness
- Freiston Environmental Education Centre, near Boston
- The Wash Discovery Centre at The Green Quay, King's Lynn
- Hunstanton Sealife Centre.

Materials and resources enabling teachers to educate their pupils about The Wash need to be developed. This can be enhanced by school pupils visiting The Wash and its hinterlands as part of their lessons or by individuals that are involved with The Wash and its hinterlands visiting pupils in schools.

Opportunities to engage with wider audiences and develop environmental initiatives are available through local partnerships made up of public, private and voluntary sector agencies. Opportunities particularly exist through the context of the 'Big Society' and localism agenda. For example, Boston Borough Council is developing a 'Greening Boston' initiative with a range of partners. Previously, Local Strategic Partnerships (LSPs) carried out this function and helped deliver the objectives set out within the Sustainable Community Strategies, which provide a long term vision of how the economic, social and environmental well-being of the local area will be improved. Some of these have now been scaled down or disbanded.

Basic information on biodiversity could provide an incentive for industries to incorporate biodiversity conservation into their daily practices. Some industries are already being engaged. For example, the farming industry is engaged through the use of agri-environment funding schemes. Local promotion of such schemes may encourage further farmers to sign-up and the wider public will gain an understanding on why these schemes benefit biodiversity (Simpkin 2006). The fishing industry in The Wash is well aware of the ecological importance of the area, and is closely involved in the development of fishing practices that are compatible with biodiversity objectives; with the support of EIFCA and NE.

Information pointing out local biodiversity interests and what individuals can do to become involved in biodiversity conservation is important. Organisations already undertaking this role include the LWT (www.lincstrust.org.uk), the Norfolk Wildlife Trust (NWT - www.norfolkwildlifetrust.org.uk) and the RSPB (www.rspb.org.uk).

The term local community in the objectives overleaf is all encompassing and includes local businesses, organisations, authorities and residents.

Education, Raising Awareness and Public Involvement Action Plan

Objectives

- Enable local communities and visitors to experience biodiversity of The Wash and its hinterlands directly, and enhance their enjoyment without damaging the biodiversity of the area
- To enhance understanding and enjoyment of wildlife by people of all ages and provide the necessary support for local conservation projects

Targets

- Ensure that 5 events per year promote The Wash and hinterlands are organised by BAP partners

Actions

- Lead partner – **WEP**

Action	Potential Partner	Date
Promote the conservation of marine, coastal and terrestrial habitats and species at 5 events per year.	All	Ongoing
Reduce littering at sea and on beaches with further promotion of Adopt-a-Beach volunteer scheme run by MCS (Adopt 1 beach using the MCS run scheme of adopt-a-beach to reduce littering at sea and on beaches).	WNNCEMS, WEP	Ongoing
Promote The Wash and North Norfolk Coast SAC and EMS Good Practice Guide.	All	Ongoing

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Glossary

Abiotic	Non living.
Agri-environment	Relating to the agri-environment Regulation of the Common Agricultural Policy (CAP) obligating Member states to offer farmers a set of incentive payments for voluntarily pursuing non-intensive farming that is of benefit to the environment.
Annelids	A taxonomic group (phylum) of segmented worms with a definite head. They are found in marine, freshwater and moist terrestrial environments.
Anoxic	Low in oxygen.
Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)	Since migrating cetaceans regularly cross national boundaries, their effective protection can only be achieved by international cooperation. Thus, the aim of the Agreement is to promote close cooperation amongst Parties with a view to achieving and maintaining a favourable conservation status for small cetaceans. A Conservation and Management Plan forming part of the Agreement obliges Parties to engage in habitat conservation and management, surveys and research, pollution mitigation and public information.
Bern Convention 1979	The abbreviated term for the Conservation of European Wildlife and Natural Habitats. The principal aims of the Convention are to ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention).
Bioaccumulate	When a substance becomes more and more concentrated over time in the body of living things.
Biodiversity	The total variety of life on Earth. All genes, species, ecosystems and the ecological processes of which they are part.
Biodiversity Action Plan (BAP)	The UK's response to its commitment to the June 1992, Earth Summit in Rio. The Convention on Biological Diversity was launched in 1994 with 'Biodiversity: The UK Action Plan' and guidance was given on the production of Local Biodiversity Action Plans. The purpose of BAPs is to focus resources on conserve and enhance biodiversity by means of local partnerships, taking account of national and local priorities.
Birds Directive 79/409/EEC	Covers the protection, management and control of all species of naturally occurring wild birds in the European territory of Member States. In particular it requires Member States to identify and give special protection to areas for the rare or vulnerable species listed in Annex 1 of the Directive and for regularly occurring migratory species.
Bonn Convention 1979	The abbreviated term for the Conservation of Migratory Species of Wild Animals. This requires the signatories to protect listed endangered migratory species.
Cephalopods	Active predatory molluscs of the large class Cephalopoda, such as octopus and squid.
Cetacean	Marine mammals; whale, dolphin or porpoise. Seals are not included.

Convention on Trade in Endangered species of Flora and Fauna (CITES)	Aims to regulate international trade in species which are endangered or which may become endangered if their exploitation is not controlled. Species covered under CITES are listed in three Appendices, according to the level of protection needed.
Coastal squeeze	Term used to explain what happens to coastal habitats that are trapped between a fixed landward boundary such as a seawall, and increasing sea levels or increases in storminess. As sea levels rise the habitat is unable to retreat landwards because of the fixed boundary that stops it. The habitat becomes 'squeezed' between the two. Losses in quantity and quality of the habitat occur.
Conservation (Natural Habitats) Regulation 1994	UK legislation that implements the EU Habitats Directive. Replaced by the Conservation of Habitats and Species Regulations in 2010.
Conservation of Seals Act (1970)	Act to provide for the protection and conservation of seals in England, Wales, Scotland and the adjacent territorial waters.
Ecosystem	A biological community of interacting organisms and their physical environment in a specific geographical area.
Epibenthic species	The flora or fauna living on the seabed or the bottom of a lake.
EU Marine Strategy Framework Directive	To protect the marine environment across Europe more effectively. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend.
EU Water Framework Directive	The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. It will ensure that all aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands meet 'good status' by 2015.
European Common Agricultural Policy	The set of principles, regulations and subsidy mechanisms adopted by the Member States of the European Union that consolidates efforts in promoting or ensuring reasonable pricing of food products, fair standards of living for farmers, stable agricultural markets, increased farm productivity and methods for dealing with food supply or surplus.
Eutrophication	Excessive richness of nutrients in a lake or other body of water, frequently due to run-off from the land, which causes a dense growth of plant life.
Favourable conservation status	A range of conditions for a natural habitat or species at which the sum of the influences acting upon that habitat are not adversely affecting its distribution, abundance, structure or function throughout the European Community in the long term. The condition in which the habitat or species is capable of sustaining itself on a long-term basis.
Filter-feeding	A method of feeding involving filtering out plankton or nutrients that are suspended in water.
Gastropods	A mollusc of the large group Gastropoda, such as a snail, slug or whelk.

Habitat	A place in which a particular plant or animal lives. Often used in a wider sense, referring to major assemblages of plants and animals found together such as woodland or heath.
Habitat Action Plan	A plan which describes the current status of a priority habitat in the UK BAP or a habitat included in a LBAP. Sets targets and objectives for its management, restoration and/or creation, and proposes the actions necessary to achieve them.
Habitats Directive 92/43/EEC	Requires Member States to create a network of protected wildlife areas, known as Natura 2000, across the European Union. This network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), established to protect wild birds under the Birds Directive. These sites are part of a range of measures aimed at conserving important or threatened habitats and species.
Hinterland	A region lying back from a point/area of reference. In this document it has been defined as the area inland from the high tide mark up to the first major road network.
Infauna	The organisms living in the sediments of the ocean floor, lake or river beds.
Intertidal	An area of coast which is covered at high tide and uncovered at low tide.
Invasive species	Species that adversely affect the habitats they invade economically, environmentally, and/or ecologically.
IUCN Red List of Threatened Species	An inventory of the global conservation status of plant and animal species.
Littoral sediment cell	Coasts are divided up into natural compartments. Each cell contains a complete sedimentation cycle including sediment sources, transport paths and sinks.
Littoral zone	The area between the high water mark, which is rarely inundated, and shoreline areas that are permanently submerged.
Local Development Framework	The spatial planning strategy in England and Wales.
Local Nature Reserve	Areas designated by the local authority, often owned by them and managed by other bodies, such as Wildlife Trusts.
Managed realignment	The progressive shifting of the boundary of natural coastal and maritime habitat landward, by moving man-made sea defences back or removing or remodelling them, creating new intertidal areas.
Marine Conservation Zones	The Marine and Coastal Access Act (2009) created a new type of Marine Protected Area, called a Marine Conservation Zone (MCZ). MCZs will protect nationally important marine wildlife, habitats, geology and geomorphology.

Marine Protected Areas	Zones of the seas and coasts where wildlife is protected from damage and disturbance. The Government is committed to establishing a well-managed ecologically coherent network of marine protected areas (MPAs) in our seas by 2012.
National Nature Reserve	Sites of national or international importance for their wildlife or natural features which have been declared by NE or its predecessors under the National Parks and Access to the Countryside Act 1949 or the Wildlife and Countryside Act 1981 (as amended). They are either owned or controlled by NE or held by approved bodies such as Wildlife Trusts.
Native species	Species that occur naturally in an area and have not been introduced accidentally or deliberately.
Non-native Species	Species that live outside their natural area of occurrence and arrived there accidentally or deliberately.
Pelagic zone	The area of the sea between the sea bed and the sea surface.
Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS9)	Sets out planning policies on protection of biodiversity and geological conservation through the planning system. This replaces Planning Policy Guidance Note 9 (PPG9) on nature conservation published in October 1994.
Planktonic larvae	The larval stage of invertebrates that are microscopic and float about in the sea or freshwater.
Polychaetes	A class of annelid worms, generally marine.
Priority Habitats	Habitats identified as being the most threatened and requiring conservation action under the UK BAP.
Priority Species	Species identified as being the most threatened and requiring conservation action under the UK BAP.
Predictive System for Multimetrics (PSYM)	A method for assessing the biological quality of still waters in England and Wales; plant species and/or invertebrate families are surveyed using a standard method; the PSYM model makes predictions for the site based on environmental data and using a minimally impaired pond dataset; comparison of the prediction and observed data gives a % score for ponds quality.
Ramsar Site	Wetlands of international importance designated under the Ramsar Convention 1971, which requires signatory countries to protect internationally important wetlands, especially those used by migratory water birds, and to use wetlands wisely.
Red Data Book	Lists nationally rare species.
Reference Area	A highly protected MCZ that can be within MCZ, SPA/SACs or both. All extraction, deposition or human-derived disturbance will be removed or prevented in these areas.
Shoreline Management Plan	A large-scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the developed, historic and natural environments. Coastal processes include tidal patterns, wave height, wave direction and the movement of beach and seabed materials.

Site of Special Scientific Interest (SSSI)	Sites of national importance for their plants, animals, geological or physiographical features designated by NE or its predecessors under the Wildlife and Countryside Act 1981 (as amended).
Species Action Plan	A plan which sets objectives and targets for the maintenance or enhancement of their populations and range, and the actions necessary to achieve them. Present in both the UK Biodiversity Action Plan and Local Biodiversity Action Plans.
Special Area of Conservation (SAC)	Areas which have been given special protection under the European Union's Habitats Directive. They provide increased protection to a variety of wild animals, plants and habitats and are a vital part of global efforts to conserve the world's biodiversity.
Special Protection Area (SPA)	Areas which have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within European Union countries. They are European designated sites, classified under the 'Birds Directive 1979' which provides enhanced protection given by the SSSI status all SPAs also hold.
Succession	A gradual sequence of changes in vegetation over a period of time until equilibrium has been attained and a climax community is established, e.g. ungrazed grassland developing into scrub and then woodland.
Supralittoral zone	The area above the spring high tide line, on coastlines and estuaries, that is regularly splashed, but not submerged by ocean water.
Suspension Feeding	See filter feeding.
UK Marine and Coastal Act 2009	Act which seeks to improve management and increase protection of the marine environment and improve recreational access to England's coasts.
Wildlife and Countryside Act 1981 (as amended)	This act protects certain species that are threatened by human activity. It also places a duty upon NE to notify owners and occupiers with an interest in an area of land if it believes that area is of special interest by way of its biological or geological features. These sites are known as SSSIs.

List of Abbreviations used within this Plan

ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North Sea
BAP	Biodiversity Action Plan
BARS	Biodiversity Action Reporting System
BBC	Boston Borough Council
BDMLR	British Divers Marine Life Rescue
CEFAS	Centre for Environment, Fisheries & Aquaculture Science
CITES	Convention on International Trade in Endangered Species
CWS	County Wildlife Site
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EC	European Commission
EIFCA	Eastern Inshore Fisheries and Conservation Authority
EMP	Eel Management Plan
EMS	European Marine Site
ESFJC	Eastern Sea Fisheries Joint Committee
EU	European Union
ha	Hectare
ICES	International Council for the Exploration of the Seas
IDB	Internal Drainage Board (in this plan it refers to those found within the boundary of this BAP)
IFCA	Inshore Fisheries Conservation Authority
IUCN	International Union for Conservation of Nature and Natural Resources
km	Kilometre
LA	Local Authority
LBAP	Local Biodiversity Action Plan
LBG	Lincolnshire Bat Group
LBP	Lincolnshire Biodiversity Partnership
LDF	Local Development Framework
LERC	Lincolnshire Environmental Records Centre
LNR	Local Nature Reserve
LSP	Local Strategic Partnership
LWS	Local Wildlife Site

LWT	Lincolnshire Wildlife Trust
m	Metre
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MPA	Marine Protected Area
MSC	Marine Stewardship Council
NBIS	Norfolk Biodiversity Information Service
NBSG	Norfolk Barbastelle Study Group
NE	Natural England
NNR	National Nature Reserve
NWT	Norfolk Wildlife Trust
PCBs	Polychlorinated biphenyl
PDV	Phocine Distemper Virus
PPS9	Planning Policy Statement 9
RA	Reference Area
RSPB	Royal Society for the Protection of Birds
SAC	Special Area for Conservation
SMP	Shoreline Management Plan
SMRU	Sea Mammal Research Unit
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WCA	Wildlife and Countryside Act (1981) as amended
WEP	Wash Estuary Project
WNNCEMS	The Wash and North Norfolk Coast European Marine Site Management Scheme

Appendix 1

UK BAP Priority Habitats Recorded within The Wash BAP Boundary

- Arable field margins
- Blue mussel beds
- Coastal and floodplain grazing marsh
- Coastal saltmarsh
- Coastal sand dunes
- Coastal vegetated shingle
- Eutrophic standing waters
- Hedgerows
- Intertidal mudflats
- Lowland beech and yew woodland
- Lowland dry acid grassland
- Lowland fens
- Lowland heathland
- Lowland meadows
- Lowland mixed deciduous woodland
- Maritime cliff and slopes
- Mosaic habitats on previously developed land
- Open mosaic habitats on previously developed land
- Ponds
- Reedbeds
- Rivers
- *Sabellaria spinulosa* reefs
- Saline lagoons
- Sheltered muddy gravels
- Sub-tidal sands and gravels
- Traditional orchards
- Wet woodland
- Wood-pasture and parkland
- Intertidal chalk
- Lowland meadows
- Seagrass beds
- Sheltered muddy gravel
- Tide-swept channels

Appendix 2

UK BAP Priority Species Recorded within The Wash BAP Boundary

The following table shows UK BAP priority species that have been recorded within The Wash BAP boundary. Other species may be found in this area but might not have been recorded with LERC or NBIS. This information was provided by LERC, NBIS and ESFJC* in 2010.

Taxon Group	Common Name	Taxon Name	Last Recorded in The Wash
Amphibian	Common Toad	Bufo bufo	2007
	Great Crested Newt	Triturus cristatus	2008
	Natterjack Toad	Epidalea calamita	2008
Bird	Arctic Skua	Stercorarius parasiticus	2008
	Black-throated Diver	Gavia arctica	2008
	Common Cuckoo	Cuculus canorus	2008
	Common Scoter	Melanitta nigra	2008
	Corn Crake	Crex crex	2006
	Dark-bellied Brent Goose	Branta bernicla subsp. bernicla	2007
	Eurasian Curlew	Numenius arquata	2008
	Eurasian Tree Sparrow	Passer montanus	2008
	Eurasian Wryneck	Jynx torquilla	2008
	European Turtle Dove	Streptopelia turtur	2008
	Common Grasshopper Warbler	Locustella naevia	2008
	Great Bittern	Botaurus stellaris	2005
	Greater Scaup	Aythya marila	2008
	Greenland Greater White-fronted Goose	Anser albifrons subsp. flavirostris	2003
	Grey Partridge	Perdix perdix	2009
	Hawfinch	Coccothraustes coccothraustes	2006
	House Sparrow	Passer domesticus	2009
	Lesser Redpoll	Carduelis cabaret	2007
	Marsh Warbler	Acrocephalus palustris	2008
	European Nightjar	Caprimulgus europaeus	2009
	Northern Lapwing	Vanellus vanellus	2008
	Red-backed Shrike	Lanius collurio	2008
	Red-necked Phalarope	Phalaropus lobatus	2008
	Reed Bunting	Emberiza schoeniclus	2009
	Ring Ouzel	Turdus torquatus	2008
	Roseate Tern	Sterna dougallii	2007
	Spotted Flycatcher	Muscicapa striata	2008
Stone-curlew	Burhinus oedicephalus	2006	

Bird (cont.)	Tree Pipit	<i>Anthus trivialis</i>	2008
	Tundra Swan	<i>Cygnus columbianus</i> subsp. <i>bewickii</i>	2008
	Wood Lark	<i>Lullula arborea</i>	2008
	Wood Warbler	<i>Phylloscopus sibilatrix</i>	2008
	Yellowhammer	<i>Emberiza citrinella</i>	2008
	Yellow Wagtail	<i>Motacilla flava</i> subsp. <i>flavissima</i>	2008
Bony fish (Actinopterygii)	Brown/Sea Trout	<i>Salmo trutta</i>	2008
	Burbot	<i>Lota lota</i>	1915
	Cod*	<i>Gadus morhua</i>	
	European Eel	<i>Anguilla anguilla</i>	2008
	Herring*	<i>Clupea harengus</i>	
	Mackerel*	<i>Scomber scombrus</i>	
	Plaice*	<i>Pleuronectes platessa</i>	
	Sole*	<i>Solea solea</i>	
	Whiting*	<i>Merlangius merlangus</i>	
Clubmoss	Marsh Clubmoss	<i>Lycopodiella inundata</i>	1954
Crustacean	Lagoon Sand-shrimp	<i>Gammarus insensibilis</i>	2003
Fern	Crested Buckler-fern	<i>Dryopteris cristata</i>	1852
	Pillwort	<i>Pilularia globulifera</i>	1954
	Annual Knawel	<i>Scleranthus annuus</i> subsp. <i>annuus</i>	1988
Flowering Plant	Basil Thyme	<i>Clinopodium acinos</i>	1988
	Broad-leaved Cudweed	<i>Filago pyramidata</i>	1884
	Chalk Eyebright	<i>Euphrasia pseudokernerii</i>	1988
	Corn Buttercup	<i>Ranunculus arvensis</i>	1981
	Corn Cleavers	<i>Galium tricornutum</i>	1992
	Cornflower	<i>Centaurea cyanus</i>	2008
	Divided Sedge	<i>Carex divisa</i>	2006
	Fine-leaved Sandwort	<i>Minuartia hybrida</i>	1988
	Fingered Speedwell	<i>Veronica triphyllos</i>	1840
	Greater Water-parsnip	<i>Sium latifolium</i>	1950
	Man Orchid	<i>Aceras anthropophorum</i>	1991
	Marsh Stitchwort	<i>Stellaria palustris</i>	1998
	Pheasant's-eye	<i>Adonis annua</i>	1916
	Prickly Saltwort	<i>Salsola kali</i> subsp. <i>kali</i>	1988
	Red Hemp-nettle	<i>Galeopsis angustifolia</i>	2005
	Red-tipped Cudweed	<i>Filago lutescens</i>	2005
	Sea Barley	<i>Hordeum marinum</i>	2008
	Slender Hare's-ear	<i>Bupleurum tenuissimum</i>	2008

Flowering Plant (cont.)	Small Cord-grass	<i>Spartina maritima</i>	2000
	Small Fleabane	<i>Pulicaria vulgaris</i>	2006
	Small-flowered Catchfly	<i>Silene gallica</i>	2004
	Tubular Water-dropwort	<i>Oenanthe fistulosa</i>	1988
	Water Germander	<i>Teucrium scordium</i>	1986
Fungus	Nail Fungus	<i>Poronia punctata</i>	1873
	Oak Polypore	<i>Piptoporus quercinus</i>	2003
	Sandy Stilt Puffball	<i>Battarrea phalloides</i>	1931
Insect – Beetle (Coleoptera)	Brush-thighed Seed-eater	<i>Harpalus froelichii</i>	1917
	Necklace Ground Beetle	<i>Carabus monilis</i>	1912
	a Downy-back Ground Beetle species	<i>Ophonus puncticollis</i>	1897
	Mellet's Downy-back	<i>Ophonus melletii</i>	1942
	Stag Beetle	<i>Lucanus cervus</i>	1872
	Sallow Guest Weevil	<i>Melanapion minimum</i>	1986
	Yellow Pogonus	<i>Pogonus luridipennis</i>	1983
Insect – Butterfly	Grayling	<i>Hipparchia semele</i>	2009
	Grizzled Skipper	<i>Pyrgus malvae</i>	1997
	Small Heath	<i>Coenonympha pamphilus</i>	2008
	Wall	<i>Lasiommata megera</i>	2008
	White-letter Hairstreak	<i>Satyrrium w-album</i>	2008
Insect – Hymenopteran	Moss Carder-bee	<i>Bombus muscorum</i>	1996
	Red-shanked Carder-bee	<i>Bombus ruderarius</i>	2007
	Sea-aster Colletes Bee	<i>Colletes halophilus</i>	1996
Insect - Moths	August Thorn	<i>Ennomos quercinaria</i>	1997
	Autumnal Rustic	<i>Eugnorisma glareosa</i>	2009
	Beaded Chestnut	<i>Agrochola lychnidis</i>	2009
	Blood-vein	<i>Timandra comae</i>	2009
	Bordered Gothic	<i>Heliophobus reticulata</i>	1924
	Brindled Beauty	<i>Lycia hirtaria</i>	2007
	Broom Moth	<i>Melanchra pisi</i>	2003
	Brown-spot Pinion	<i>Agrochola litura</i>	2001
	Buff Ermine	<i>Spilosoma luteum</i>	2009
	Centre-barred Sallow	<i>Atethmia centrago</i>	2009
	Common Fan-foot	<i>Pechipogo strigilata</i>	1899
	Currant Shoot Borer	<i>Lampronia capitella</i>	1874
	Dark-barred Twin-spot Carpet	<i>Xanthorhoe ferrugata</i>	2008
	Dark Brocade	<i>Blepharita adusta</i>	2008
	Dark Spinach	<i>Pelurga comitata</i>	2008

Insect – Moths (cont.)	Dot Moth	<i>Melanchra persicariae</i>	2009
	Double Dart	<i>Graphiphora augur</i>	1999
	Dusky Brocade	<i>Apamea remissa</i>	2009
	Dusky-lemon Sallow	<i>Xanthia gilvago</i>	2009
	Dusky Thorn	<i>Ennomos fuscantaria</i>	1978
	Ear Moth	<i>Amphipoea oculea</i>	2009
	False Mocha	<i>Cyclophora porata</i>	1884
	Feathered Gothic	<i>Tholera decimalis</i>	2006
	Figure of Eight	<i>Diloba caeruleocephala</i>	1999
	Flounced Chestnut	<i>Agrochola helvola</i>	2009
	Fuscous Flat-body Moth	<i>Agonopterix capreolella</i>	1997
	Galium Carpet	<i>Epirrhoe galiata</i>	2001
	Garden Dart	<i>Euxoa nigricans</i>	1992
	Garden Tiger	<i>Arctia caja</i>	2003
	Ghost Moth	<i>Hepialus humuli</i>	2009
	Goat Moth	<i>Cossus cossus</i>	2001
	Grass Rivulet	<i>Perizoma albulata</i> subsp. <i>albulata</i>	1996
	Green-brindled Crescent	<i>Allophyes oxyacanthae</i>	2009
	Grey Dagger	<i>Acronicta psi</i>	2009
	Heath Rustic	<i>Xestia agathina</i>	2008
	Hedge Rustic	<i>Tholera cespitis</i>	2008
	Horehound Long-horn Moth	<i>Nemophora fasciella</i>	2006
	Knot Grass	<i>Acronicta rumicis</i>	2009
	Large Nutmeg	<i>Apamea anceps</i>	2009
	Large Wainscot	<i>Rhizedra lutosa</i>	2001
	Latticed Heath	<i>Chiasmia clathrata</i>	2008
	Marsh Moth	<i>Athetis pallustris</i>	2006
	Minor Shoulder-knot	<i>Brachylomia viminalis</i>	1995
	Mottled Rustic	<i>Caradrina morpheus</i>	2009
	Mouse Moth	<i>Amphipyra tragopoginis</i>	2009
	Mullein Wave	<i>Scopula marginepunctata</i>	1992
	Oak Hook-tip	<i>Watsonalla binaria</i>	2009
	Pale Eggar	<i>Trichiura crataegi</i>	1977
	Pale Shining Brown	<i>Polia bombycina</i>	2005
	Powdered Quaker	<i>Orthosia gracilis</i>	2007
	Rosy Minor	<i>Mesoligia literosa</i>	2006
	Rosy Rustic	<i>Hydraecia micacea</i>	2009
	Rustic	<i>Hoplodrina blanda</i>	2009
	Sallow	<i>Xanthia icteritia</i>	2009

Insect – Moths (cont.)	Scarce Pug	<i>Eupithecia extensaria</i> subsp. <i>Occidua</i>	2001
	September Thorn	<i>Ennomos erosaria</i>	1997
	Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	2005
	Shoulder-striped Wainscot	<i>Mythimna comma</i>	2009
	Slate Sober Moth	<i>Syncopacma albipalpella</i>	1874
	Small Emerald	<i>Hemistola chrysoprasaria</i>	2002
	Small Phoenix	<i>Ecliptopera silaceata</i>	2008
	Small Square-spot	<i>Diarsia rubi</i>	2009
	Sword-grass	<i>Xylena exsoleta</i>	1913
	The Cinnabar	<i>Tyria jacobaeae</i>	2009
	The Crescent	<i>Celaena leucostigma</i>	2008
	The Forester	<i>Adscita statures</i>	2006
	The Lackey	<i>Malacosoma Neustria</i>	2001
	The Spinach	<i>Eulithis mellinata</i>	2001
	The Sprawler	<i>Asteroscopus sphinx</i>	2009
	The Streak	<i>Chesias legatella</i>	2009
	V-moth	<i>Macaria wauaria</i>	1992
	White Ermine	<i>Spilosoma lubricipeda</i>	2009
	White-line Dart	<i>Euxoa tritici</i>	2005
White-spotted Pinion	<i>Cosmia diffinis</i>	1913	
Insect - Orthopteran	Large Marsh Grasshopper	<i>Stethophyma grossum</i>	1968
Insect – True fly (Diptera)	Dune Snail-killing Fly	<i>Salticella fasciata</i>	1987
Lichen	A Lichen species	<i>Bacidia incompta</i>	1968
Marine Mammal	Bottle-nosed Dolphin	<i>Tursiops truncatus</i>	2002
	Harbour/Common Seal	<i>Phoca vitulina</i>	2008
	Harbour Porpoise	<i>Phocoena phocoena</i>	2009
	Minke Whale	<i>Balaenoptera acutorostrata</i>	1977
	Northern Bottlenose Whale	<i>Hyperoodon ampullatus</i>	1942
	Sperm Whale	<i>Physeter catodon</i>	2003
White-beaked Dolphin	<i>Lagenorhynchus albirostris</i>	1930	
Mollusc	Depressed (or Compressed) River Mussel	<i>Pseudanodonta complanata</i>	1996
	Lagoon Sea Slug	<i>Tenellia adspersa</i>	2000
	Narrow-mouthed Whorl Snail	<i>Vertigo angustior</i>	1893
	Shining Ram's-horn	<i>Segmentina nitida</i>	Unknown
Reptile	Adder	<i>Vipera berus</i>	1999
	Common Lizard	<i>Zootoca vivipara</i>	2004
	Grass Snake	<i>Natrix natrix</i>	2009

Sharks, Skates & Rays (Elasmobranch)	Common skate*	Dipturus batis	
	Tope Shark*	Galeorhinus galeus	
Spider (Araneae)	Sand Running-spider	Philodromus fallax	1905
Terrestrial Mammal	Barbastelle bat	Barbastella barbastellus	2010
	Brown Hare	Lepus europaeus	2010
	Brown Long-eared Bat	Plecotus auritus	2007
	Harvest Mouse	Micromys minutus	2009
	Noctule	Nyctalus noctula	2006
	Otter	Lutra lutra	2009
	Red Squirrel	Sciurus vulgaris	2001
	Soprano Pipistrelle	Pipistrellus pygmaeus	2007
	Water Vole	Arvicola terrestris	2009
	West European Hedgehog	Erinaceus europaeus	2009

Appendix 3

Habitat Selection Table

Habitat	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Habitat	Internationally Important	Steering Group Feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Arable field margins	✓		✓			✓	Cereal field margins plan		Already covered by the Lincolnshire and Norfolk BAPs. No action plan as not felt value would be added.
Blue mussel beds	✓	✓	✓	✓				✓	The Wash has naturally occurring blue mussel beds. They are important to the marine environment.
Built environment	✓								This is not a UK BAP priority habitat and there are no cities included in The Wash BAP area. No individual action plan.
Churchyards & cemeteries	✓					✓	✓		This is not a UK BAP priority habitat. Already covered by the Lincolnshire and Norfolk BAPs. No individual action plan.
Coastal & floodplain grazing marsh	✓		✓		✓	✓	✓	✓	Steering group felt value could be added to this plan,
Coastal saltmarsh	✓	✓	✓	✓		✓		✓	Important habitat in The Wash BAP area.
Coastal sand dunes	✓		✓			✓	✓	✓	This is an important habitat for species that inhabit The Wash so has been given an action plan to conserve the habitat rather than individual species.
Coastal vegetated shingle	✓		✓	✓					Only found within the Snettisham Nature Reserve. This is already managed by the RSPB. No value would be added. No individual action plan.

Habitat Selection Table (continued)

Habitat	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Habitat	Internationally Important	Steering Group Feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Drains	✓	✓				✓		✓	Important habitat in The Wash BAP area. The hinterlands are covered by a large inter-connecting network of drains providing habitats and wildlife corridors.
Gardens & allotments	✓					✓	Allotments plan being added		Not a UK BAP priority habitat and not nationally or internationally important. No individual action plan.
Hedgerows & hedge trees	✓		✓			✓	Hedgerows plan		Already covered by the Lincolnshire and Norfolk BAPs. No individual action plan.
Intertidal mudflats	✓	✓	✓	✓				✓	Cover a large area of The Wash and are important for many bird species that use The Wash.
Lowland beech & yew woodland	✓		✓			Ancient semi-natural woodland plan			Only a small amount in The Wash BAP area. No individual action plan.
Lowland heathland	✓		✓			✓	✓		Found on the eastern side of The Wash and already covered by the Norfolk BAP. No individual action plan.
Lowland mixed deciduous woodland	✓		✓			Ancient semi-natural woodland plan	✓		Mainly found on the eastern side of The Wash and already covered by the Norfolk and Lincolnshire BAPs. No individual action plan.
Maritime cliffs	✓		✓				✓		This habitat is protected by its geological SSSI status and is included in the Norfolk BAP. No individual action plan.
Parks & open spaces	✓					✓			Not a UK BAP priority habitat and not nationally or internationally important. No individual action plan.

Habitat Selection Table (continued)

Habitat	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Habitat	Internationally Important	Steering Group Feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Ponds	✓		✓		✓	✓	✓		Not much is known about this resource in The Wash hinterlands. Included in the Wash BAP to gather more information.
Reedbed	✓		✓			✓	✓	✓	This is an important habitat for species that inhabit The Wash so has been given an action plan to conserve the habitat rather than individual species.
Rivers	✓	✓	✓			✓		✓	Important habitat as they flow into The Wash and contribute to the quality of the coastal and marine habitats. Provide wildlife networks in The Wash hinterlands.
Roadside verges	✓		✓			✓			Not a UK BAP priority habitat. No individual action plan.
<i>Sabellaria spinulosa</i> reefs	✓	✓	✓	✓		Being added in 2011		✓	Important habitat in The Wash.
Saline lagoons	✓	✓	✓	✓		✓	✓	✓	Important for bird species and other rarer species.
Traditional orchards	✓		✓				✓		Only a small amount in The Wash BAP area. Mainly found on the eastern side of The Wash, which is already covered by the Norfolk BAP. No individual action plan.
Veteran trees & parkland	✓						Lowland wood-pasture & parkland plan		Only a small amount in The Wash BAP area and are not internally or nationally important. No individual action plan.
Wet woodland	✓		✓			✓	✓		Only a small amount in The Wash BAP area. Mainly found on the eastern side of The Wash, which is already covered by the Norfolk BAP. No individual action plan.

Appendix 4

Species Selection Table

Species	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Species	Internationally Important	Steering Group Feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final decision	
								Individual Action Plan	Reasoning
Barn owl	✓					In farmland birds grouped plan			Not a UK BAP priority species. No individual action plan.
Bittern	✓		✓			✓	✓		Included reedbed habitat action plan rather than the individual species plan.
Grey partridge	✓		✓		✓	✓	✓	✓	Farmland bird grouped plan may add value to this species.
House Sparrow	✓		✓			✓			Possible urban birds grouped plan but limited urban areas in The Wash BAP area. No individual action plan.
Lapwing	✓		✓		✓	✓		✓	Farmland bird grouped plan may add value to this species.
Linnet	Subspecies not recorded separately		Subsp. <i>autochthona/cannabina</i>		✓	✓		✓	Farmland bird grouped plan may add value to this species.
Marsh harrier	✓			✓	✓			✓	Farmland bird grouped plan may add value to this species.
Montagu's harrier	✓			✓	✓			✓	Farmland bird grouped plan may add value to this species.
Reed bunting	✓		✓		✓	✓	✓	✓	Farmland bird grouped plan may add value to this species.
Song Thrush	✓		✓			✓	✓		Possible urban birds grouped plan but limited urban areas in The Wash BAP area. No individual action plan.
Skylark	✓				✓	✓	✓	✓	Farmland bird grouped plan may add value to this species.
Swift	✓					✓			Possible urban birds grouped plan but limited urban areas in The Wash BAP area. No individual action plan.

Species Selection Table (cont.)

Species	Recorded in The Wash BAP area	Locally Important	UK BAP Priority Species	Internationally Important	Steering Group feel value added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Tree sparrow	✓		✓		✓	✓	✓	✓	Farmland bird grouped plan may add value to this species.
Turtle dove	✓		✓		✓	✓		✓	Farmland bird grouped plan may add value to this species.
Yellowhammer	✓		✓		✓	✓		✓	Farmland bird grouped plan may add value to this species.
Yellow wagtail	✓		✓		✓	✓		✓	Farmland bird grouped plan may add value to this species.
Bass	✓		✓			Being added in commercial fish grouped plan			Very limited bass fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Cod	✓		✓			Being added in commercial fish grouped plan			No cod fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Common skate	✓ (rare)		✓	✓	✓				Possibly add value to this species with a plan. Would have to be done with careful consideration with EIFCA, CEFAS, MMO & EA. Need to take existing management into account and fit in with other legislation. Due to time constraints a plan has not been included in this edition of the BAP.
European eel	✓		✓	✓				✓	Suffered sharp decline in European range and important in the ecosystem.
Haddock						Being added in commercial fish grouped plan			Not recorded in The Wash BAP area. No individual action plan.
Halibut			✓			Being added in commercial fish grouped plan			Not recorded in The Wash BAP area. No individual action plan.

Species Selection Table (cont.)

Species	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Species	Internationally Important	Steering Group feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Herring	✓		✓			Being added in commercial fish grouped plan			Very limited herring fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Lemon sole	✓					Being added in commercial fish grouped plan			No lemon sole fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Lesser sand eel	✓		✓						Already monitored by EA & CEFAS young fish survey. No individual action plan.
Mackerel	✓		✓			Being added in commercial fish grouped plan			No mackerel fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Plaice	✓		✓			Being added in commercial fish grouped plan			No plaice fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Pollack						Being added in commercial fish grouped plan			Not recorded in The Wash BAP area. No individual action plan.
Sole	✓		✓			Being added in commercial fish grouped plan			No sole fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Thornback ray	✓				✓				Possibly add value to this species with a plan. Would have to be done with careful consideration with EIFCA, CEFAS, MMO & EA. Need to take existing management into account and fit in with other legislation. Due to time constraints a plan has not been included in this edition of the BAP.

Species Selection Table (cont.)

Species	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Species	Internationally Important	Steering Group feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Tope shark	✓		✓	✓	✓				Possibly add value to this species with a plan. Would have to be done with careful consideration with EIFCA, CEFAS, MMO & EA. Need to take existing management into account and fit in with other legislation. Due to time constraints a plan has not been included in this edition of the BAP. EIFCA byelaw prohibits fishing for tope.
Whiting	✓		✓			Being added in commercial fish grouped plan			No whiting fishery in The Wash. They are caught as by-catch but work is underway to limit this. No individual action plan.
Great crested newt	✓		✓	✓		✓	✓		The Wash hinterlands are not a stronghold for this species and they are already included in the Lincolnshire and Norfolk BAPs. No individual action plan.
Natterjack toad	✓		✓			✓			The only population in The Wash is found at Gibraltar Point NNR. This is managed by the LWT. Actions already carried out through the Lincolnshire BAP. No individual action plan.
Barbastelle	✓		✓		✓	✓	✓	✓	Steering group felt this could add value to bats because there are a number of old structures that could potentially be converted into bat roosts and there has not been much study done on how bats use saltmarsh. The Wash BAP could help achieve these.
Brown hare	✓		✓			✓	✓		Already covered by the Lincolnshire and Norfolk BAP. No individual action plan.

Species Selection Table (cont.)

Species	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Species	Internationally Important	Steering Group feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Brown long-eared bat	✓		✓		✓	✓	✓	✓	Steering group felt this could add value to bats because there are a number of old structures that could potentially be converted into bat roosts and there has not been much study done on how bats use saltmarsh. The Wash BAP could help achieve these.
Noctule	✓		✓		✓	✓	✓	✓	Steering group felt this could add value to bats because there are a number of old structures that could potentially be converted into bat roosts and there has not been much study done on how bats use saltmarsh. The Wash BAP could help achieve these.
Otter	✓	✓	✓	✓		✓	✓		This species is covered by The Wash and North Norfolk SAC designation and by the Lincolnshire and Norfolk BAPs. No individual action plan.
Soprano pipistrelle	✓		✓		✓	✓	✓	✓	Steering group felt this could add value to bats because there are a number of old structures that could potentially be converted into bat roosts and there has not been much study done on how bats use saltmarsh. The Wash BAP could help achieve these.
Water vole	✓		✓			✓	✓		This species is covered by the Lincolnshire and Norfolk BAPs and there is lots of work carried out on it already. No individual action plan.
Atlantic white-sided dolphin			✓						Not recorded in The Wash BAP area. No individual action plan.
Common dolphin			✓						Not recorded in The Wash BAP area. No individual action plan.

Species Selection Table (cont.)

Species	Recorded in The Wash BAP Area	Locally Important	UK BAP Priority Species	Internationally Important	Steering Group feel Value Added	Action Plan in Lincolnshire BAP	Action Plan in Norfolk BAP	Final Decision	
								Individual Action Plan	Reasoning
Common seal	✓	✓	✓	✓		Common & grey seal being added		✓	The Wash contains a significant proportion of England's common seal population.
Harbour porpoise	✓		✓	✓	✓		✓	✓	Because of the lack of knowledge on this species use of The Wash an action plan may help to find more and promote them to the public.
White-beaked dolphin	✓		✓						Not recorded in The Wash BAP area since 1930. No individual action plan.
Greater water parsnip	✓		✓	✓		✓	✓		Not recorded in The Wash BAP area since 1950. No individual action plan.



Photo credit: Knot by Lucy Yates

Appendix 5

Action Plan Summary

Marine Action Plans		
Blue Mussel Beds on Sediment Action Plan		
Objective		
Maintain a sustainable population of blue mussel beds in The Wash		
Targets		
Maintain a blue mussel bed distribution of 368 ha in The Wash		
Actions		
Lead Partner - EIFCA		
Action	Potential Partner	Date
Support research into methods for encouraging the expansion of existing blue mussel beds or the development of new beds e.g. encouraging collaboration between The Wash and the Wadden Sea for such research.	EIFCA, NE	2015
Support the fishing industry (fishermen and local processors) to obtain Marine Stewardship Council (MSC) certification for The Wash mussel fishery.	EIFCA, NE	2015
Ensure mussel cultivation activities do not damage, disturb or destroy interest features of The Wash by evaluating impacts of mussel cultivation via appropriate assessment process before new lays are granted. Carrying capacity research is ongoing and relates to this action.	EIFCA, NE	Ongoing
Continue to monitor mussel stocks and implement measures leading to a sustainable fishery.	WNNCEMS, EIFCA, NE	Ongoing
Support research into factors affecting mussel populations e.g. food availability and carrying capacity research, hydrodynamic studies and parasite studies.	EIFCA, NE, EA, CEFAS	Ongoing
Intertidal Mudflats Action Plan		
Objectives		
Maintain the quality of the existing resource through appropriate management		
Targets		
Achieve favourable or recovering condition (SSSI) of intertidal mudflat by appropriate management		
Actions		
Lead Partner - NE		

Action	Potential Partner	Date
Monitor the extent of intertidal mudflats in The Wash.	NE, WNNCEMS	Ongoing
Carry out intertidal benthic surveys using cores to monitor the extent and distribution of biotopes in The Wash.	NE, WNNCEMS	Ongoing
Ensure that natural tidal movements are not impeded and that there is continued presence of muddy creeks.	NE	Ongoing
Sabellaria spinulosa Reefs Action Plan		
Objectives		
Maintain the extent and quality of <i>Sabellaria spinulosa</i> reefs in The Wash subject to natural change		
Targets		
Establish a baseline for existing extent and condition of <i>Sabellaria spinulosa</i> reef in The Wash		
Maintain the extent of <i>Sabellaria spinulosa</i> reef in The Wash (based on baseline figure) subject to natural change		
Ensure shrimp fishing activity does not adversely affect <i>Sabellaria spinulosa</i> reef features throughout the site		
Actions		
Lead partner - EIFCA		
Action	Potential Partner	Date
Obtain baseline data on the distribution of <i>Sabellaria spinulosa</i> reefs.	EIFCA, NE, JNCC, Wind farm developers, CEFAS	Ongoing
Identify management measures for <i>Sabellaria spinulosa</i> reefs.	EIFCA, NE, Fisheries industry	Ongoing
Once management measures have been identified set actions to implement them.	EIFCA, NE, Fisheries industry	Ongoing
Work with potential partners to continue sustainable fishing.	WNNCEMS	Ongoing
Carry out surveillance work to monitor the <i>Sabellaria spinulosa</i> reef.	NE, WNNCEMS	Ongoing
Common/Harbour Seal Action Plan		
Objectives		
To maintain and enhance the range of the common seal population in The Wash		
Targets		
Maintain and enhance the current range of the common seal in The Wash		
Maintain and enhance the population of common seals in The Wash		
Actions		

Lead partner – NE		
Action	Potential Partner	Date
Raise awareness of the common seal in The Wash through publicity materials and events. Ensure they are not disturbed through this action.	WEP, WNNCEMS, BDMLR, NBIS, LWT	Ongoing
Ensure common seals are taken into consideration in management activities at designated areas of The Wash.	NE	Ongoing
Ensure seal watching trips do not disturb the seals.	NE, WNNCEMS	Ongoing
Harbour Porpoise		
Objectives		
Gain a better understanding of harbour porpoise numbers and distribution in The Wash		
Targets		
Obtain baseline information on the harbour porpoise that use The Wash		
Actions		
Lead Partner - WEP		
Action	Potential Partner	Date
Monitor harbour porpoises in The Wash by setting up effort based surveys at 3 sites around The Wash using the Sea Watch Foundation methodology.	WEP, WNNCEMS	2015
Raise awareness of harbour porpoise in The Wash through publicity materials and events. Ensure they are not disturbed through this action.	WEP, WNNCEMS, BDMLR, NBIS, LWT	Ongoing
Distribute cetacean sightings card and information on how to survey for cetaceans.	WEP, EIFCA, NBIS, LBP, LWT	Ongoing

Coastal Action Plans		
Coastal Sand Dunes Action Plan		
Objective		
To maintain existing areas of dune systems allowing natural processes to continue		
To protect any currently undesignated sites from development		
Targets		
Obtain baseline data on the extent and condition of coastal sand dune habitat in The Wash		
Maintain the current extent and condition of coastal sand dune habitat in The Wash (based on baseline figure)		
Achieve favourable condition (SSSIs) or favourable management (LWSs/CWSs) for designated coastal sand dunes in The Wash		
Actions		
Lead Partner - NE		
Action	Potential Partner	Date
Undertake desk based study and surveys to find the extent and condition of coastal sand dune habitat in The Wash.	WEP, LBP, NBIS, RSPB, NE, LWT	2015
Promote and encourage the creation of semi-natural habitats behind dune systems to buffer from adjacent land use and allow landward movement of dunes.	NE, LWT, NWT	2015
Implement beach management strategies that encourage protection of the seaward fronts of dune systems from unsustainable development activity.	NE, EA, LAs	Ongoing
Ensure that all relevant parties, including landowners and managers, are informed of the importance of coastal sand dunes and of appropriate management.	NE, RSPB, LWT, NWT	Ongoing
Coastal Saltmarsh Action Plan		
Objectives		
To identify areas for the creation of saltmarsh through managed realignment if opportunities arise		
To maintain the quality of the existing resource through appropriate management and continue to allow natural coastal processes		
Targets		
To maintain the current extent (approx. 4901ha, based on fig 5) of coastal saltmarsh in The Wash subject to natural change		
Achieve favourable condition (SSSIs) or favourable management (LWSs/CWSs) of coastal saltmarsh in The Wash.		
Actions		

Lead Partner - NE		
Action	Potential Partner	Date
When opportunities arise support the recreation of coastal saltmarsh habitat through managed realignment.	NE, RSPB, NBIS, EA, LWT	Ongoing
Work with landowners to produce management plans for coastal saltmarsh and continue to allow natural coastal processes.	NE, RSPB, landowners	2015
Carry out condition monitoring of coastal saltmarsh in The Wash and keep baseline information up to date.	NE, WNNCEMS, RSPB, EA	Ongoing
Ensure that all relevant parties, including landowners and managers, are informed of the importance of coastal saltmarsh and of appropriate management.	RSPB, LWT, NWT, NE	Ongoing
Saline Lagoons Action Plan		
Objectives		
Maintain extent and condition of saline lagoons consistent with the development of a naturally functioning coastline		
Create or recreate saline lagoons when the opportunity arises through managed realignment and other coastal defence schemes		
Targets		
Obtain baseline data on the extent and condition of the saline lagoon habitat in The Wash		
Maintain the current extent and condition of saline lagoon habitat in The Wash (based on baseline figure)		
Expand the extent of saline lagoons in The Wash.		
Actions		
Lead partner - NE		
Action	Potential Partner	Date
Undertake desk based study and surveys to find the extent and condition of saline lagoon habitat in The Wash.	WEP, LBP, NBIS, RSPB, NE, IDBs	2015
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.	NE, IDBs, LAs	Ongoing
Ensure that all relevant parties, including landowners and managers, are informed of the importance of saline/brackish lagoons and ditches, and of appropriate management.	NE, RSPB, EA	Ongoing
Identify all suitable sites for saline/brackish lagoon creation/restoration.	NE, RSPB, EA	2015

Ensure that all suitable saline/brackish lagoons in The Wash are protected by appropriate designation, e.g. SPA, SSSI, LWS, CWS.	NE, WNNCEMS, RSPB, LAs	Ongoing
European Eel Action Plan		
Objectives		
Address the decline of the European eel and implement the EU Regulation through production and delivery of the Anglian River Basin Eel Management Plan		
Targets		
Obtain baseline data on the population and distribution of European eel in the wetlands and coastal areas of The Wash by 2013		
Maintain and enhance the current distribution of the European eel in The Wash once the baseline has been set		
Actions		
Lead partner – EA		
Action	Potential Partner	Date
Implement the Anglian River Basin Eel Management Plan (with partners).	EA, IDBs, LBP, King's Lynn Conservancy Board, Boston Port	2012
As part of surveying or regulatory work collect information on eels, especially eel captures or observations in transitional or marine waters, to supplement the EA monitoring work.	IDBs, King's Lynn Conservancy Board, Boston Port, fishermen	Ongoing
EA, landowners and IDB to work together to join existing prioritised barrier lists and expand to include any other known barriers.	IDBs, EA, landowners	2012
Work with landowners to identify barriers to eel migration and help solve this issue.	IDBs, EA	2015

Hinterland Action Plans		
Coastal and Floodplain Grazing Marsh Action Plan		
Objective		
To halt the ongoing decline in grazing marsh and ensure sensitive management of surviving habitat		
To encourage pastoral farming within the grazing marshes		
Targets		
Obtain baseline data on the extent and condition of coastal and floodplain grazing marsh in The Wash		
Maintain the extent and condition of grazing marsh in The Wash (based on baseline figure)		
Restore grazing marsh in The Wash where opportunities arise		
Actions		
Lead Partner - RSPB		
Action	Potential Partner	Date
Prepare an inventory of current and potential grazing marsh in The Wash to provide baseline data.	NE, LBP, NBIS	2015
Survey grazing marsh in The Wash and assess whether it is being managed appropriately.	NE	2015
Identify and promote opportunities for grazing marsh restoration and creation.	NE, RSPB, EA, LBP, NBIS, LWT, NWT	2015
Carry out breeding and winter bird surveys on coastal and floodplain grazing marsh in The Wash.	RSPB, NE, WNNCEMS	Ongoing
Surveillance/monitoring to ensure current grazing regimes are effective for wildlife.	NE, RSPB, WNNCEMS	2015
Ponds Action Plan		
Objectives		
To determine the extent, location and condition of ponds in The Wash		
To ensure ponds that are known to be in favourable condition are maintained in that state		
To enhance existing ponds in The Wash through appropriate management		
To create new wildlife ponds		
Targets		
Establish a baseline for existing extent and condition of ponds within The Wash		
Maintain the current extent of ponds within The Wash (based on baseline figures)		
Increase the number of UK BAP priority ponds in The Wash		

Actions		
Lead Partner - WEP		
Action	Potential Partner	Date
Undertake desk based study and surveys to collect baseline data on the extent and condition of ponds around The Wash.	WEP, IDBs, LBP, NBIS, NE, EA	2015
Based on the results of the baseline data collected assess whether the highest quality ponds within The Wash are suitable for LWS/CWS designation.	LAs, NE, LBP, NBIS	2020
Based on the results of the baseline data identify those ponds of high quality that would benefit from management.	NE	2020
Once ponds are identified for management work, work with landowners and managers, to ensure habitat is maintained and enhanced in accordance with each site's primary habitat/species interest.	NE, IDBs, LAs, BBC	2020
Develop a partnership with the Million Pond Project and others to establish new ponds where environmentally suitable and feasible.	WEP, IDBs, NE, RSPB, BBC	Ongoing
Reedbed Action Plan		
Objectives		
To create a network of well-managed reedbeds		
Targets		
Establish a baseline for existing extent and condition of reedbeds in The Wash		
Maintain the current extent and condition of reedbed in The Wash (based on baseline figure)		
Create new reedbeds as near as possible to existing sites on areas of current low nature conservation interest (figure to be set after baseline obtained)		
Actions		
Lead partner - RSPB		
Action	Potential Partner	Date
Undertake desk based study and surveys to produce an accurate baseline figure for the total area of reedbed in The Wash hinterlands.	WEP, LBP, NBIS, IDBs, RSPB, NE	2015
Identify priority sites for habitat recreation and expansion from baseline data.	NE, IDBs, EA	2016
Promote the maintenance of reedbeds and encourage management on appropriate sites.	NE, RSPB	Ongoing
Continue to target conservation management and habitat recreation using HLS and other grant schemes.	NE	Ongoing

Rivers and Drains Action Plan		
Objectives		
To maintain the current extent of rivers and drains		
To improve water quality, water resources and habitat diversity of rivers and drains		
To enhance the characteristic flora and fauna of rivers and drains		
Targets		
Maintain the extent of rivers and drains in The Wash hinterlands		
Manage rivers and drains to promote use by flora and fauna		
Actions		
Lead partner – IDB		
Action	Potential Partner	Date
Control non-native species as appropriate on sites where organisations have that responsibility.	IDBs, RSPB, NE, EA, LWT, NWT	Ongoing
Ensure landowners are aware of and observe statutory requirements relating to spraying near drainage ditches and channels.	IDBs, EA, WNNCEMS	Ongoing
Encourage appropriate management to enhance wildlife value of rivers and drains.	IDBs, NE, RSPB, EA	Ongoing
Work with landowners annually to reduce the input of point and diffuse sources of pollution into watercourses.	NE, EA, IDBs	Ongoing
Bats Grouped Action Plan		
Objectives		
Maintain and enhance the current distribution of bats across The Wash and its hinterlands		
Gain a better understanding of how bats utilise habitats within The Wash and its hinterlands		
Targets		
Determine whether bats use the saltmarsh in The Wash		
Determine what species use the saltmarsh in The Wash		
Create roost sites that bats can use in The Wash and its hinterlands		
Actions		
Lead Partner - WEP		
Action	Potential Partner	Date
Continue to undertake surveys and investigate monitoring across The Wash with particular reference to the saltmarsh.	LBG, NBIS, NBSG	2015
Report on the results of the bat surveys.	LBG, NBSG	2016

Identify structures that could be converted into roost sites for bats.	LBG, IDBs, EA, NE	2013
Once possible roost site structures have been identified convert them to make possible roost sites for bats.	IDBs, EA, NE	2015
Monitor new roost sites.	LBG, NBIS	Ongoing
Farmland Birds Grouped Action Plan		
Objectives		
Maintain and enhance farmland bird populations in The Wash and its hinterlands		
Targets		
Expand the populations of farmland birds in The Wash hinterlands		
Actions		
Lead Partner - RSPB		
Action	Potential Partner	Date
Promote the Higher Level Stewardship Scheme to increase the uptake of farmland birds.	NE, IDBs, RSPB,	Ongoing
Encourage people to monitor the results of Higher Level Stewardship Scheme.	NE, IDBs, RSPB,	Ongoing
Promote voluntary participation in the Breeding Bird Surveys and other farmland bird surveys.	RSPB, WEP	Ongoing
Pass on the details of Marsh and/or Montagu's harriers which have 'vulnerable' nests in silage, rape, or barley crops to the RSPB Harrier Protection Scheme (via Jim Scot, RSPB Snettisham).	All	Ongoing
Promote and implement the farmland bird package(s) as a toolkit to reverse the long-term decline in farmland birds as part of Entry Level or Higher Level Stewardship agreements.	RSPB, NE, farmers	Ongoing

Common Areas Action Plans		
Research, Data Collation and Management Action Plan		
Objective		
To acquire data on habitats and species in The Wash and its hinterlands to feed into the Lincolnshire and Norfolk environmental Records Centres		
To establish a co-ordinated programme for the survey and monitoring of species and habitats		
Targets		
Establish a biodiversity survey and monitoring programme to fill identified gaps in knowledge		
Actions		
Lead Partner - WEP		
Action	Potential Partner	Date
Promote the importance of general recording of habitats and species within The Wash and sending the records into the appropriate Local Records Centre.	All	Ongoing
Identify gaps in knowledge and target resources towards survey of priority habitats and species.	All	Ongoing
Carry out general habitat and species surveys in The Wash.	All	Ongoing
Ensure data is collated on a regular basis to track progress towards achieving BAP targets.	All	Ongoing
Policy, Planning and Legislation Action Plan		
Objectives		
To achieve sustainable use of the land and sea, which will conserve and enhance biodiversity in The Wash and its hinterlands		
Embed the ecosystem approach in planning and development at all levels, including those frameworks that channel resources for both the sea and land		
Targets		
Promotion of habitats and species in The Wash in LDF, SMP, Catchment Management Plans and other plans and policies as appropriate		
Actions		
Lead Partner - WEP		
Action	Potential Partner	Date
Ensure UK BAP priority habitats and species are appropriately referred to in all policy documents.	All	Ongoing
Encourage use of relevant Codes of Conduct for reducing human impact on local marine wildlife.	EIFCA, NE, WNNCEMS	Ongoing

Ensure development plans give adequate protection to all designated sites within The Wash and its hinterlands.	All	Ongoing
Education, Raising Awareness and Public Involvement Action Plan		
Objectives		
Enable local communities and visitors to experience biodiversity of The Wash and its hinterlands directly, and enhance their enjoyment without damaging the biodiversity of the area		
To enhance understanding and enjoyment of wildlife by people of all ages and provide the necessary support for local conservation projects		
Targets		
Ensure that 5 events per year promote The Wash and hinterlands are organised by BAP Partners		
Actions		
Lead partner – WEP		
Action	Potential Partner	Date
Promote the conservation of marine, coastal and terrestrial habitats and species at 5 events per year.	All	Ongoing
Reduce littering at sea and on beaches with further promotion of Adopt-a-Beach volunteer scheme run by MCS (Adopt 1 beach using the MCS run scheme of adopt-a-beach to reduce littering at sea and on beaches).	WNNCEMS, WEP	Ongoing
Promote The Wash and North Norfolk Coast SAC and EMS Good Practice Guide.	All	Ongoing



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