



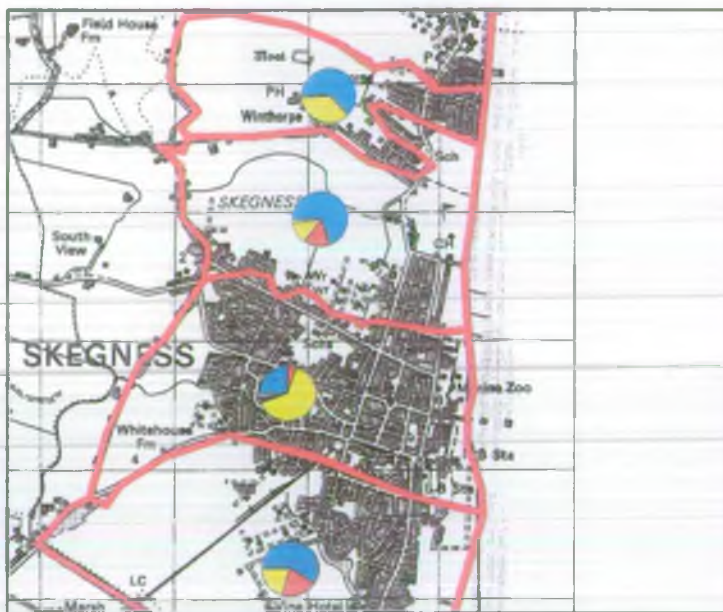
ENVIRONMENT AGENCY

Anglian Region

LINCOLNSHIRE SHORELINE MANAGEMENT PLAN

VOLUME III - SUPPORTING DOCUMENT

DECEMBER 1996



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ENVIRONMENT AGENCY
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LINCOLNSHIRE SHORELINE
MANAGEMENT PLAN

VOLUME III - SUPPORTING DOCUMENT

December 1996

Revision	Date	Prepared	Checked	Approved	Status
-	December 1996	A J Sleight R W F Hill <i>[Signatures]</i>	N Heasman <i>[Signature]</i>	N W Beech <i>[Signature]</i>	Final

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GLOSSARY

ABBREVIATIONS

APPENDICES

A	CONSULTATION
B	EXISTING COASTAL DEFENCES
C	NATURE CONSERVATION CITATIONS

SECTION 1

LINCOLNSHIRE SHORELINE MANAGEMENT PLAN

1.1 INTRODUCTION

This document is Volume III of the Lincolnshire Shoreline Management Plan.

In total the SMP comprises three volumes; these are:

- Volume I: Core Report
- Volume II: Atlas
- Volume III: Supporting Document

The scope of the three documents is outlined below:

Volume I, Core Report: The Core Report describes how the Lincolnshire coast has been considered as a number of so called "management units"; these are lengths of coast with coherent characteristics in terms of natural coastal processes and land use. It sets out the specific objectives of the SMP with regards to the whole coast and these management units. The coastal defence options are then appraised in terms of these objectives and in terms of their economic viability. Preferred strategic options are thus derived.

The remainder of the Core Report is concerned with recommendations for future research and monitoring of the coast, and recommendations for the future review procedures for the SMP.

Volume II, Atlas: The Atlas comprises 18 maps accompanied by short descriptions of the information presented and the sources of the data. These maps also show the location of existing activities, sites and interests essential to maintaining the character of the Lincolnshire coast. They are therefore described as the area assets. A list of the maps included in the Atlas is provided in Table 1.1.

Volume III, Supporting Document: The Supporting Document provides further background and details to the information contained in the Atlas.

Some diagrams and tables are repeated between documents to avoid excessive cross-reference.

1.2 CONSULTATION

The Lincolnshire SMP has been developed in two stages. Stage 1 dealt with the collection and presentation of data and Stage 2 with the integration of all information which, together with the results of consultation, led to the preparation of the coastal defence strategies.

At the beginning of Stage 1 (March 1995) a Scoping Document was issued to over 100 interested parties to advise them of the project and to request relevant information. Data collected was used in the preparation of draft editions of the Atlas and Supporting Document. At the end of Stage 1 (August 1995) these documents were issued for consultation.

During Stage 2 the Atlas and Supporting Document were revised in the light of the consultation and a draft of the Core Report prepared. These three documents formed the draft SMP which was issued for consultation in December 1995. Finally, comments from this consultation were incorporated into the three documents and the SMP was published in December 1996.

A list of those consulted during the preparation of the SMP together with a summary of the responses received during the Stage 1 and Stage 2 consultation is provided in Appendix A.

1.3 SUPPORTING DOCUMENT

This document presents the information on the following key issues:

- coastal processes
- coastal defences
- land use and the human environment
- natural environment.

The information presented is the result of the data gathering and consultation exercises undertaken during the preparation of the draft SMP.

Throughout the document reference is made to the maps included in the Atlas (Volume II of the SMP).

TABLE 1.1
MAPS INCLUDED IN ATLAS

Map No	Title	No of Sheets
1	Introduction to Lincolnshire Coast	1
2	Sea Bed Contours	1
3	Sedimentology	1
4	Geomorphology	1
5	Beach Sediment Sizes	1
6	Shoreline Evolution	3
7	Wave Conditions	1
8	Tidal Conditions	1
9	Net Longshore Transport	1
10	Coastal Defences	3
11	Land Use	3
12	Planning Framework	1
13	Commercial Fishing Activities	1
14	Tourism and Recreation	1
15	Habitats	1
16	Conservation Sites	1
17	Archaeology	1
18	Management Units	1

SECTION 2

LOCATION

2.1 GENERAL

The Lincolnshire SMP covers the coastline from Donna Nook to Gibraltar Point, a length of approximately 50km. In addition to the shoreline boundary the SMP is also limited by hinterland and offshore boundaries. All three boundaries are shown in Figure 2.1, and are discussed in the following sections.

2.2 SHORELINE BOUNDARY

The length of coast between Donna Nook and Gibraltar Point has been designated sediment sub-cell 2c. The boundaries of this cell were determined by HR Wallingford (HR Wallingford, 1993) from an assessment of the movement of material along the coast and are shown on Map 1.

The northern limit of Donna Nook is considered as a "drift divide" and the southern limit at Gibraltar Point a "sediment sink". HR Wallingford define a drift divide as a point where the direction of the coast changes abruptly and material is moving away from the point on both sides. There is a tendency for erosion at a drift divide. However, in the case of Donna Nook the beaches are being fed by the nearshore sand bank system and accretion is occurring. A sediment sink is defined as a point on the coast where sediment transport paths meet and accretion tends to occur. At both types of boundary, interference with sediment movements on one side should not cause significant impacts on the other.

Sub-cell 2c is bounded to the north by sub-cell 2b: Immingham to Donna Nook and to the south by sub-cell 2d: Gibraltar Point to Snettisham.

2.3 HINTERLAND BOUNDARY

All land below the +5m OD contour is at risk of flooding. This constitutes a large area which extends up to 15km inland of the coast. From practical considerations the hinterland area defined for the purposes of the Plan is broadly based on the extent of flooding that occurred in 1953. This area has, however, been extended to include areas which, though not flooded, were isolated by flooding. It has also been extended, in places, to provide a minimum width of 1km from the coast. The hinterland boundary is shown on Map 11.

2.4 OFFSHORE BOUNDARY

The location of the offshore boundary should take into account the following issues:

- i) the effect of the bathymetry on the transformation of waves approaching the shoreline
- ii) the movement of material between the offshore banks and the shoreline
- iii) the potential effects of offshore material extraction on the shoreline

These issues are discussed below in the context of defining the offshore boundary for the Plan; further details are provided in Section 3.

- i) Work completed during the strategy study for the Mablethorpe to Skegness Sea Defences (NRA, 1991) has shown that the sand banks offshore from Gibraltar Point and between Mablethorpe and Donna Nook, together with the sand banks further offshore at Inner Dowsing, all modify extreme waves approaching the coast. The sand bank systems should therefore be included within the SMP and this would require the offshore boundary to be located at the -20m CD contour.
- ii) Research by Dugdale (Dugdale, 1995) has shown that in addition to protecting the shoreline, the sand banks offshore from Gibraltar Point and between Mablethorpe and Donna Nook also provide a source of sand for the adjacent beaches. These banks should therefore be included in the SMP and this would require the offshore boundary to be located at the - 10m CD contour.
- iii) The extraction of material offshore from the Lincolnshire coast could, potentially, affect the coastal processes by increasing the exposure of the shoreline to wave energy. Careful consideration therefore needs to be given to such proposals so that the effects on the coastline can be established. For this reason it is important that the sand banks affecting the propagation of waves towards the shoreline are included within the SMP. This would require the offshore boundary for the SMP to be located at the -20m CD contour.

Material is currently being extracted from an area of the seabed approximately 5km south east of the Inner Dowsing Sand Bank for the nourishment of the Lincolnshire beaches. It has, however, been established that these dredging operations will not affect the coastal processes along the Lincolnshire coast and the offshore boundary has therefore not been extended to include this dredging site.

On the basis of these comments the offshore boundary has been located at the - 20m CD contour.

SECTION 3

COASTAL PROCESSES

3.1 HISTORICAL EVOLUTION OF THE COASTLINE

Since the last Ice Age, which began approximately 75,000 years ago, the Lincolnshire coastline has undergone a series of dramatic changes, these are briefly summarised as follows:

- before the last Ice Age the coastline was located at the eastern edge of the Lincolnshire Wolds, some 15km inland of the present day position
- with the arrival of the last Ice Age glaciers moved over East Lincolnshire leaving glacial deposits and icemelt sand and gravel deposits, the latter which are now the Docking Shoal and Saltfleet, Theddlethorpe and Protector Overfalls
- in the immediate post glacial period East Lincolnshire was much higher than it is now and the sea was far away to the east
- by 5500 BC the sea had refilled the North Sea basin and separated Britain from the continent. In Lincolnshire the shoreline was approximately 15km east of the present day position
- around 1800 BC the sea had flooded the offshore sand and gravel banks formed during the last Ice Age. These banks became a series of low lying islands with an extensive sheltered tidal lagoon in their lee. It is thought that the Dowsing Overfalls and Inner Dowsing bank began to form at this time as a bar across the main entrance to the lagoon
- by the 9th century the coastline was approximately 2km east of the present day location and rising sea levels began to produce beaches from the glacial sands on the offshore banks
- in the 13th century a series of major floods overwhelmed the offshore banks and transported sand and gravel onto the Lincolnshire beaches
- the coastline was now exposed to the open sea and over the following centuries the wave and tidal conditions in the North Sea have continued to adjust the coastline
- by the 19th century the gradual improvement and reconstruction of the defences had finally held the advance of the sea between Mablethorpe and Skegness and the position of this length of the coastline from this date has been stabilised.

The information in this section has largely been taken from a book by D Robinson describing the history of the Lincolnshire Seaside (Robinson, 1981).

3.2 PHYSICAL CHARACTERISTICS

3.2.1 General

As noted in Section 3.1 the present day coastline dates from the 19th century when the defences effectively held the advance of the sea. The physical characteristics of this coastline are described in the following sub-sections.

3.2.2 Bathymetry

Map 2 illustrates the bathymetry of the seabed off the Lincolnshire coast. The information shown on the map has been taken from Admiralty Chart No 1190. Limited inshore bathymetric surveys have been undertaken for lengths of the coast between Mablethorpe and Skegness (EGS, 1990) in connection with the NRA's strategy study for the Mablethorpe to Skegness Sea Defences (NRA, 1991), however, the Admiralty Chart is the only source of data covering the full extent of the Plan area.

The seabed is relatively featureless with sand banks providing the only notable features. Nearshore sand bank systems exist to the north of Mablethorpe and to the south of Skegness (Skegness Middle and South, Inner and Outer Knock, and Outer Dogs Head). Further offshore a sand bank occurs at Inner Dowsing. This bank is orientated NW - SE, ie. parallel with the tidal flows and is around 15m higher than the surrounding seabed.

The interaction between the sand banks and the tidal currents can result in turbulent areas of sea known as overfalls. Saltfleet, Theddlethorpe, Trusthorpe, Protector and Inner Dowsing Overfalls are identified on Map 2.

3.2.3 Seabed Sedimentology

Map 3 defines the character of the deposits on the seabed off the Lincolnshire coast. The majority of the area has been covered by a resource study completed by the British Geological Survey in 1992 (BGS, 1992). This study involved a combination of geophysical and sampling techniques and was built upon previous desk studies that had been undertaken by BGS. To the south of Skegness data has been taken from Admiralty Chart No.1190. Finally, inshore data was available from geophysical surveys (EGS, 1990) undertaken in connection with the NRA's strategy study for the Mablethorpe to Skegness sea defences (NRA, 1991).

Offshore the deposits are predominantly gravels, sandy gravels, gravelly sands and sands. The majority of the seabed is gravelly with sand deposits occurring at Inner Dowsing. In general the gravelly deposits are less than 1m thick whilst sand deposits are over 1m thick and, locally on Inner Dowsing, up to 12m. On these banks and adjacent sandy areas, sand

waves with amplitudes up to 8m have been formed by the strong tidal currents. These deposits are mostly underlain by a stiff, stoney clay which is, in turn, underlain by chalk.

Inshore there are sand banks north of Mablethorpe and south of Skegness. Sand deposits are also found at Mablethorpe and Skegness, but between these locations the seabed consists predominantly of clays with sand limited to a narrow beach within 500m of the shoreline.

3.2.4 Beaches

The beaches along the Lincolnshire coast may be broadly divided into three zones, these are:

- Donna Nook to Mablethorpe
- Mablethorpe to Skegness
- Skegness to Gibraltar Point

North of Mablethorpe the beaches are wide and shallow and consist of a thick layer of fine sand backed by salt marshes and sand dunes. The zone between Mablethorpe and Skegness has narrow relatively steep beaches with little sand cover for the underlying clay. The final zone to the south of Skegness again has wide shallow beaches with abundant sand backed by salt marshes and dunes.

It is evident that those beaches to the north of Mablethorpe and south of Skegness are, in general, accreting whilst those in the middle zone are eroding.

A "ridge and runnel" formation is found on the Lincolnshire beaches. The ridges are not parallel to the coastline but are orientated in a south easterly direction as the dominant waves are from the north-east (see Map 7). They also gradually migrate southwards. It is believed that such features are built up by wave action on beaches that have an overall gradient which is flatter than the equilibrium gradient for the sediment, and that the movement of the ridge is caused by the longshore transport of beach material.

The typical grading of sand on the beaches between Mablethorpe and Skegness is shown on Map 5. These beaches generally comprise fine to medium sand with a mean particle diameter (D_{50}) of 0.2mm. The grading of the beaches does, however, vary seasonally. In the winter months gravel is generally more evident as the rougher seas transport the fine sand offshore. In the summer months, when sea conditions are more moderate, the beaches are able to recover and are generally covered with fine sand. The samples of the existing beach material shown on Map 5 were taken during the month of August, in connection with the strategy for Mablethorpe to Skegness Sea defences (NRA, 1991).

The Agency are currently undertaking a nourishment scheme involving the placing of sand on the beaches from Whitehouse Corner (1km south of Ingoldmells Point) to Mablethorpe.

Sample F (see Map 5) is representative of the material placed during the first phase of these works to the south of Ingoldmells Point.

The NRA/Agency have for many years undertaken regular profile surveys of the beaches along the Lincolnshire coast for monitoring purposes. A summary of the data held within the Agency's archives is given in Table 3.1.

TABLE 3.1
BEACH PROFILE DATA

Extent	Length of Records	Frequency of Surveys	Reference
Beach profiles covering entire Plan at 1000m centres	1959 - to date	Monthly	Agency archives
Beach profiles covering entire Plan at 1000m centres	1991 - to date	6 Monthly	Agency archives
5km long beach and nearshore profiles at -500m centres south of Skegness and north of Mogg's Eye -1000m centres between Skegness and Mogg's Eye	September 1990	-	EGS, 1990
1km long beach and nearshore profiles at -250m centres between Skegness and Chapel -1000m centres between Chapel and Mablethorpe	Summer 1992	-	EGS, 1993
1km long beach and nearshore profiles at -250m centres between Ingoldmells and Chapel -1000m centres between Ingoldmells and Skegness	May 1994	-	EGS, 1994

3.3 MARINE CLIMATE

The coastline of Lincolnshire is exposed to waves, tides, tidal currents and meteorological surges. These conditions are described below.

3.3.1 Wave Conditions

Waves generated offshore in the North Sea are modified by the seabed bathymetry as they approach the coastline.

Wave studies were undertaken for the strategy study for the Mablethorpe to Skegness Sea Defences (NRA, 1991) and from this work inshore wave conditions along the Lincolnshire coast have been derived. Results from this study are shown on Map 7 where wave roses for seven points along the coast are presented. They illustrate the 1 in 1 year and 1 in 100 year significant wave heights for directions between 0° N and 120° N. They have been calculated using wind data recorded at the Dowsing light vessel and take into account the effect of seabed changes on the waves as they approach the coast. Statistical techniques have then been used to determine the 1 in 1 year and 1 in 100 year significant wave heights.

The significant wave height is defined as the average of the highest one third of the waves and has been found to approximate to the visual estimate of wave height that would be obtained by an experienced observer.

The wave roses indicate that the exposure of the coastline to wave energy reduces significantly to the south of Skegness; this is due to the sheltering effect of the offshore sand banks. The roses also indicate that the largest waves approach the coast from the north-east.

3.3.2 Tidal Conditions

The tidal conditions are discussed under the headings of tide levels, tidal currents and tidal current residuals.

Tide Levels

The tidal regime along the Lincolnshire coast is semi-diurnal, ie. the water level rises and falls twice a day.

A table of tide levels at Skegness is shown on Map 8. It has been reproduced from the Admiralty Tide Tables (Admiralty, 1995) and indicates that the tidal range, the difference between high and low water levels, is 6.0m on a spring tide and 2.8m on a neap tide. Levels are given relative to Ordnance Datum (OD). These are predicted astronomical tide levels and do not take account of surges which can have a significant effect. Surges are related to the meteorological conditions and, under extreme conditions, can increase predicted astronomical tide levels by over 2m.

Tidal Currents

A table of tidal streams (in knots) is also shown on Map 8. The table, taken from Admiralty Chart No. 1190, indicates that the rising, or flood, tidal currents flow approximately north to south and that the falling, or ebb, tidal currents are from south to north. The tidal currents are moderate with peak flows on a spring tide of approximately 2 knots (1m/sec).

The interaction between the sand banks and the tidal currents can result in turbulent areas of sea known as overfalls. Saltfleet, Theddlethorpe, Trusthorpe, Protector and Inner Dowsing Overfalls are shown on Map 8.

Tidal Current Residuals

Map 8 also illustrates the direction of the tidal current residuals at a number of locations. Tidal current residuals are the net differences between the flood and ebb flows.

Inshore tidal residuals do not contribute significantly to the movement of material as transport in this zone is dominated by wave action. However, offshore these residuals are the primary cause of sediment movement and control the development and changes to the offshore sand banks.

3.3.3 Combined Water Levels and Wave Conditions

Damage and erosion of the coastal defences is, in general, not due solely to high water levels or extreme waves but occurs due to a combination of these factors.

The interdependence of these factors is very important in the design of coastal defences. Work was undertaken by HR Wallingford (HR Wallingford, 1990) as part of the strategy study for the Mablethorpe to Skegness Sea Defences (Agency, 1991), which investigated the correlation between high water levels and high waves and derived joint probabilities for these parameters.

3.3.4 Sea Level Rise

Relative sea level rise, the change in sea level with respect to the local land mass, is due to changes in the level of the land and absolute changes in the level of the oceans. It has been the subject of considerable research and various estimates of future relative sea level rise have been made.

MAFF (1993) give a sea level rise allowance for the Anglian Region of the Agency of 6mm/year upto the year 2030. This is based on the findings of the Intergovernmental Panel on Climate Change (IPCC, 1990) and Shennan (1989). NRA (1992) quotes the same value for the period to 2030 and also estimates a rise of 8.5mm/year between 2030 and 2100 for the Anglian Region.

This anticipated rise in the level of the sea will affect the wave climate and the future evolution of the coastline. It should also be taken into account in the design of future defences for the Lincolnshire coast.

3.4 PRESENT DAY PROCESSES

3.4.1 General

Recent trends in coastline evolution suggest a continuing erosion of the shoreline between Mablethorpe and Skegness, but shoreline advance to the north of Mablethorpe and to the south of Skegness.

These trends are illustrated on Map 6 which presents:

- the evolution of the high water mark between 1880 and 1970
- the long term movement of the high and low water marks
- beach level trends between Mablethorpe and Skegness

The information relating to the movement of the high and low water marks has been derived from Ordnance Survey maps (Agency, -) and Anglian Water (1988). The long term movements are based on a comparison of maps prepared between 1850 and 1890 and those prepared in the 1970's. They represent therefore, mean trends over approximately one hundred years. Beach level trends have been derived from an analysis of beach profiles between 1960 and 1990 (HR Wallingford, 1991).

These trends divide the coastline into the following zones:

- Donna Nook to Mablethorpe
- Mablethorpe to Skegness
- Skegness to Gibraltar Point

These zones are discussed in more detail in the following sub-sections.

3.4.2 Donna Nook to Mablethorpe

In comparison with the coastline south of Skegness (see Section 3.4.4 below), much less information exists for the length between Donna Nook and Mablethorpe. However, the two lengths of coastline have much in common, in particularly the importance of the nearshore sandbank systems and the relationship between these features and the tidal flows.

The nearshore zone between Donna Nook and Mablethorpe contains a large volume of sand which forms a shelf shallower than 10m deep extending eastwards to Protector Overfalls. The mobile sand on this shelf has been formed into a series of relatively indistinct sandbanks and channels by the tidal residuals at the entrance to the Humber Estuary. The sandbank system is illustrated in Figure 3.1 and is virtually a mirror image of that which exists off Gibraltar Point. It is, however, much more stable, in so far that it does not exhibit a tendency to migrate.

The general trend of accretion north of Mablethorpe is considered to be due to the presence of this sandbank system which supplies sediment to the adjacent beaches. A study into sediment transport pathways by McLaren (Halcrow, 1990) has indicated that sediment exchange does occur between the sand banks to the south of the Humber and the adjacent shoreline. It is believed that these sand banks are fed by the coastline to the north of the Humber.

In addition to providing a source of sediment, it is considered that the sandbanks limit the wave energy reaching the coast. This reduces longshore transport rates and contributes to the accumulation of sand on the beaches north of Mablethorpe.

Although there has been a general advance in the high water mark between 1880 and 1970 it should be noted that between Saltfleet and Donna Nook the low water mark has been retreating. This would suggest a long term steepening of the intertidal profile and not uniform accretion over this length.

3.4.3 Mablethorpe to Skegness

The trend of erosion between Mablethorpe and Skegness is primarily due to wave induced longshore transport of sand along the coast and erosion of the underlying clay layer during storms. Inshore tidal current residuals do not contribute significantly to the movement of material (NRA, 1991). This trend has caused the beaches to steepen and fall as shoreline retreat is prevented by the presence of hard defences. This is illustrated on Map 6.

Map 9 illustrates the direction and relative magnitude of the potential net longshore transport. Overall the coastline is subject to a net southerly transport of sand with rates that increase going from Mablethorpe to Skegness. Consequently more sand is transported out of this length of the coast than arrives at Mablethorpe and hence the beaches are eroding.

The second cause of beach loss is the erosion of the underlying clay. During a storm the thin sand layer is largely removed from the upper beach and transported offshore. This exposes the clay layer to wave attack. The clay is eroded, transported (in suspension) away from the beach and effectively lost. Following the storm, sand gradually returns to the beaches but at a lower level as some of the clay has been permanently lost. This trend of reducing beach levels is illustrated on Map 6 which indicates that the beaches are typically falling at a rate of 2cm/year.

3.4.4 Skegness to Gibraltar Point

The trend of accretion south of Skegness is due primarily to two factors: the net wave induced southerly transport of sand along the Lincolnshire shoreline south of Mablethorpe, and the presence of nearshore tidally generated and maintained sand banks. The location of these sand banks is shown in Figure 3.2.

Figure 3.3 illustrates bedload current residuals off Gibraltar Point (Dugdale, 1995). Bedload current residuals are the net differences in the capacity of the flood and ebb flows to transport material along the bed. The figure illustrates that the sand bank complex essentially represents the balance point between ebb and flood residuals. The area to the north of these sand banks is characterised by flood residuals and the area to the south (which includes Boston Deep channel and the southern flanks of the sand bank) by ebb residuals. As a consequence the sand banks operate as very efficient sediment traps.

Measurements taken on the crest of Skegness Middle indicate an onshore movement of sediment along this sandbank and suggest that this feature plays a dominant role in the accumulation of sand on the adjacent foreshore. (Dugdale, 1995). This is supported by an analysis of Admiralty Charts dated 1910, 1924, 1958 and c 1970 (Dugdale, 1995) which indicates a persistent southerly migration of the Skegness Middle sandbank by approximately 4km during the period covered by the surveys, ie. between 1910 and 1970. Over the period the accumulation of sediment on the foreshore has moved in sympathy with the sandbank suggesting the banks do influence foreshore accretion.

In contrast, measurements taken to the south, both on the foreshore, in the Wainfleet Swatchway and on the Inner Knock suggest a possible path for sediment movement from the foreshore into the sandbank complex. It therefore seems likely that Skegness Middle is supplied with sand along sediment pathways from other sandbanks to the south and that a closed circulation of sand has established.

If these conditions are correct then much of the sand that has accumulated at Gibraltar Point has been supplied by the southerly longshore transport of sand along the Lincolnshire coast. The tendency for accumulation and shoreline advance has, nevertheless, been helped by the presence of the sandbank system.

The southerly migration of Skegness Middle has meant that the shoreline in the vicinity of Skegness Pier and south of Lagoon Walk has lost a source of sediment and is now experiencing shoreline erosion. It is also understood that localised and/or temporal erosion occurs at other locations to the south of Skegness as a result of the dynamic nature of this length of coast.

3.5 FUTURE EVOLUTION OF COASTLINE

3.5.1 Donna Nook to Mablethorpe

The trend of accretion is likely to continue.

3.5.2 Mablethorpe to Skegness

The Agency are currently undertaking a scheme to nourish the beaches between Whitehouse Corner (1km south of Ingoldmells Point) and Mablethorpe by the importation of sand (see Section 4.3).

This will result in the immediate advance of the high water mark. Longshore transport will, however, continue to cause erosion and the Agency's strategy is to maintain the beaches over the next fifty years by undertaking periodic renourishment.

3.5.3 Skegness to Gibraltar Point

In the future, the current trend of erosion between Skegness and south of Lagoon Walk is likely to be reduced and possibly reversed by the beach nourishment scheme discussed in Section 4.3.

The increased southerly longshore transport of sand may result in the return of wide sandy beaches along this length and also enhance accretion rates at Gibraltar Point.

Further substantial southerly movement of Skegness Middle is unlikely as it is beginning to impinge on the flood channel of Wainfleet Swatchway. It is likely that this sandbank will slowly decline in volume as material is progressively transferred onshore. Once onshore it will be transported southwards and contribute to accretion at Gibraltar Point (Dugdale, 1995).

3.6 INTERACTION WITH ADJACENT COASTLINE

The Lincolnshire Shoreline Management Plan is concerned with sediment sub-cell 2c which is bounded by sub-cell 2b: Immingham to Donna Nook to the north and sub-cell 2d: Gibraltar Point to Snettisham to the south.

The boundary at Donna Nook is a sediment divide with longshore transport occurring in both directions either side of this point due to the changing orientation of the coastline and possibly the local refraction of waves as they travel over the offshore sandbanks. In addition, the boundary is being fed by these offshore sandbanks.

The boundary at Gibraltar Point is a sediment sink and research (Dugdale, 1995) suggests that there is a closed circulation of sand occurring between the offshore sandbanks and the beaches at this location.

On the basis of the information gathered during this first stage, there is no evidence to indicate that significant direct exchange of sediment (sands and gravel) occurs across the boundaries of sub-cell 2c. Consequently there appears to be no reason to modify the boundaries of this sub-cell. However it has been suggested that the coastline north of the Humber is feeding the Lincolnshire coast indirectly via the offshore sandbanks.



SECTION 4

COASTAL DEFENCES

4.1 HISTORY OF DEFENCES

The Lincolnshire coastline is very much a battleground between the land and the sea and has a long history of flooding.

As discussed in Section 3.1, by the 19th century the gradual improvement and reconstruction of the defences had finally held the advance of the sea and the position of the Lincolnshire coastline from this date has remained largely stable.

There were, however, floods during the 19th century caused by the failure of the sea banks: in 1837 it is reported that flood water rose 8'9" above ground level around Winthorpe Church and in 1883 extensive sea defence works were required at Sutton and Trusthorpe following the extraordinary tide (Robinson, 1981).

Periodic flooding has continued into this century with the most notable event occurring in January 1953 when low atmospheric pressure and high winds raised the water levels along the coast by 2 to 2.5m above the predicted spring tide level. These high water levels combined with very rough seas resulted in extensive flooding along the Lincolnshire coast. The extent is illustrated in Figure 4.1.

The existing sea defences, which comprised of sand dunes, clay banks, wooden wall, concrete slabs and walls and isolated steel-piled stepped concrete walls, were unable to withstand the extreme conditions and multiple breaches occurred between Mablethorpe and Ingoldmells Point. Failure initially occurred at Acre Gap, Sandilands, where a layer of sand was spread over adjacent fields and flood water flowed inland for 10km. The promenade at Mablethorpe was wrecked and the sea drove large quantities of sand and water into the streets of the town.

Flooding in 1953 led to the loss of 41 lives along the Lincolnshire coast, together with major damage to property and the evacuation of 5000 people from the towns of Mablethorpe and Sutton-on-Sea.

Immediately following the event, emergency works were undertaken by contractors and Army personnel to secure the defences before the next spring tide. This involved transporting thousand of tonnes of clay, chalk and stone by road and rail to the coast to seal the breaches.

Further details on the 1953 floods may be found in papers from the Institution of Civil Engineers conference on the North Sea Floods (ICE, 1954), D Robinson's book of the Lincolnshire Seaside (Robinson, 1981) and a booklet entitled 'The Flooding of Eastern England' (Harland, 1980).

The defences were rebuilt following the 1953 event and were able to withstand further events which occurred in 1976 and 1978. During these events the defences were overtopped but no breaches occurred.

The defences are still subject to ongoing major capital works. A study to examine the most appropriate strategy for the defence of the coastline between Mablethorpe and Skegness was completed in 1991. This led to a decision by the NRA to adopt a strategy of beach nourishment over the next fifty years. Further details of recent works undertaken on the coastline and the beach nourishment scheme are given in Section 4.3.

4.2 EXISTING DEFENCES

4.2.1 Type of Defence

The coastal defences along the Lincolnshire coast may be broadly divided according to the following lengths:

- Donna Nook to Mablethorpe
- Mablethorpe to Skegness
- Skegness to Gibraltar Point.

The type of defence along each length is briefly described below and more detailed information may be found on Map 10 and in Appendix B.

Donna Nook to Mablethorpe

Over this length the defences consist of dunes between Mablethorpe and Saltfleet and an embankment, fronted by dunes, between Saltfleet and Donna Nook.

Mablethorpe to Skegness

For the majority of this length hard defences have been constructed. These include concrete seawalls, some with either rock armour or concrete units as toe protection, and revetments. These structures are, in general, fronted by short timber groynes.

Skegness to Gibraltar Point

To the south of Skegness the defences are dunes except for a short length of embankment within the Gibraltar Point Nature Reserve. This embankment is known as Bulldog Bank.

4.2.2 Standard of Defence

The standard of defence is defined as the return period of the storm event that the defences

are able to provide protection against.

The standard (of defence) of the Lincolnshire defences is given in Appendix B. This data is taken from work completed during the strategy study for the Mablethorpe to Skegness Sea Defences (NRA, 1991) and updated using information provided by Agency personnel.

In general the standard of defence has been determined from an assessment of overtopping during storm events. Overtopping can be tolerated up to a certain threshold beyond which damage will occur and eventually lead to a breach of the defences.

4.2.3 Residual Life

The residual life of the defence is the number of years the structure is estimated to last before its integrity is compromised as a result of progressive deterioration (due to abrasion, corrosion and beach lowering).

The evaluation of residual lives is based upon a site inspection, the use of engineering judgement, a knowledge of past performance and rates of deterioration of similar defences.

The residual life of the Lincolnshire defences is given in Appendix B. No account has been taken of the beach nourishment. Again this information has generally been taken from the strategy study for the Mablethorpe to Skegness Sea Defence (NRA, 1991). It has, however, been updated to 1995. Additionally, information obtained during site inspections and discussions with Agency personnel has been incorporated into the table.

4.3 CURRENT AND FUTURE WORK TO DEFENCES

In 1990 the NRA commissioned Posford Duvivier to undertake a study to determine the most appropriate coastal strategy for the Lincolnshire Coast between Mablethorpe and Skegness (NRA, 1991).

The study considered the following alternatives:

- revetment
- set back
- rock protection to sea walls
- beach nourishment
- rock groynes
- detached breakwaters.

The most promising options were reviewed in terms of environmental and technical implications and a comparative economic evaluation was also prepared. The study concluded that beach nourishment was the most appropriate strategy for the Lincolnshire coast.

The NRA adopted the strategy of beach nourishment and site work on the scheme commenced in 1994 at Whitehouse Corner, 1km south of Ingoldmells Point. The scheme will nourish the beaches as far north as Mablethorpe and, on completion in 1998, will provide a 200 year standard of defence.

The strategy also includes for the maintenance of the beaches over the next fifty years. This will require the periodic renourishment of the beaches and also the maintenance of the existing sea walls.

In addition, prior to the completion of the beach nourishment scheme it will be necessary to maintain the defences (in terms of their standard of defence and residual life) and work recently completed or planned in the near future is listed in Table 4.1.

TABLE 4.1
RECENTLY COMPLETED AND PLANNED
WORK TO COASTAL DEFENCES

Part No.	Location	Grid References	Description	Date Completed/ Planned
39	Sutton on Sea	522821 to 520825	Construction of concrete seawall	July 1993
40	Chapel St Leonards	569703 to 571698	Rehabilitation of existing sea defence including placing a flexible rock armour revetment	August 1993
41	Ingoldmells	571694 to 574687	Construction of concrete stepwork over existing grouted slag revetment	June 1993
42	Winthorpe	572655 to 573656	Rehabilitation of existing sea defence including placing flexible rock armour revetment	April 1993
45	Skegness	571634	Construction of concrete seawall with Seabee revetment	February 1993
46	Mablethorpe	509850 to 510848	Demolition of chalets and construction of concrete seawall	January 1993
47	Sutton on Sea	525815 to 527810	Strengthening existing sea defence	April 1994
48	Hunoft	546778 to 544781	Concrete wall with Seabee revetment	October 1994
50	Various	574673 to 574679	Renovation of splashdeck, replacement of handrailing	March 1994
51	Chapel St Leonards	567708 to 570700	Stepwork refurbishment	June 1994
52	Mablethorpe	512846 to 513844	Stepwork and decking refurbishment	July 1994
53	Mablethorpe	510851 to 511849	Stepwork and decking refurbishment	July 1994
54	Mablethorpe	508855 to 511849	Stepwork refurbishment	July 1994
55	Ingoldmells	575687 to 575681	Strengthening existing sea defence and new splashwall	June 1994
56	Winthorpe	572655	Rock toe to existing stepwork	February 1995
57	Sutton on Sea	517835 to 521827	Pilecap encapsulation and replacement of steps	April 1995
58	Chapel St Leonards	558698 to 570700	Stepwork refurbishment	April 1995
59	Moggs Eye	547776	Concrete wall with Seabee revetment	February 1996
60	Sandilands	536797 to 539791	Rock armour to toe of concrete Seabee	January 1996
61	Mablethorpe	509852	Access ramp refurbishment	March 1996
62	Mablethorpe	508855	Stepwork Refurbishment	March 1996
-	Skegness	572642 to 572655	Flexible rock armour protection (beach training works)	March 1995
-	Ingoldmells Outfall	575687	Construction of first 20m of proposed 80m outfall	April 1995
-	Ingoldmells Outfall	585687	Completion of remainder of outfall	October 1995
	Mablethorpe to south of Ingoldmells	507856 to 574677	Beach nourishment	1998



SECTION 5

LAND USE AND THE HUMAN BUILT ENVIRONMENT

5.1 LAND USE

5.1.1 Introduction

The need to defend the coastline from flooding or erosion arises from the location of residential, industrial, commercial and agricultural sites within the coastal zone. It is, therefore, important to define the land use along the Lincolnshire coast so that all assets at risk can be identified and taken into account when preparing strategic coastal defence options.

5.1.2 Land Use Classification

The classification of land use within the area of the Plan has been based on the Flood Defence Standards of Service and Asset Management project completed by Posford Duvivier for the NRA (1995).

For this project land use was assessed using the United States Landsat TM satellite imagery dated 20 May and 12 June 1994. This data was analysed by the National Remote Sensing Centre at Farnborough, Hants and has been categorised into the following 7 land use bands:

- Rural - includes all pasture, arable and horticultural land
- Commercial - includes retail outlets and offices generally in high density urban centres
- Industrial - includes large industrial sites and estates, warehousing and out of town retail centres. Also includes airfields.
- Recreational - includes formal parks, golf courses, racecourses, playing fields and theme parks
- Residential - includes all types of residential property except for flats in town centres and individual buildings such as farm houses. Also includes static caravans
- Woodland - includes deciduous, coniferous and mixed woodland together with heathland and other scrub
- Other - unclassified but includes water bodies, bare rock or sand and building sites. Although not a land use, the area obscured by clouds and cloud shadow has also been included in this band.

5.1.3 Results

The results of the land use analysis is shown on Map 11. The data is displayed as a percentage of the land area and has been grouped into discrete compartments. The boundaries of these compartments have generally been determined by topographical features, both man-

made and natural.

Overall, the map illustrates that land use within the Lincolnshire tidal flood plain is predominantly rural with residential, recreational, industrial and commercial activities occurring along the coastal fringe. The overall land use as a percentage of land area is shown in Table 5.1.

TABLE 5.1
OVERALL LAND USE WITHIN LINCOLNSHIRE
TIDAL FLOOD PLAIN

Land use Classification	Land use (% of Land Area)
Rural	85.0
Residential	10.8
Recreational	1.8
Woodland	0.6
Commercial	0.3
Industrial	0.2
Other	1.3

Note: Flood Plain Area = 135 km²

Rural use is predominantly agricultural with both arable and livestock farming practised. The main centres for residential and recreational use are Mablethorpe, Chapel St Leonards, Ingoldmells and Skegness.

Further information on land use within the flood plain is given in the remainder of this section which discusses the human and built environment.

5.2 THE PLANNING FRAMEWORK

5.2.1 National Planning Guidance

Through the publication of Planning Policy Guidance Notes (PPGs), the Government provides guidelines to all relevant authorities on how they should execute their responsibilities with regard to the wider public interest.

The following PPGs are particularly relevant to the development of the Lincolnshire SMP.

- PPG 7, The Countryside and the Rural Economy (DoE, 1992).
- PPG 9, Nature Conservation (DoE, 1994)
- PPG 15, Planning and the Historic Environment (DoE, 1994)
- PPG 16, Archaeology and Planning (DoE, 1990)
- PPG 17, Sport and Recreation (DoE, 1991)
- PPG 20, Coastal Planning (DoE, 1993)
- CCG 218, Policy Guidelines for the Coast (DoE, 1995)

The above documents set out, in some detail, the factors which must be considered in strategic policy making, and should be fully taken into account during the development of strategic options for the SMP. The county authorities develop their structure plans within the PPG framework.

PPG 20 on Coastal Planning is especially relevant to the SMP along with the Department of Environment's Coastal Forum. The Forum was formed in 1995 as a coastal initiative to take forward the effective co-ordination of coastal zone policies and practice.

The Lincolnshire Structure Plan (1982) is the primary statutory planning framework for the study area (LCC, 1982). The current county level policies are included in four documents:

- Lincolnshire Structure Plan (LCC, 1982)
- Alteration No. 1 (LCC, 1991)
- Alteration No. 2 (LCC, 1993)
- Alteration No. 3 (LCC, 1994).

The "Alterations, 1, 2 and 3" are updates or revisions to the original Structure Plan undertaken by the Planning Authority as resources and requirements permit. Alteration No. 3 is more relevant to the SMP as it includes Environment, Conservation, Recreation, Rural Economy, Tourism, The Coast, Waste Disposal and Minerals. A document prepared by Lincolnshire County Council (LCC) in the mid-eighties is the Subject Plan entitled "Development on the Lincolnshire Coast" (LCC, 1986).

Within the county level strategic guidance provided by the above documents, the relevant

District Council is required to prepare more detailed policies taking into account local conditions and needs. The study area for the Lincolnshire SMP is entirely within the jurisdiction of East Lindsey District Council (ELDC) and the following documents apply:

- East Lindsey Local Plan Part One (ELDC, 1993a)
- East Lindsey Local Plan Part Two (ELDC, 1993b).

The following paragraphs outline policies from National Guidance and both County and Local Plans which are particularly relevant to the development of the SMP. Given the limitations in this document only the policies are outlined. A full account can be seen by referring to the original planning documents. Map 12 illustrates the areas of planning constraints relevant to the SMP.

5.2.2 Structure Plan Policies

The 1981 Structure Plan for Lincolnshire set out five broadly defined Coastal Conservation Areas (CCAs) (LCC, 1982). The Subject Plan for "Development on the Lincolnshire Coast" set out these areas in more detail (LCC, 1986). Since 1986 one of the CCAs has been deleted from policy guidance. The CCAs were designed to protect the remaining natural character of the coastline and the requirements of sea defence, and therefore contain a general presumption against development.

More specifically, **Policy 49A** from the LCC Structure Plan, Alteration No. 3, states:

"Within the CCA planning permission will not normally be granted for development unless the local planning authority is satisfied that it is essential for the proposed development to be located in one of the conservation areas. Planning permission will not normally be granted for development which would adversely affect the saltmarsh.

Any essential development should not harm the amenity, character and/or nature conservation interest of the CCA because of its siting, scale, form, appearance, materials, noise or fume emissions or traffic generation" (LCC, 1993).

Additionally, **Policy 50A** from Alteration No. 3 states:

"Coastal management and conservation measures, including schemes for dune protection and the regulation of access, will be introduced along popular and/or sensitive areas of the coast where physical damage is apparent" (LCC, 1993).

Areas around Mablethorpe and Skegness have been identified as **multipolicy areas**. The complex and built-up nature of these areas results in a wide variety of policies being developed by both LCC and ELDC which are of general interest but are not set out in detail in this document. It should be noted that Alteration 3 has yet to be finally approved by the Secretary of State.

"Essential Development" as quoted in many of the policies is not defined in the Structure Plan, whether or not the development is essential is up to the relevant planning authority to determine.

5.2.3 Local Plan Policies

The relevant district councils are required to adopt and implement the County guidance at local level. East Lindsey District Council, the relevant authority for the whole of the study area, prepared a Local Plan in 1993 (ELDC, 1993a; ELDC, 1993b). ELDC was required to draw up policies for the CCAs in order to reflect local requirements and conditions. As stated in the Local Plan (ELDC, 1993a), the four CCAs are:

- CCA1 - Tetney to Mablethorpe
- CCA2 - Sutton-on-Sea to Chapel St. Leonards
- CCA3 - Chapel St. Leonards to Ingoldmells
- CCA4 - Skegness to Friskney.

The relevant policies from ELDC are:

Policy C19 which states

"Within CCA1 and CCA4 development will not normally be permitted unless it is essential in that location. In particular, no built development should be permitted on or to the seaward side of the sand hills. Where permitted, development shall not harm the amenities, character or ecological balance of the area because of its siting, scale, form, appearance, materials, noise or fume emissions or traffic generation".

and **Policy C20**

"Within CCA2 and CCA3 development will be permitted only where:-

- (a) it is essential in that location; or
- (b) it relates to an existing outdoor informal recreational use; or
- (c) it represents a minor extension to an existing building; and
- (d) it does not harm the amenities or character of the area because of its siting, scale, form, appearance, materials, noise or fume emissions or traffic generation" (ELDC, 1993a).

The policies developed for the CCAs reflect the division of the East Lindsey coast into two main types:

- CCA1 and CCA4 where foreshore is being raised and extended by coastal deposition
- CCA2 and CCA3 where the coastline is being eroded.

The former zone contains mud-flats, saltmarshes and dunes of international wildlife interest, whereas the latter zone is an intensively used holiday coast of national significance. The eroding coastline is heavily used by holiday-makers "partly because the sea is closer and more accessible" (ELDC, 1993a).

ELDC has recorded its intention to implement the principles of co-ordination essential to coastal planning, through its **Advocacy Policy C21** which states:

"The District Council will co-operate with the County Council and voluntary organisations in preparing and implementing a coastal management plan for the Coastal Conservation Areas" (ELDC, 1993a).

The preparation of a SMP for the Lincolnshire Coast, co-ordinated by the Agency, will form an important component of any future coastal management plan.

ELDC has also adopted a number of policies relating to **countryside or areas of open character** which seek to retain the important areas of open land (ELDC, 1993a). With the exception of urban areas, almost the entire length of the study coast is included in such designations. **Policies DC1, DC2 and DC3** stipulate and control the type of development which is allowed in the designated countryside areas. The policies are not included here, but they should be taken into account when considering strategic options.

PPG 21 on Tourism (DoE, 1993) recognises the importance of traditional seaside resorts in maintaining a diverse tourist economy. ELDC has identified a number of **defined coastal holiday areas** to which **Policy T2** is applied:

"Within the defined coastal holiday areas, the development of tourism facilities and attractions and holiday accommodation will normally be permitted provided that they are of a holiday style and character, they add to the range and quality of tourism uses and that infrastructure can be provided. Development which results in the loss of land for tourism uses or which harms the holiday character of these areas will not be permitted" (ELDC, 1993a).

5.2.4 Relevance of the Planning Framework to the Preparation of the SMP

As explained in Section 1.1, a SMP "... is a document which sets out a strategy for coastal defence for a specified length of coast taking account of natural coastal processes and human and other environmental influences and needs" (MAFF, 1995a). The local planning authorities are responsible for the type and control of development within their areas of jurisdiction and this is carried out primarily through the preparation of plans and the granting of planning permission. Additionally, the information contained in the adopted planning documents can be expected to provide an indication of "human and environmental influences and needs" (MAFF, 1995a).

In preparing the strategic coastal defence options for the Lincolnshire coast, the strategies must be consistent with the adopted policies and objectives already established within the planning framework. The planning framework includes Planning Policy Guidance and other Ministry advice, site designations, County Plans, Local Plans and non-statutory plans.

Coastal defence authorities (or "competent authorities") are under obligation to take account of different aspects of the planning framework. Planning Policy Guidance must be noted by all authorities. The role of conservation designations as part of the planning framework is explained in greater detail in Section 6.1.3. In terms of planning permission (ie. adherence to County and District Plans), coast protection works (except emergency works) and new flood defence capital works require planning permission (MAFF, 1995b). Other flood defence and land drainage improvement works have deemed planning permission.

5.2.5 Possible Issues Associated with Future Development Planning

During the consultation exercise the following issues were expressed with respect to the development of the SMP within the planning framework:

- in the long term a diverse and healthy rural community should be promoted through planning policies. Future coastal defence programmes should be set against this as outlined in PPG7, The Countryside and Rural Economy (MAFF response, 1995).
- any proposals for future development on the coast will need to be consistent with the coastal defence strategy.

The issues associated with planning and conservation are discussed further in Section 6.1.3.

5.3 AGRICULTURAL USES

5.3.1 Background

Land use in the study area is predominantly agricultural, with the main population centres in Mablethorpe, Sutton-on-Sea, Ingoldmells and Skegness. Although agriculture still retains considerable importance in the local economy, agricultural employment in East Lindsey has experienced considerable decline in recent years (ie. part-time, full-time, seasonal and casual). Between 1983 and 1993 the total agricultural workforce was reduced by over 18% (Agricultural Census data, 1983-1993). However, there are still a significant number of people employed in the agricultural workforce.

The agricultural land classification map for East Lindsey, identifies the majority of the study area as being Grade 3, although the classification does not divide the area into Grade 3a and 3b (MAFF, 1995c). Unpublished data (including soils and geological maps and site survey work) suggests that "a significant proportion of the Grade 3 land in agriculture is Grade 3a" (MAFF response, 1995). There are some small areas of Grade 2 and Grade 1 at the

extremities of the study area.

PPG 7 The Countryside and the Rural Economy (DoE, 1992) states that agricultural land of Grades 1, 2 and 3a "... is the best and most versatile land, and is a national resource for the future". The document continues "... considerable weight should be given to protecting such land against development, because of its special importance" (DoE, 1992).

5.3.2 Agricultural Issues

Through consultation with the agricultural interests, concern was expressed over the potential loss of any agricultural land. The issue of managed retreat is also of concern and it is felt that it should not be contemplated unless it is voluntary and with full compensation (National Farmers Union response, 1995).

5.4 COMMERCIAL FISHING ACTIVITY

5.4.1 Introduction

Fisheries management on the Lincolnshire coast, out to six nautical miles, is the responsibility of the Eastern Sea Fisheries Joint Committee (ESFJC). Commercial fishing activity along the Lincolnshire coast is typical of many coastlines along the east coast of England. Fishing effort is essentially small scale, involving a wide variety of methods and vessels. Typically the trips are day lengths, although vessels from the Wash and Humber do make longer trips which may incorporate working the Lincolnshire coast.

5.4.2 Geographical extent of fishing grounds

Map 13 shows the area of origin and principal activities of vessels working along or adjacent to the Lincolnshire coast. The fishermen using this area will typically switch between different fishery methods and grounds, depending on a number of interrelated variables such as market forces, availability of species; weather and sea conditions. The variety of methods and grounds used by a number of independent vessels make it extremely difficult to specify actual areas of fishing activity. Similarly, any areas which are given boundaries are likely to be of only limited value as long term tools for strategic decision making, because of inevitable changes in fishing patterns which occur as a result of market forces, etc. It is, however, possible to identify fishing areas for inshore fixed gear fishing activity, since each fisherman has preferred grounds on which to place pots, lines or nets.

Therefore, whilst it is not possible to delimit all fishing activity within the area, trawling, etc. it is possible to identify the inshore fishing areas at risk from interference by coastal defence works.

5.4.3 Shellfish Areas

There are no designated commercial shellfish harvesting beds within the study area. There are, however, beds just outside the study area to the north and south. Horseshoe Point and the Wash are currently classified as bivalve mollusc production areas (grade B) under the Food Safety (Live Bivalve Mollusc and other Shellfish) Regulations 1992 as required by Directive 91/492/EEC.

5.4.4 Nursery Grounds

Shallow coastal areas are often important nursery grounds for species of fin-fish. The Lincolnshire coast is no exception. MAFF have undertaken a number of research trawls in this area (although most effort has been targeted at the Wash), the results of which suggest that there are a large number of immature fish in the coastal area at certain times of the year.

In the past, at a number of locations along the coastline, there were isolated and irregularly harvested cockle beds. These were intermittently worked, usually when the Wash based vessels were unable to operate in the Wash or Humber. Nowadays, it is thought that the area is unlikely to hold many cockles possibly due to beach changes (MAFF response, 1996).

5.4.5 Access Points

The locally launched vessels are reliant on there being sufficient launching points along the coast to minimise travel time to fishing grounds. Other vessels (from Grimsby for example) are brought to the Lincolnshire coastline for launching into the inshore grounds. The existing accesses used by fishermen are:-

- Skegness (North Shore Road and Lagoon Walk)
- Huttoft
- Mablethorpe
- Anderby
- Chapel St. Leonards
- Wainfleet Haven
- Saltfleet Haven

The use of some of these accesses is already constrained for a number of reasons which include: management measures, heavy use of beaches during summer months, tidal conditions etc.

5.4.6 Fisheries Issues

Although there is insufficient data regarding all the fishermen's interests, it is possible to identify common issues which are likely to be of concern to fishermen working the coastline.

These issues, with respect to the development of the SMP, include any potential:-

- restriction or loss of access from promenade to beach
- restriction or loss of access from beach to sea (e.g. due to changes in beach slope)
- change in the level of suspended sediment in the water
- exclusion from fishing grounds as a result of coastal defence construction traffic
- destruction/disturbance/smothering of feeding habitats
- destruction/disturbance/smothering of spawning or breeding habitats
- destruction/disturbance/smothering of designated shellfish beds
- increase in "soft engineering" options dependent on marine aggregate extraction (the latter being the cause for concern)
- restriction on access for fishing vessels to Saltfleet Haven and Gibraltar Point inlets.

5.5 TOURISM AND RECREATION

5.5.1 Tourism

The origin of the Lincolnshire coast as a destination for tourists can be traced back to 1875 and is closely related to the use of the railway. The area enjoyed major periods of expansion in the 1930s and again in 1950s and 60s. On the whole, after a gradual decline in popularity in the 1970s and 80s, the tourist industry in the area has stabilised. In recent years the industry has begun to recover (LCP, 1994). Tourism is a vital component of the coastal economy and it is estimated that East Lindsey District generates over £200 million in tourism spending each year with an estimated 5 million day visitors coming to the area (LCP, 1994). The importance of the tourism industry in terms of the provision of employment is illustrated in the high variation in unemployment rates between January (18.4%) and June (9.7%) (LCP, 1994).

The tourist season for this stretch of coastline is relatively short, lasting only 20 weeks with a high season of 8 weeks during July and August (LCP, 1994). In addition, the coast has importance for local recreational use all year, albeit at a much lower intensity.

5.5.2 Recreation

A diverse range of recreational activities take place along the Lincolnshire coast. Formal activities include watersports (sailing, sailboarding, land yachting), sea and beach fishing, and wildfowling. Many of these operate from clubs at the main centres of Mablethorpe and Skegness. Informal activities such as walking, bathing, the use of amenity beaches, and observing the wildlife interest occur along the length on the coast. There is, however, little information on the extent of each recreational activity.

Wildfowling is undertaken at Grainthorpe Marsh between September 1st and February 20th (North Lincolnshire Wildfowling Club response, 1995). It is a highly regulated and self disciplined activity regarded as formal recreation. It is a managed pastime with clubs being

actively involved in wardening, to prevent unauthorised shooting and to ensure the conservation of the area.

Land yachting takes place on the beach to the north of Mablethorpe when the tide is out. It is undertaken every other weekend from September until Easter.

Map 14 illustrates the principal activities which are associated with the tourism and recreation industry.

5.5.3 Tourism and Recreation Issues

During consultation with numerous recreational groups, various concerns were expressed with respect to the development of the SMP, including the need to ensure that:-

- wildfowling is not restricted during winter months as a result of construction works (BASC response, 1995).
- the consequences of sea level rise, leading to the potential loss of large areas of foreshore and saltmarsh, is considered (BASC response, 1995).
- the wide expanse of fine sand at Mablethorpe, for land yachting, is retained (Lincolnshire Landyacht Club response, 1995).
- beach and sea access for watersports and other beach users is retained.
- there is no danger to beach users during the construction phase.
- any restrictions on access to the beach and sea during construction are minimised and/or alternative accesses provided.

5.6 ARCHAEOLOGY AND HERITAGE

5.6.1 Heritage Sites

Consultation with English Heritage confirmed that there are no scheduled ancient monuments within 1km of the present coastline. There are a number of important heritage sites and designated Conservation Areas (ELDC, 1993a) within local settlements, but none have been identified within 1km of the coastline.

5.6.2 Sites of Archaeological or Potential Archaeological Interest

Recent work on coastlines in the UK has suggested that many remains of archaeological significance are still to be discovered and recorded. The extent of investigations into such sites in the study area is restricted, and therefore there is little accurate information to be

obtained. The Lindsey Coastal Survey is the most recent piece of archaeological work undertaken on the study coast (Brooks, 1990). The field work for this study took place over six weeks during the winter of 1989/90, with a short site re-assessment in March 1990. The survey was undertaken using basic observation techniques, with a limited amount of environmental core sampling.

The Lindsey Coastal Survey divides the coastline into broad erosional or depositional zones which are generally consistent with archaeological potential. The zones (see Figure 5.3) are as follows:

Zone 1 is within the mouth of the Wash, and as an area of material accretion, it is unlikely that archaeological deposits would be exposed within this zone. Sites or deposits of archaeological interest in this zone are likely to be receiving additional material covering and protection (Brooks, 1990).

Zone 2, generally speaking, is also an area of material accretion (natural and man-made) and "... is not expected to reveal any deposits of archaeological importance" (Brooks, 1990).

Zone 3, stretching from Seathorne to Mablethorpe, was noted as having "... the exposures of archaeological importance for the Lincolnshire coast" (Brooks, 1990). In this zone both Lower and Upper Peats were exposed, and it is these layers which are associated with the major archaeological deposits (Brooks, 1990). The Ingoldmells Parish in particular has provided a "marked concentration of archaeological deposits" from the Iron Age and Roman period.

Zone 4 covers an area north of Mablethorpe and is essentially a zone of sand accretion "backed by saltmarshes with no archaeologically important deposits" (Brooks, 1990).

Therefore, on the basis of the limited survey work, the stretch of coastline between Seathorne and Mablethorpe appears the most likely to contain sites of archaeological importance. This is also the part of the coastline which is subject to erosion and, as new deposits are exposed, the threat of damage to, or loss of, the features increases.

Notwithstanding the above, the survey contractor recognised the limitations of the work in that the exposures are only temporary because of rapid beach movements and seasonal fluctuations which expose different portions at different times. The information given above is therefore a "one-off" statement of the condition and location of exposures at that time (1989). In Zone 3, particularly as the beach level continues to fall and more clay becomes exposed, the archaeological deposits could potentially be destroyed.

Map 17 illustrates examples of the type of archaeological remains that have been found within the SMP area.

5.6.3 Archaeology Issues

Consultation with archaeological interest groups and a review of available literature has led to the identification of the following issues that should be considered in the preparation of the Lincolnshire SMP:

- the lack of comprehensive and/or up to date information concerning the extent of archaeologically significant deposits
- the impact of beach nourishment schemes on the archaeological resource
- the need for communication and liaison between groups to be developed

5.7 MILITARY USES

5.7.1 Background

The interest of the military in the study area is confined to their use of firing/exercise areas around Donna Nook and Saltfleetby. The location of these sites is illustrated on Figure 5.1. The military also have a strong presence in the Wash area (at Wainfleet, south of Gibraltar Point) (WESG, 1994a).

RAF Donna Nook is a Strike Command Air Weapons Range extending over some 885 hectares of tidal beach incorporating saltmarsh, sand dunes, meadows, ponds and slacks (MoD, 1993). The Ministry of Defence property is licensed to English Nature and is managed on their behalf by the Lincolnshire Trust for Nature Conservation (LTNC). The area contains numerous features of nature conservation value which have resulted in the site being assigned various designations. The features of nature conservation interest are explained further in Section 6.1.3.

The current Surface Danger Area of RAF Wainfleet occupies 65km² of saltmarsh and mudflat. This area borders the study area.

5.7.2 Military Issues

Consultation with the military interests demonstrated that the following would be of concern in the development of the SMP:

- the effect of any proposal on existing beach levels and the impact of any change on MoD's ability to maintain viable target arrays on the Bombing Ranges (MoD response, 1995).
- the possibility of uncovering unexploded ordnance during construction work.

5.8 OFFSHORE ACTIVITY

5.8.1 Oil and Gas Exploration

Several blocks or areas of the North Sea adjacent to the Lincolnshire coastline have been nominated for exploration by oil and gas companies. Of these, two whole blocks and several half blocks were offered for licence by the government in 1994. These are situated well offshore and do not lie within the study area. Although these are not immediately near the Lincolnshire shoreline this does show that oil and gas exploration in inshore waters near to the Lincolnshire shore is possible. At present there is no evidence to suggest that oil will be found in the area, indeed two wells drilled close by in the late 1960s were both dry (Arthur Andersen, Petroleum Services, 1994). When oil and gas exploration takes place within areas where there are environmental concerns, special conditions will be attached to operator's licences, following consultation between MAFF, the Joint Nature Conservation Committee (JNCC) and DTI. These conditions have been agreed between the DTI and United Kingdom Offshore Operators Association following consultation with the Joint Nature Conservation Committee (JNCC). The guidelines also cover exploration and operating restrictions to protect the interests of other users of the sea (fishery, transport and defence interests).

The government has stated that it is committed to protecting the environment. This, however, "does not mean there are no 'no go areas' where oil and gas activity is excluded forever. As information on environmental resources improves and oil and gas technology develops, there may be increased scope for exploring areas in sensitive areas while still protecting the environment" (DTI Press Note P/94/701, 1994).

The schedule of exploration for oil and gas resources is generally long term, so at the present time oil and gas exploration is unlikely to be a key consideration in the SMP. Nonetheless, if future hydrocarbon exploration and production does take place near the Lincolnshire shoreline the SMP could potentially need modification in future.

The Theddlethorpe Gas Terminal to the north of Mablethorpe is served by the Theddlethorpe Viking gas pipeline as illustrated on Figure 5.2.

5.8.2 Aggregate Extraction

The southern North Sea provides an important source of marine aggregates for the construction industry in the United Kingdom and abroad. The demand for this type of material, particularly sand, has intensified in recent years as additional material is required to meet the increasing demand for "soft defences" to protect the UK coastline. The development of "soft defence" options relies on the provision, to some extent, of a large quantity of material of a suitable grade and quality to match or complement the existing beach material. Furthermore, economic requirements dictate that the source of this material must be reasonably close to the location of the beach nourishment project. Given the implications

of the Agency's strategy for nourishment of the Lincolnshire Coast, it is likely that this will be accompanied by an increase in the demand for sand from offshore sources.

Figure 5.2 illustrates the licensed extraction areas in the Southern North Sea in June 1995. Existing Licensed Area 107 is currently being used as a source of material for the beach nourishment project being undertaken by the Agency.

As part of the licensing procedure it was necessary to demonstrate that dredging operations within this area would not adversely affect the coastal processes, fisheries and marine environment along the Lincolnshire coast. The same procedure would also apply to future applications to extract material from the seabed.

5.8.3 Issues Related to Offshore Activity

Following the literature review and consultation process leading to the preparation of the first Stage SMP, a number of key issues were raised with respect to the offshore extractive industries notably marine aggregate extraction. The issues raised must be further analysed and discussed, and taken account of during the preparation of strategic coastal defence options for the coastline. The SMP should ensure that:

- consideration is given to potential or possible sources of material for beach nourishment prior to a strategic decision being taken.
- an awareness of a potential source of material facilitates an assessment of the "net benefit" of the strategic choices (ie. benefits of soft engineering matching the costs of marine sand extraction).

SECTION 6

THE NATURAL ENVIRONMENT

6.1 THE NATURAL ENVIRONMENT

6.1.1 Background

The Lincolnshire Coast is an important area for wildlife. This is reflected by the numerous designations which occur along the stretch of coast between Gibraltar Point and Donna Nook. Coastal habitats range from large expanses of saltmarsh and sand and mudflats, to scrub and grasslands within mature sand dune systems.

6.1.2 Nature Conservation Designations

Sections of the Lincolnshire Coast are covered by a variety of local, national and international designations to protect features of the natural environment. The different designations provide varying degrees of protection to features of particular value. The principal designations are shown on Map 16. Further details of the sites are appended in Appendix C. Table 6.1 provides a brief description of the designation, and the main features of interest within the boundary. For the purposes of the table, sites first and foremost identified as being SSSI's because of their role in providing the statutory mechanism through which the other national and international designations are implemented.

TABLE 6.1.
CONSERVATION DESIGNATIONS

Site Name	Designation	Management	Main Features
North Lincolnshire Coast	Site of Special Scientific Interest (SSSI) Special Protection Area (SPA) Ramsar Site candidate Special Area of Conservation (pSAC)	Tetney Marshes Reserve (1,259 ha) - RSPB Donna Nook Reserve (1,106 ha) - LTNC	Intertidal sand Shingle bars Mudflats Saltmarsh Mature dunes Dune slacks and brackish pools Breeding grey seal colony Overwintering and breeding birds
Saltfleetby - Theddlethorpe	Site of Special Scientific Interest National Nature Reserve proposed Ramsar proposed SPA	EN and LTNC	Intertidal sand and mud flats Mature sand dunes and dune scrub Salt and freshwater marsh Vascular plants Invertebrates Natterjack toads Breeding and overwintering birds
Sea Bank Clay Pits	Site of Special Scientific Interest	LTNC	Isolated flooded clay workings Aquatic plant communities Marginal wetland flora
Gibraltar Point	Site of Special Scientific Interest Special Protection Area Ramsar Site National Nature Reserve	LTNC and ELDC	Mature sand dunes Salt and freshwater marsh Invertebrates Passage and breeding birds Coastal geomorphology
Wash and North Norfolk Coast (NB. Gibraltar Point is included in part of the designation)	candidate Special Area of Conservation (Marine)		Subtidal sandbanks Glasswort and other annuals colonising mud and sand Saltmeadows Saltmarsh scrubs Intertidal mudflats and sandflats Shallow inlets and bays Common seal

TABLE 6.1 (continued)

Site Name	Designation	Management	Main Features
North Norfolk Coast and Gibraltar Point Dunes (NB. Gibraltar Point is included in part of the designation)	candidate Special Area of Conservation (terrestrial)		Dune grasslands Lagoons Mediterranean saltmarsh scrub Shifting dunes Shifting dunes with marram grass Humid dune slacks Coastal shingle vegetation outside the reach of waves.
Sutton-on-Sea Foreshore	Regionally Important Geological Site (RIGS)		Intertidal area postglacial Peat exposures
Wolla Bank Foreshore	Regionally Important Geological Site (RIGS)		Intertidal area postglacial Peat and forest exposures
Vickers Point Foreshore	Regionally Important Geological Site (RIGS)		Postglacial deposits Peats and forest exposures
Chapel Point	Geological Conservation Review Site (GCR Site)		Intertidal area postglacial Peat and forest exposures
Seacroft Foreshore	Site of Nature Conservation Importance (SNCI)		Sand and shingle ridges Extensive areas of mud Ornithological
Anderby Creek	Site of Nature Conservation Importance		Mature grey sand dune Reed dominated clay pits Passage migrants
Warren Road Dunes	Site of Nature Conservation Importance		Inner dune grassland
Huttoft (submerged forest)	Regionally Important Geological Site		Submerged forest

Although it is not included in this Plan, the Wash estuary directly borders the study area to the south and, therefore, should be mentioned. The Wash, which is designated as a SSSI, SPA, Ramsar Site and candidate SAC, includes areas managed primarily for nature conservation through NNR status, and RSPB and LTNC reserves. The Wash provides a rich feeding ground for nationally and internationally important populations of wintering and passage wildfowl and waders. The Wash is also important for its invertebrate communities and seal population. It is included and discussed further in the Wash Shoreline Management Plan.

6.1.3 Planning Implications of Nature Conservation Designations

The existence of SPA and candidate SAC sites both within and adjacent to the study area bestow particular responsibilities on the relevant coastal authorities. The MAFF guidelines on SMPs state that:

"Shoreline Management Plans which include such sites will need to reflect the special protection afforded to the habitats or species for which they are identified as being of international importance. Damage to these sites is only permissible for 'imperative reasons of overriding public interest' and where there is no reasonable alternative option or different practicable approach available which would have lesser impact" (MAFF, 1995a).

As a member of the European Community the Government has a responsibility to implement the "Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora" ("the Habitats Directive") and "Council Directive 79/409/EEC on the conservation of wild birds" (the "Birds Directive"). The Habitats Directive defines and lists sites including habitats and species of European importance. These sites are to be designated as Special Areas of Conservation (SAC) and, together with the Special Protection Areas (SPAs) listed in the "Birds Directive" form a series of sites known as "Natura 2000". These are implemented into UK law by the Conservation (Natural Habitats + C) Regulations 1994 and the Wildlife and Countryside Act 1981. A number of sites along the Lincolnshire Coast have been designated as SPAs and candidate SACs and as such should be fully considered during the development of strategic options. Article 6 of the 'Habitats Directive' states that:

"Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated"

While Article 5 of the "Birds Directive" states that in respect to SPA's:

"Member States shall take appropriate steps to avoid pollution or deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of this Article".

Table 6.2 lists the SPA and SAC together with the other conservation designations and their supporting legislation.

TABLE 6.2
CONSERVATION DESIGNATIONS AND LEGISLATION

Designation	Legislation
Special Area of Conservation (SAC)	Designated under Council Directive 92/43/EEC and implemented into UK law by Conservation (Natural Habitats + C) Regulations 1994 and Wildlife and Countryside Act 1981.
Special Protection Areas (SPA)	Designated under Council Directive 79/409/EEC and implemented into UK law by Wildlife and Countryside Act, 1981 and Conservation (Natural Habitats + C) Regulations 1994.
Ramsar Site	Listed under the Convention on Wetlands of International Importance implemented into UK law through Wildlife and Countryside Act 1981.
Site of Special Scientific Interest (SSSI)	Notified under Section 28 of the Wildlife and Countryside Act.
National Nature Reserve (NNR)	Declared under Section 19 of the National Parks and Access to the Countryside Act 1949 or Section 35 of the Wildlife and Countryside Act 1981.
Local Nature Reserve (LNR)	Designated under Section 21 of the National Parks and Access to the Countryside Act 1949.
Site of Nature Conservation Importance (SNCI)	Designated by county wildlife trust and accepted by local authorities.
Regionally Important Geological Sites (RIGS)	Designated by local RIGS group and accepted by local authorities.

6.1.4 Habitats

Much of the data used in the preparation of Map 15 has been reproduced from the coastal oil pollution maps prepared by the Nature Conservancy Council in 1990 (NCC, 1990). The boundaries used in the map are only illustrative for two reasons: the changing nature of the coastline and also the scale of the map which limits the level of detail that can be shown. In the mapping of Gibraltar Point, a variety of information sources have been used to illustrate the habitats on Figure 6.1.

Despite the limitations of the data, the map illustrates the major types of habitats present on the coastline. Essentially the central stretch between Mablethorpe and Skegness consists of sandy beaches (with mud/clay exposures) backed by hard sea defences, whereas towards the

north and south of the study area there are more diverse habitats with both sand dune and saltmarsh.

The following paragraphs provide an outline of the importance of each of the habitats illustrated on the map:

Large areas of **sand flats** are found to the north of Theddlethorpe and from Skegness southwards. The relatively coarse-grained sand flats, together with areas of mixed sediment, especially around Donna Nook, support a rich flora and fauna. Wading birds and fish regularly feed on these invertebrate animals in the intertidal zone. In the northern part of the study area, the sand banks are used by seals as haul-out areas at low water. Many wildfowl and wader species are found in national and international numbers on the sand and mud flats at the north and south of the sandy area.

The **saltmarshes** on the Lincolnshire coast have developed as a natural progression from mudflats. The periodic flooding of the mudflats, and the deposition of material raises the level of the mudflats allowing saltmarsh vegetation to develop. The saltmarshes provide valuable habitats for a range of plants and animals adapted to the saline environment. The three largest areas of saltmarsh exist at Grainthorpe Haven, from south of Saltfleet Haven northwards to Donna Nook and Gibraltar Point. At both Donna Nook, Saltfleetby and at Gibraltar Point the saltmarsh is backed by natural dune systems which has led to the development of features, such as brackish pools and sandy areas within the marsh. Such features increase the habitat diversity and improve the ability for a variety of communities to establish. In addition to supporting many animal and plant species, mature saltmarshes form important breeding sites for birds.

Sand dunes occur at intervals along the coast. They are widest at Theddlethorpe and Gibraltar Point where there is an active accretion zone, and fragmentary between Mablethorpe and Skegness where coastal erosion is the dominant force. Sand dunes provide a number of associated habitats. Sea buckthorn scrub dominates many areas and, as it is only found on the east coast of England as a native species, is recognised as being nationally scarce. The scrub provides nesting sites for a variety of birds and acts as a valuable food source for migrant species arriving in England after crossing the North Sea in autumn and winter. The mature lime rich dunes on the North Lincolnshire Coast, Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SSSIs have a diverse flora and support important freshwater marsh and dune slack habitats. The dunes at Saltfleetby support a rich fen community and also provide a breeding ground for natterjack toads and other amphibians, dragonflies and numerous birds.

There are a range of other habitats which are of interest. The **Sea Bank Clay Pits** were excavated in 1953 to repair the sea walls and have developed uncommon aquatic communities characteristic of slightly brackish, eutrophic water. These pits along with the reedbeds and wetland flora, form an important habitat for breeding, wintering and passage birds and aquatic invertebrates.

Areas of **mudflats** are also present, notably at the North Lincolnshire Coast SSSI and Gibraltar Point SSSI, supporting a number of invertebrate communities which in turn support feeding waders and wildfowl.

6.1.5 Ornithological Interest

The areas to the north and south of the study area have the most ornithological interest. The North Lincolnshire Coast SSSI is internationally important for populations of knot, grey plover, bar-tailed godwit, turnstone, sanderling, shelduck and dark-breasted brent geese with nationally important breeding colonies of little tern and ringed plover. Saltfleetby-Theddlethorpe Dunes SSSI is used as a feeding and roosting site for waders and wildfowl, and is also of ornithological interest for the whitethroat, blackcap, garden warbler and nightingale which breed in the mature scrub. Yellow wagtail and tern also breed at the site. The stretch of coast from Mablethorpe to Skegness is regularly used in winter by feeding waders including sanderling, bar-tailed godwit, redshank and ringed plover (NRA, 1990a). Gibraltar Point SSSI supports internationally important populations of oystercatcher, grey plover, knot, sanderling and bar-tailed godwit and nationally important populations of ringed plover. The diversity of coastal habitats at Gibraltar Point supports a number of breeding birds including mallard, shelduck, ringed plover, little tern, oystercatcher and redshank.

6.1.6 Nature Conservation Issues

From the literature review and consultation process, a number of issues were raised with regard to nature conservation interests. The SMP should thus ensure that:-

- the long-term protection and enhancement of the natural environment is provided for.
- the natural processes are allowed to operate throughout the sub-cell as much as possible (LTNC response, 1995).
- the sediment size and character in any nourishment scheme does not significantly differ from present (LTNC response, 1995).
- consideration is given to the beach nourishment operations and the principles of ridge and runnel development and movement of the sweep zone in longshore drift (LTNC response, 1995).
- enhancement of the dunes is undertaken, to try and redress the past 60% loss of dunes along the central Lincolnshire Coast, Mablethorpe to Skegness (LTNC response, 1995).
- rising relative sea levels and coastal squeeze are considered in all strategic decisions.

- consideration is given to the potential decline in sand supply should hard defences or groynes be considered. This could increase and continue the erosion of a number of dune systems along the coast (LTNC response, 1995).
- consideration is given to the processes that work within the sediment sub-cell, and also the inputs to, and outputs from, the sediment budget of the sub-cell (LNTC response, 1995).
- any effect on the RIGS submerged forest exposure is minimised.
- adequate future monitoring of the movement of beach material and its potential effects on the ecosystems at Gibraltar Point is provided.
- the conclusions from the study of sandhills between Mablethorpe and Skegness is taken in account (NRA, 1993).

6.2 LANDSCAPE

6.2.1 Background

Though the Lincolnshire shoreline is not defined as a Heritage Coast for its landscape importance, it is nevertheless an important landscape and amenity area. It provides a valuable asset in its landscape, wildlife and cultural heritage and important amenity in the opportunities for quiet relaxation and for more active outdoor pursuits. Therefore, Heritage Coast policies should be regarded as an important component of wider policies for the conservation of the shoreline.

The landscape can be summarised as follows:-

At Mablethorpe and Skegness the landscape is dominated by wide, expansive sandy beaches backed by concrete sea defences and tourist facilities. In summer, the scene is typical of a holiday resort, busy with tourists and holiday activity. The open stretches of beach between the main resorts are peaceful and uncluttered, backed by dune systems or concrete defences and chalets. The sea defences often intrude on the landscape, both at promontories such as Chapel Point and particularly at sites where rock and Seabee units have been employed. To the north and south of the study area the coastal scene is characterised by wide views with a transition from sandy beaches, through saltmarsh and sand dunes.

The Countryside Commission would like to see the principles for Heritage Coasts adopted in the Lincolnshire SMP as follows:

- to conserve, protect and enhance the natural beauty of the coast, including its terrestrial, littoral and marine flora and fauna, and its heritage features of architectural,

historical and archaeological interest.

- to facilitate and enhance its enjoyment, understanding and appreciation by the public, by improving and extending opportunities for recreational, educational, sports and tourist activities that draw on and are consistent with, the conservation of the natural beauty of the coast and its heritage.
- to maintain and (where necessary) improve the environmental health of inshore waters and beaches through appropriate works and management measures.
- to take account of the needs of agriculture, forestry, fishing and the economic and social needs of communities on the coast, by promoting sustainable forms of social and economic development, which in themselves conserve and enhance natural beauty and heritage features.

6.2.2 Landscape Issues

From the consultation exercise, concern was expressed over the adverse effect that hard defences would have on the present landscape character.

6.3 LAND DRAINAGE AND WATER QUALITY

6.3.1 Background

The Ingoldmells sewage treatment works (STW) services an area extending from Huttoft in the north to Willoughby in the west to Skegness in the south-east. Sewage undergoes preliminary treatment and is then discharged offshore via a 2310m long submarine pipeline situated north of Skegness and south of Ingoldmells Points. The outfall is built at an angle to the coastline in a north-east direction and discharges all year round.

The area north of Huttoft is served by Mablethorpe STW. The sewage is treated using a full biological process with activated sludge, secondary treatment and UV disinfection. The final effluent is discharged some 2km inland in Wold Grift drain.

A small STW is situated at Saltfleet. This provides primary treatment of sewage for approximately 400 people. This STW discharges to Saltfleet Creek.

The Agency is the competent authority for implementing the EC Bathing Water Directive (76/160/EEC) and the Urban Waste Water Directive (91/271/EEC). Along the Lincolnshire Coast there are seven bathing waters recognised under the Bathing Water Directive. These are at Skegness, Ingoldmells, Chapel St. Leonards, Anderby Beach, Moggs Eye, Sutton-on-Sea and Mablethorpe. The Marine Conservation Society (MCS) divides water quality results into five quality grades (MCS, 1995) and as such Skegness and Sutton-on-Sea have the cleanest water quality.

6.3.2 Land Drainage Outlets

The study area is covered by three Drainage Boards; the Louth Drainage Board north of Saltfleet Haven, the Alford Drainage Board from Saltfleet Haven southwards to Winthorpe and the remaining length is within the Skegness District Internal Drainage Board.

There are eleven pumping stations from which water courses, draining the surrounding area, discharge directly to tidal creeks or outfalls along the coast. These are shown on Figure 6.2.

6.3.3 Issues

Through the consultation process concern was expressed with respect to the development of the SMP, over the:-

- potential for sewage to be brought back into coastal waters due to aggregate extraction and sand pumping for beach recharge schemes.
- need to address the operational matters relating to the pumping stations if fluvial flood protection standards are to be maintained.

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GLOSSARY

Astronomical Tide	The tide levels and flows which would result from gravitational effects eg. of the Earth, Sun and Moon, without any meteorological influences.
Atlas	This document provides a summary of data collected during the preparation of the Lincolnshire Shoreline Management Plan
Beach Nourishment	The importation of material to supplement the existing beach (also known as beach recharge/replenishment/feeding).
Bedload Current Residual	The difference in the capacity of the flood and ebb tidal flows to transport material along the seabed.
Chart Datum	The level to which both tide levels and water depths are reduced on marine charts. On UK charts, this level approximates to the predicted lowest astronomical tide level (LAT).
Core Report	This document sets out the strategy for the Lincolnshire coast. It includes details of the appraisal process leading to the selection of the preferred options. It also contains recommendations for future monitoring, research and updating.
Detached Breakwaters	Coastal structures lying parallel to, but not connected to the shore. They are generally constructed from imported rock or concrete units placed on the sea bed.
Drift Divide	A point where the orientation of the coast changes abruptly and beach material is moving away from the point.
Ebb	Period when tide is falling. Often taken to mean the ebb current which occurs during this period.
Fauna	Animals
Flood	Period when tide is rising. Often taken to mean the flood current which occurs during this period.
Flora	Plants
Geomorphology	The study of landforms and landforming processes.
Groynes	Coastal structures lying at right angles to, and connected to the shore. They may be constructed from timber, concrete, steel sheet piles or rock.

Hard Defences	Defences that tend to confront and resist the natural coastal processes, eg. seawalls.
Hinterland Boundary	The landward boundary of the Lincolnshire Shoreline Plan.
Local Plan	A document which sets out the policies at a district level.
Longshore Transport	Movement of beach sediments approximately parallel to the shoreline. Also known as longshore drift.
Management Objectives	Objectives for the management of the shoreline. These objectives form the basis for the appraisal and development of the strategic coastal options.
Management Unit	A length of shoreline with coherent characteristics in terms of both natural coastal processes and land use.
Neap Tide	Tides of small range which occur twice a month (when the moon is in quadrature).
Offshore Boundary	The seaward boundary of the Lincolnshire Shoreline Management Plan.
Planning Policy Guidance	Notes prepared by the Government to provide guidance to local authorities and others on policies and the operation of a planning system.
Ramsar Site	Protected wetland site under the Ramsar convention on wetlands of international importance especially as waterfowl habitat.
Revetment	A sloping surface of stone, concrete or other material used to protect an embankment, natural coast or shoreline against erosion.
Residual Life	The number of years the defence is estimated to last before its integrity is compromised as a result of progressive deterioration.
Sea Walls	Solid coastal structure built parallel to the shoreline.
Scoping Document	The document issued to interest parties at the start of the first stage in the production of the Lincolnshire Shoreline Management Plan.
Sediment Cell	A length of coastline which is relatively self-contained as far as the movement of sand or shingle is concerned.
Sediment Sink	A point on the coast where material is moving towards the point and beaches are tending to build up.

Shoreline	The interface between the land and the sea.
Shoreline Management Plan	A document which sets out a strategy for coastal defences for a specified length of coast.
Significant Wave Height	The average of the highest one third of the waves
Soft Defences	Defences designed to work with rather than against the natural coastal processes. They tend to absorb rather than reflect wave energy and be dynamic rather than static eg. beach nourishment.
Spring Tide	Tides of large range which occur twice a month (when the moon is new or full).
Standard of Defence	The return period of the storm event that the defences are able to provide protection against.
Strategic Coastal Defence Option	Generic term for any coastal management strategy eg. do nothing, advance, retreat or hold the existing coastal defence line.
Structure Plan	A document providing strategic policies and the statutory planning framework for the county.
Supporting Document	This document provides background to the information contained in the Atlas.
Surge	Change in water level as a result of meteorological conditions (wind, high or low atmospheric pressure).
Tidal Range	The vertical difference between high and low water.
Tidal Current Residual	The difference between the flood and ebb tidal flows.

ABBREVIATIONS

AAD	Average Annual Damage
AD	Annual Damage
Agency	Environment Agency (Anglian Region)
CCA	Constant Natural Asset
CNA	Critical Natural Capital
CNC	Coastal Conservation Areas
DOE	Department of the Environment
DTI	Department of Trade and Industry
ELDC	East Lindsey District Council
ESFJC	Eastern Sea Fisheries Joint Committee
EN	English Nature
GCRS	Geological Conservation Review Site
HE	House Equivalent
IDB	Internal Drainage Board
IPCC	Intergovernmental Panel on Climate Change
LCC	Lincolnshire County Council
LCP	Lincolnshire Coastal Partnership
LTNC	Lincolnshire Trust for Nature Conservation
MAFF	Ministry of Agriculture, Fisheries and Food
MOD	Ministry of Defence
NCC	Nature Conservancy Council
NNR	National Nature Reserve
NRA	National Rivers Authority (Anglian Region)
OD	Ordnance Datum
PAGN	Project Appraisal Guidance Notes
PPG	Planning Policy Guidance
pSAC	possible Special Area of Conservation
PV	Present Value
RIGS	Regionally Important Geological Site
RNLI	Royal National Lifeboat Institution
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SMP	Shoreline Management Plan
SMR	Sites and Monuments Record
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works

**APPENDIX A
CONSULTATION**

APPENDIX A
CONSULTATION

The following individuals and organisations were consulted during the preparation of the SMP.

Nature Conservation	
English Nature	- Headquarters - Grantham Office
RSPB	- East Anglian Regional Office
Lincolnshire Trust for Nature Conservation	- Headquarters
Marine Conservation Society	- Conservation Office
Lincolnshire County Council	- County Ecologist
National Rivers Authority	- Conservation Department
Fisheries	
Eastern Sea Fisheries Joint Committee	- Deputy Clerk and Fisheries Officer
North Eastern Sea Fisheries Committee	- Clerk of the Committee
National Rivers Authority	- Fisheries Officer
MAFF	- Lowestoft, Sea Fisheries Inspectorate - Burnham-on-Crouch, Directorate of Fisheries Research
National Federation of Fishermens Organisations	- Secretary
Sea Fish Industry Authority	- Shellfish Environment Officer
Lowestoft Inshore Fishing Vessels Owners Association	- Chairman
Lowestoft Fishing Vessels Owners Association Ltd.	- Secretary
North Norfolk Fishermen's Society	- Secretary
Lincolnshire Coastal Fishermen's Association	- Secretary/Chairman
King's Lynn Fishing Vessels Owners Association	
Boston and District Inshore Fishermen's Association	- Secretary
Wells and District Inshore Fishermen's Association	
Suffolk Coastal Longshore Fishermen's Association	
Yorkshire and Anglian Fish Producers Organisation	

Fisheries (Continued)	
King's Lynn Fishing Industry Co-operative Ltd.	General Council member
Fosdyke Fishing Society	- Secretary
Boston Fishermen's Co-Operative Ltd.	- Secretary
J and J Shellfish	- Manager
Grimsby Seiners Association	- Chairman
Hull Fishing Vessels Association	- Chairman
Great Yarmouth Fishermen's Society	- Chairman
Bridlington and Flamborough Fisheries Society	- Chairman
Water Quality and Drainage	
Skegness and Alford Drainage Board	- Chief Executive
Land Ownership/Landscape/Land Use	
The Crown Estate	- Marine Estates
County Landowners Association	- Regional Secretary
National Farmers Union	- Technical Advisor (East Midlands Region)
Countryside Commission	- Eastern Regional Office
Council for the Protection of Rural England	- Lincolnshire Branch
Ministry of Defence	- Defence Lands Services
The National Trust	- East Midlands Region
MAFF	- Land Use Planning Unit
Woodland Trust	- Public Affairs Office
Lincolnshire County Council	- Recreational Services Department
Leisure/Recreation/Tourism	
East Midlands Tourist Board	- Business Services Manager
Lincolnshire Coast Partnership	- Project Manager
Eastern Council for Sport and Recreation	- East Midlands Region
Ramblers Association	
Skegness 2000	
Mablethorpe Sutton and District Tourist Association	- Chairman
British Association for Shooting and Conservation	- Conservation Officer
Seagull	- Chairman

Recreational Clubs	
Skegness Yacht Club	
Northshore Sailboard Club	
Skegness Boating Club	- Treasurer
Mablethorpe Land Yachting	
Huttoft Boating Club	
The North Lincolnshire Wildfowlers Club	- Honourary Secretary
Lincolnshire Landyacht Club	- Secretary
Skegness Sailboard Club	- Club Secretary
Skegness Sea Angling Club	- Hon. Secretary
The Pier Angling Club	
Mablethorpe Angling Club	
Earl of Scarborough Sports Centre	
Skegness Canoe Club	
Archaeology/Heritage	
Society for Lincolnshire History and Archaeology	- Chairman
Lincolnshire County Council	- County Archaeologist
English Heritage	- East Midlands Team
Heritage Trust of Lincolnshire	- Chairman
Lindsey Archaeological Services	- Manager
Services	
National Rivers Authority	- Flood Defence and Operations
Anglian Water Services Limited	- Marine Group
National Grid Company Plc	- Wayleave Officer (Midlands)
British Pipeline Agency	- Operations Supervisor
East Midlands Electricity	- Planning Engineer
British Gas Plc	- Theddlethorpe Terminal, Manager
British Telecom	- East Midlands District
Parish/Town Councils	
Skegness Town Council	- Town Clerk
Mablethorpe and Sutton Town Council	- Town Clerk
Huttoft Parish Council	- Parish Clerk

Parish/Town Councils (Continued)	
Anderby Parish	- Parish Clerk
Chapel St. Leonards Parish Council	- Parish Clerk
Ingoldmells Parish Council	- Parish Clerk
Addlethorpe Parish Council	- Parish Clerk
Local Authorities	
East Lindsey District Council	- Central Services Department - Planning and Economic Development - Community and Housing - Contract Services Department
Lincolnshire County Council	- Highways and Planning - Environment Officer
Others	
HM Coastguard	- Yarmouth District - Humber District
RNLI	- Honourary Secretary
Sea Defence Flood Committee (Skegness Town Council)	- Chairman
Department of the Environment	- Coastal Policy Division
Department of Transport	- Ports Division
Anglian Coastal Authorities Group	- Secretary
MAFF	- Flood and Coastal Defence Division - Midlands Regional Office

RESPONSES TO SCOPING DOCUMENT

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LEISURE AND AMENITY

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr G Cook (Honorary Secretary) North Lincolnshire Wildfowlers Club</p>	<ul style="list-style-type: none"> - founded in 1952 - hold shooting rights over Grainthorpe Marsh and sand - wildfowling is undertaken on marsh between September and February - map of the marsh 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr G J Rowland (Secretary) Lincolnshire Landyacht Club</p>	<ul style="list-style-type: none"> - the club uses the beach from the Mablethorpe outfall northwards - the accesses at Golf Road and North End are used - the club is mainly active between September and Easter every other weekend - a British Championship is held in the autumn - the wide expanse of fine sand with gullies and banks provide an ideal landyachting site 	<ul style="list-style-type: none"> - need to retain the wide expanses of fine hard sand
<p>Mr D C Pendrigh (Treasurer) Skegness Boating Club</p>	<ul style="list-style-type: none"> - enclosed letter from Skegness Boating Club submitted to E.L.D.C. regarding Lagoon Walk - have had to spend considerable money on accesses and have problems with access due to changing beach levels - the club would welcome further work to their frontage (being 150 yards from the end of Lagoon Walk) with a reasonable access being included in the plan - appropriate to plan a good leisure boating facility for Skegness 	<ul style="list-style-type: none"> - the need for a better access

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LEISURE AND AMENITY

Name and Organisation	Summary of Responses	Major Concerns
Mr M Smith (Secretary) Skegness Sailboard Club	- map illustrating areas of frequent use	- need to retain access to the shore
Mr S Kinning (Honorary Secretary) Skegness Sea Angling Club	- map illustrating areas used for bait digging and beach and boat fishing	- no concerns at this stage
Mr J Calderbank (Secretary) Eastern Council for Sport and Recreation	- passed letter to John Palmer of the East Midlands Region	- no concerns at this stage
Ms J Crowson (Chairman) SEAGULL	<ul style="list-style-type: none"> - effluent from the Ingoldmells Sewage Treatment Works only receives preliminary treatment and there is concern that beach nourishment works would cause effluent to be pumped ashore - sand used for nourishment should be consistent with beach sand so as not to affect the nature conservation interest along the coastline - could the mass of sand which has migrated south and built-up off Gibraltar Point be recovered for use in the north of the study area - should plan for a back up of 'soft' sea defences 	<ul style="list-style-type: none"> - ensure that contaminated effluent is not sluiced ashore during the proposed beach nourishment schemes - need to use a sediment size similar to the existing for any proposed beach nourishment schemes
Mr B Prescott (Project Manager) The Lincolnshire Coast Partnership	<ul style="list-style-type: none"> - enclosed copy of corporate brochure outlining activities, aims and objectives of the partnership involved with Strategic Tourism Development for the Lincolnshire Coast to boost tourism in the existing resorts 	- no concerns at this stage

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LEISURE AND AMENITY

Name and Organisation	Summary of Responses	Major Concerns
<p>Ms J Wright (Chairman) Mablethorpe, Sutton and District Tourism Association</p>	<ul style="list-style-type: none"> - voluntary organisation to promote Mablethorpe and the surrounding area - important that beaches are aesthetically attractive and sea defences maintained 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr H Knott (Senior Conservation Officer)</p>	<ul style="list-style-type: none"> - enclosed BASC paper on 'Coastal Zone Management' - three wildfowling clubs have shooting rights over areas of the foreshore in the study area - copy of letter sent to clubs - map illustrating wildfowling club interests (copied letter to clubs) - concern over loss of present foreshore and saltmarsh due to the consequences of sea level rise - wildfowling is a highly regulating and self-disciplined activity 	<ul style="list-style-type: none"> - need to carry out sporting activities unhindered during the winter months - effect of sea level rise on saltmarsh and foreshore is of concern

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LANDSCAPE

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr D Vose (Senior Countryside Officer) Countryside Commission</p>	<ul style="list-style-type: none"> - remit to conserve the beauty of the countryside and help people enjoy it - the coast is an important focus for landscape, wildlife, cultural heritage and amenity purposes - though no part of the study area is defined as a Heritage Coast the Countryside Commission would like to see the principles set out for Heritage Coasts adopted - provided a list of principles developed to conserve Heritage Coasts - map of Countryside Stewardship sites (contact Jilly Hall) - catalogue of Countryside Commission publications 	<ul style="list-style-type: none"> - no concerns at this stage

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - GENERAL

Name and Organisation	Summary of Responses	Major Concerns
Mr B G Oliver (Flood and Coastal Defence Division) MAFF	<ul style="list-style-type: none"> - the document should be consistent with MAFF guidelines on SMPs - contact Mr G Sexton, Regional Engineer at Lincoln - contact Mr P Chillingworth, LUPU in Cambridge 	<ul style="list-style-type: none"> - need to be consistent with MAFF SMP guidelines
Mr R M Thomas (Terminal Manager) British Gas	<ul style="list-style-type: none"> - gas terminal is adjacent to the coastline - some of the land is let to tenant farmers - the good management of sluice gates by Louth Drainage Board means that the watercourses in the area are not subject to flooding 	<ul style="list-style-type: none"> - any changes to the sluice would be of concern
Mr R Stoddard (Secretary) Anglian Coastal Authorities Group	<ul style="list-style-type: none"> - support objectives and the proposed structure of the plan - ACAG are presently discussing how plans should integrate at the boundaries 	<ul style="list-style-type: none"> - no concerns at this stage
Miss B Connings Department of Environment	<ul style="list-style-type: none"> - passed letter to Departments East Midlands Regional Office 	<ul style="list-style-type: none"> - no concerns at this stage

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - SERVICES

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr D J Sissons (Principal Engineer) Lindsey Marsh Drainage Consortium</p>	<ul style="list-style-type: none"> - plan of watercourses and pumping stations in the Board's area - study area affects, Louth Drainage Board, Alford Drainage Board and Skegness District Internal Drainage Board - many of the consortium's pumping stations discharge directly to tidal creeks or coastal outfalls - the Boards are responsible for maintaining the flows through the outfalls into which they discharge water 	<ul style="list-style-type: none"> - the operational matters relating to the pumping stations must be addressed in order to maintain fluvial flood protection standards
<p>Mr P Hickey Anglian Water</p>	<ul style="list-style-type: none"> - list of discharge points along the Lincolnshire Coast 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr Sturman (District Controller - Yarmouth District) HM Coastguard</p>	<ul style="list-style-type: none"> - important that emergency service vehicles (Coastguard, ambulance, police) continue to have access to the foreshore throughout the works 	<ul style="list-style-type: none"> - ensure accesses remain open to emergency service vehicles
<p>Mr K Vardy (District Controller Humber District)</p>	<ul style="list-style-type: none"> - consideration should be given to the requirements (ie. sufficient access to the coast) of the Coastguard service - Mr J Harrison at Cleethorpes may have further information regarding the area 	<ul style="list-style-type: none"> - need to retain accesses for Coastguard service
<p>Mr J Long (British Telecom)</p>	<ul style="list-style-type: none"> - no specific interest as plant is unlikely to be affected, however, contact when specific plans are drawn up to confirm 	<ul style="list-style-type: none"> - contact when detailed plans are drawn up

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - FISHERIES

Name and Organisation	Summary of Responses	Major Concerns
<p>Mrs F L Franklin MAFF - Fisheries Laboratory</p>	<ul style="list-style-type: none"> - chartlets showing shellfish beds classified under Directive 91/492 - there is a local commercial fishery for several species of finfish and shrimps - the area is an important nursery ground for juvenile flatfish - a disposal site is present at Dugeon 30km offshore - some gas exploitation takes place along the coast - contact Crown Estate over aggregate extraction 	<ul style="list-style-type: none"> - activities should not result in disturbance of shellfish beds or any deterioration in water/shellfish quality
<p>Mr M D Wilkinson (Clerk) North Eastern Sea Fisheries Committee</p>	<ul style="list-style-type: none"> - no comments, though would like to continue to receive further information 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr C Beech (Deput Clerk and Fishery Officer) Eastern Sea Fisheries Joint Committee</p>	<ul style="list-style-type: none"> - committee's interests concerned with ensuring the sustainability of fisheries within the area - communication between various interests should be improved - data regarding details of fishing activities is available for examination 	<ul style="list-style-type: none"> - ensure the ports of Saltfleet Haven and Gibraltar Point remain accessible - seasonal fishing activities involving the use of beach launched boats should not be curtailed - flood defence needs should not be met at the expense of the marine environment

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - FISHERIES

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr B Deas (Secretary) National Federation of Fishermen's Organisations</p>	<p>- NFFO represents fishermen in England and Wales</p>	<p>- the potential of 'soft' engineering approach involving a massive increase in marine aggregate dredging is of concern</p> <p>- need to prevent disruption to fisherman landing points</p> <p>- need to prevent disruption to fishing operations and grounds</p>
<p>Mr P Midgley (Council Member) Wash Seafoods</p>	<p>- concern over aggregate extraction, already suffering the effects of the work on Area 107.</p>	<p>- object to any proposals for aggregate extraction in their fishing grounds</p>
<p>Ms S Gaff (Secretary) North Norfolk Fishermen's Society</p>	<p>- no comments as Eastern Sea Fisheries Joint Committee will be dealing with the matter</p>	<p>- no concerns at this stage</p>
<p>Mr D Shilling Lowestoft Fishing Vessel Owners Association Ltd</p>	<p>- no comments on SMP, but alarmed by number of applications for marine extraction of sand</p>	<p>- offshore boundary must include the extraction area if beach nourishment is to be used</p>

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - NATURE CONSERVATION

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr M Crick (Conservation Officer) Lincolnshire Trust for Nature Conservation</p>	<ul style="list-style-type: none"> - map of conservation and geological designations - interests centred on the need to conserve wildlife and natural heritage including the physical features and processes. - the conservation designations and legislation should be recognised - consider the inputs to and outputs from the sediment budget of the sub-cell in regard to the coastal features on the Lincolnshire coast, and elsewhere. - provide a strategic framework which sustains biodiversity and the integrity of the natural environment - consider the enhancement of the natural environment - consider environmental change including sea level rise, coastal squeeze and the implications on coastal habitats - concern over ridge and runnel development and movement of sweep zones in longshore drift during beach nourishment - how will the nourishment operation ensure the RIGS is not damaged - the need for monitoring of beach nourishment material to determine any effects on Gibraltar Point - welcome the detailed study on Skegness to Gibraltar Point 	<ul style="list-style-type: none"> - need to maintain and enhance present ecological and geological interest - the extension of the present hard defences would be of concern - ensure Lagoon Walk is not extended with hard defences - concern over certain aspects of the beach nourishment scheme (ridge and runnels, sweep zone, RIGS and monitoring)

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - NATURE CONSERVATION

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr D Robinson (Honourary Secretary) Lincolnshire Trust for Nature Conservation</p>	<ul style="list-style-type: none"> - the complex features of Gibraltar Point have evolved over the last two centuries - erosion of outer dunes along the north and centre of the reserve is thought to be related, in part, to the decline in sand supply from the north - Lagoon Walk and the transition from rock armour to dunes must be considered and alternatives such as timber and kidding investigated - the LTNC must be closely involved in any schemes, especially as Gibraltar Point will be the final recipient 	<ul style="list-style-type: none"> - need to have an effective transition from rock armour to dunes at Lagoon Walk - ensure the hard defences at Lagoon Walk are not extended
<p>Mr J Sharpe (Conservation Officer) RSPB</p>	<ul style="list-style-type: none"> - ensure the Birds Directive (79/409/EEC) and Habitats Directive (92/43/EEC) are taken into consideration - enclosed summaries of the bird interest in the Wash and Humber Estuary - the coast at Gibraltar Point and at Donna Nook are actively accreting, therefore, the natural processes should be allowed to operate undisturbed - generally favour 'soft' engineering 	<ul style="list-style-type: none"> - the loss of important habitats or species - ensure the natural processes are allowed to operate throughout the sub-cell
<p>Mr J Shackles (Conservation Officer) English Nature</p>	<ul style="list-style-type: none"> - details and citations on conservation designations 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr N Durston (Public Affairs Officer) The Woodland Trust</p>	<ul style="list-style-type: none"> - no property interests within the study area 	<ul style="list-style-type: none"> - no concerns in regard to Woodland Trust property

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - NATURE CONSERVATION

Name and Organisation	Summary of Responses	Major Concerns
Sarah Welton Marine Conservation Society	- emphasized the value of coastal flora in bringing together and co-ordinating all those with interests in and responsibilities for the coast and would hope such a group would be considered in the plan	- no concerns at this stage

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LANDOWNERS

Name and Organisation	Summary of Responses	Major Concerns
<p>Flight Lieutenant A Callaway Royal Air Force Donna Nook</p>	<ul style="list-style-type: none"> - Donna Nook is an Air Weapons Range with access being strictly controlled - in addition to Donna Nook the beach area from Saltfleet Haven to Theddlethorpe Gas Terminal is MoD owned - clearance for conduct of proposed activities and day to day activities must be arranged in advance with MoD - map of land and sea boundaries of Donna Nook Surface Danger Area 	<ul style="list-style-type: none"> - concerned over the fragility of the sea defences and the need to complete study as soon as possible
<p>Mr P A Cooper (Defence Land Agent) Ministry of Defence</p>	<ul style="list-style-type: none"> - plan illustrating MoD interests 	<ul style="list-style-type: none"> - concerns of a 'bird strike' during dredging - effect on existing beach levels and impact of any change on MoDs ability to maintain viable target arrays would be of concern - health and safety of service personnel and members of public should be addressed
<p>Mr N R Jacobson (Marine Estates Crown Estates)</p>	<ul style="list-style-type: none"> - map illustrating Crown Estate's ownership - the land is under a number of leases - the Crown Estate makes its land available providing coastal defence works are carried out within the relevant authority's powers and have the consent of the DoT, and if necessary the consent of MAFF 	<ul style="list-style-type: none"> - no concerns at this stage

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - AGRICULTURE

Name and Organisation	Summar of Responses	Major Concerns
<p>Mr P J Chillingworth (Regional Planning Advisor) MAFF - Land Use Planning Unit</p>	<ul style="list-style-type: none"> - provided information on the study area, agricultural land quality, dominant farm type, agricultural employment and the rural economy - the main concerns of the unit are the protection of the best and most versatile agricultural land, the rural economy, and the rural environment - a wide agricultural area should be included in Phase 2 of the study - more specific maps and charts can be produced for the purposes of Stage 2 if required 	<ul style="list-style-type: none"> - need to protect the best and most versatile agricultural land
<p>Mr D Patterson (Honourary Secretary) Council for the Protection of Rural England</p>	<ul style="list-style-type: none"> - favour coastal defence management in an environmentally sustainable way - access to the beach is important for the residents and visitors 	<ul style="list-style-type: none"> - need to retain accesses
<p>Mr P J Geldart (Regional Secretary) Country Landowners Association</p>	<ul style="list-style-type: none"> - able to detail the extent of memberships or landowners on the map, if necessary 	<ul style="list-style-type: none"> - agricultural interests must be considered
<p>Mr P R Tame (Technical Advisor) National Farmers Union</p>	<ul style="list-style-type: none"> - concern over inundation of the agricultural land - concern over 'managed retreat' unless on a voluntary basis with full compensation to participating landowners and occupiers - specific projects with implications for land use and management should only be pursued after full consultation with landowners and occupiers - need unify all coastal plans 	<ul style="list-style-type: none"> - 'managed retreat' should only be contemplated on a voluntary basis - full consultation of specific projects should be undertaken with landowners

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LOCAL AUTHORITIES

Name and Organisation	Summary of Responses	Major Concerns
<p>Miss K Turton (Dept. of Planning and Economic Development) East Lindsey District Council</p>	<ul style="list-style-type: none"> - provided Deposit Lindsey Local Plan information in the Deposit Plan should be sufficient - passed a copy of the letter to Community and Housing Services Department 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr G N Keeping (Countryside Manager) Lincolnshire County Council</p>	<ul style="list-style-type: none"> - copies of the Definitive Map of public rights of way - land ownership plan - 'Explore the Lincolnshire Countryside' leaflet - passed a copy of the letter to the County Archaeological Officer 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr M E Ball (Estates and Valuation Manager) East Lindsey District Council</p>	<ul style="list-style-type: none"> - map of East Lindsey foreshore ownership at Mablethorpe and Skegness 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Mr A G Rogers (Clerk) Mablethorpe and Sutton Town Council</p>	<ul style="list-style-type: none"> - consideration of the proposals to establish a cycleway incorporating the promenade between Mablethorpe and Sutton - problem of beach cleaning, if the beach nourishment scheme results in an area of unwashed sand - erosion of soil on the landward side of the sea wall 	<ul style="list-style-type: none"> - problem of beach cleaning - landward erosion of the sea wall

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - LOCAL AUTHORITIES

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr J S Watson Lincolnshire County Council</p>	<ul style="list-style-type: none"> - interested as the statutory planning authority, development control authority for mineral workings and waste disposal, and as consultee on marine dredging licences and NRA sea defence developments - will 'managed retreat', predictions on future geomorphological trends, water quality, etc. be investigated? 	<ul style="list-style-type: none"> - no concerns at this stage

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - ARCHAEOLOGY AND HERITAGE

Name and Organisation	Summary of Responses	Major Concerns
<p>Mr M Cooper (East Midlands Team) English Heritage</p>	<ul style="list-style-type: none"> - no scheduled ancient monuments are within 1 km of the present coastline, but the area is likely to contain non-scheduled archaeological remains - contact Lincolnshire County Council - not aware of studies being undertaken in the study area, but feels it is important to commission a detailed coastal survey to identify and assess the significance of historic structures once the likely areas for possible works have been identified 	<ul style="list-style-type: none"> - archaeological survey required in areas of proposed works
<p>Mr A Keeling (Business Services Manager) East Midlands Tourist Board</p>	<ul style="list-style-type: none"> - passed enquiry to Brian Prescott of the Lincolnshire Coast Partnership 	<ul style="list-style-type: none"> - no concerns at this stage
<p>Ms S Browne (Managing Agent) National Trust</p>	<ul style="list-style-type: none"> - no interests in the area 	<ul style="list-style-type: none"> - no concerns regarding National Trust properties

SUMMARY OF RESPONSES TO SCOPING DOCUMENT - PARISH COUNCILS

Name and Organisation	Summary of Responses	Major Concerns
Ms M Hibbert (Clerk) Chapel St. Leonards Parish Council	- support the SMP	- no concerns at this stage
Mrs N Robinson (Clerk) Huttoft Parish Council	- plan of the foreshore rights of Huttoft Parish Council	- no concerns at this stage

RESPONSES TO STAGE 1 DOCUMENTS

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - NATURE CONSERVATION

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr J Kew (Senior Conservation Officer) RSPB East Anglian</p>	<p>23/10/95 (letter)</p>	<ul style="list-style-type: none"> - This sediment sub-cell lies adjacent to the Wash - The issue of coastal squeeze within the Wash could be exacerbated by reductions in sediment supply the area receives which the Wash SMP identifies as being from the Holderness coast - How important is sediment from the Holderness coast in relation to the accreting sections north of Mablethorpe? - Is there any evidence that the off-shore sandbanks act as a sink for some of the sediment transported south from Holderness. - Connections between subcells 2a, 2c and 2d must be addressed in the relevant plan - The Saltfleetby - Theddlethorpe NNR is proposed as a possible future extension to the Humber Estuary SPA and RAMSAR sites. English Nature will be able to confirm this 	<ul style="list-style-type: none"> - Vital that sediment supply to the Wash be maintained and taken into account when considering options for this SMP - Critical that natural processes be allowed to operate on the Holderness coast

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - NATURE CONSERVATION

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr P Murby (Coastal Conservation Officer) (Lincolnshire Trust for Nature Conservation)</p>	<p>18/10/95 (letter)</p>	<ul style="list-style-type: none"> - Has it been firmly established that the dredging of Inner Dowsing sand bank will not affect the north Norfolk coast? - Between Saltfleetby and Donna Nook there is general retreat of the low water mark suggesting a long term steepening of the intertidal profile, not a uniform accretion - The finer sediments, muds and silts, should be considered as of great importance to the natural development of the area and its sustainability - The objectives of planning, in the context of the SMP and elsewhere are far wider and certainly encompass the protection of the natural environment - Anomalies between the overall management objectives and the detailed subject area objectives will need to be resolved if the planning is to provide a strategic framework for sustainable shoreline management and coastal defence policies 	<ul style="list-style-type: none"> - Seriously question "there is no evidence to indicate that significant exchange of sediment occurs across the boundaries of the subcell 2c". Refer to work done by HR Wallingford and AHW Robinson which proves otherwise - The description of the key planning objective as simply "to provide protection from flooding and erosion" is not acceptable - The SMP appears to emphasise aspects of coastal protection and defence whilst failing to fully reflect the aim of sustainable shoreline management

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - NATURE CONSERVATION

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr P Murby (continued)		<ul style="list-style-type: none">- Need to establish a more cogent overall aim for coastal management- The dunes from Theddlethorpe to Skegness are a significant feature of the landscape and should not be neglected- Various recommendations to change text and references to inaccuracies	

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - NATURE CONSERVATION

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr D Robinson (Honourary Secretary) Lincolnshire Trust for Nature Conservation</p>	<p>24/10/95 (letter)</p>	<ul style="list-style-type: none"> - The coast around Skegness is dynamic with local erosion as well as accretion - Question the assertion of shoreline advance north of Mablethorpe - The processes around Donna Nook are critical to understanding the coastline both to the north west and to the south - Geological section - where are the submerged forest and post-glacial clays? - The sites of Nature Conservation importance (SNCI) have been designated by the trust and accepted by local authorities - Regionally important geological sites (RIGS) should be included in Table 6.2, with similar note to that on SNCI's - References made to the meeting on 31st August 1995 	<ul style="list-style-type: none"> - Concern about the consideration of the boundaries of subcell 2c with 2b and 2d. Both Donna Nook and Gibraltar Point areas are critical to understanding the processes affecting the adjoining cells

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - NATURE CONSERVATION

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr D Robinson (continued)</p>		<ul style="list-style-type: none"> - Discussions with J Shackles of English Nature have set out the preferred future options for the three broad zones. Donna Nook to Mablethorpe, do nothing. Mablethorpe to Skegness, hold the line. Skegness to Gibraltar, do nothing - Reference made to work being carried out by Scott Wilson Kirkpatrick - Recommend that a degree of overlap with the SMP's for the Humber and the Wash takes place - Enclosed diagrams on grading of sand and profiles of beaches 	

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - RECREATION AND AMENITY

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr D Pendrigh (Treasurer) Skegness Boating Club</p>	<p>1/10/95 (letter)</p>	<ul style="list-style-type: none"> - Hopeful that whatever is done it will improve and ease the launching and recovery of small boats across the beach - Strongly support the extension of revetment as long as a usable beach access is incorporated - Supports the strategy of beach nourishment although not convinced of the theory as the beach, at present appears to be accreting quickly - The club favours the reintroduction of groynes - Detached breakwaters would be hostile to small craft, however, further information would be helpful, but at this stage the club would not support them - The club is, by far, the major user of the sea in the area - Commercial fishing and access is not included or shown on Map 13 neither is access or car parking shown on Map 14 	<ul style="list-style-type: none"> - The maintenance of a usable access to the beach is vitally important - Dune management, retreat and no action would be damaging to our activities, hope one of the other options will prevail

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - ARCHAEOLOGY AND HERITAGE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr S Catney (Archaeological Officer) Lincolnshire County Council - Recreational Services Unit</p>	<p>27/10/95 (letter)</p>	<ul style="list-style-type: none"> - Find enclosed copies from the Lincolnshire County Sites and Monuments Record. This information will enable you to plot a base level of the archaeological knowledge to date and update the entry in the SMP - Very little work has been carried out on the coast and therefore, this information is only a small part of the picture - Suggests that the draft, archaeological management objective should read "to develop a strategy to enable the minimisation and mitigation of adverse impacts of the coastal defence works on the archaeological resource" 	<ul style="list-style-type: none"> - No concerns at this stage

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - ARCHAEOLOGY AND HERITAGE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr A Cooper English Heritage - East Midlands team</p>	<p>27/10/95 (letter)</p>	<ul style="list-style-type: none"> - With the exception of the management objectives at the end of the SMP, there is no reference to the archaeology/historic environment. This may create a misleading impression that the SMP is concerned with natural rather than the historical environment - Disappointed that no attempt was made to assess the historical background of the Lincolnshire Coastline prior to 1880 - The planning framework should draw attention to the relevant development plan policies regarding archaeology 	<ul style="list-style-type: none"> - The management objectives section relating to archaeology appears fairly weak in comparison with the biological/geological section - Report focuses more on the natural environment rather than the historical one

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - ARCHAEOLOGY AND HERITAGE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Ms N Field (Partner) Lindsey Archaeological Services</p>	<p>16/10/95 (letter)</p>	<ul style="list-style-type: none"> - Believe the account presented in Section 5.6 to be a fair summary of the present state of knowledge - Only work carried out in the area is the Humber Wetlands Project which is investigating the archaeological resource in the Humber basin and Lincolnshire coast. The emphasis is on the whole of the marshland zone, not the intertidal zone. The project is only in the preliminary stage - Necessary to identify, precisely the location and extent of archaeological remains under threat and make an assessment of their importance - Attention drawn to minor errors in text 	<ul style="list-style-type: none"> - Important that a properly funded archaeological element should be included in all sea defence work as soon as possible

SUMMARY OF RESPONSES TO STAGE I DOCUMENTS - LOCAL AUTHORITIES

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr J Watson Lincolnshire County Council Highways and Planning Department</p>	<p>31/10/95 (Faxed copy of letter)</p>	<ul style="list-style-type: none"> - will be reporting the progress made to the County Council's planning and regulation sub-committee - Information appears to be broadly consistent with what would be expected on this topic - Actual height of principle sea banks is not given in the Lincolnshire SMP. It would be interesting to see if further work is needed to raise bank heights - Has coarser sand deliberately been used for beach nourishment? - Are estimated wave heights over particular periods based on historical records or are they predictions for the future? - No formal designation of the SNCI's by local authorities as identified on Map 16, table 5 - Interesting to see, in Stage 2, how priorities will be indicated, or compromises reached, where the objectives in relation to a particular management unit are in conflict - Council's Archaeology officer will respond separately 	<ul style="list-style-type: none"> - With the Lincolnshire SMP, the Council were consulted at the draft stage on the whole document, rather than just a summary. Unclear in this case what information is omitted from the summary - Insufficient reference to the coast's importance for local recreational purposes throughout the year - The archaeological potential of the Lincolnshire coast is not emphasised sufficiently within Map 16

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - LOCAL AUTHORITIES

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Miss K Turton East Lindsey District Council Department of Planning and Economic Development</p>	<p>6/11/95 (letter)</p>	<ul style="list-style-type: none"> - Map 14 makes no mention of the caravan development at North Somercotes - Further clarification of the word "assets" within the objectives of the plan. As in this context assets are taken to have a much wider meaning, such as nature conservation, beaches, associated holiday trade as well as property and human life 	<ul style="list-style-type: none"> - No concerns at this stage

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - SERVICES

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr P Linwood (Senior Marine Scientist) Anglian Water</p>	<p>12/10/95 (letter)</p>	<ul style="list-style-type: none"> - Alterations to coastal hydrodynamics could have an impact upon dispersion characteristics where consideration would have to be given to the consequences for waste management operations - Need to consider how it may impinge upon obligations to comply with various legislative requirements - Whatever strategic option is chosen it could have implications upon the siting of the company's waste management operations such as treatment works, pumping stations and pipelines located in coastal areas - Expect to be fully consulted, and at the appropriate time be involved in discussions on the options to be adopted 	<ul style="list-style-type: none"> - Any alteration to coastal hydrodynamics which could arise from any strategy adopted - Would like a clearer recognition of the issues relating to the siting of waste management operations in the further development of the plan

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - FISHERIES

Name and Organisation	Response Date	Summary of Responses	Major Concerns
<p>Mr C F Beach (Deputy Clerk and Fishery Officer) Eastern Sea Fisheries Joint Committee</p>	<p>1/11/95 (letter)</p>	<ul style="list-style-type: none"> - Sea Fisheries Committees are only responsible for management of the fisheries inside the six mile limit. This should be emphasised - Suggested changes to paragraph 2 of Map 13 - Other minor changes suggested to the text 	<p>- No concerns at this stage</p>

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - OTHERS

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr R Stoddard (Secretary) Anglian Coastal Authorities Group	13/10/95 (letter)	- Presented document to members at a meeting held on 21/9/95 - May wish to contact Terry Oakes at Waveney District Council to obtain details of the southern North Sea Sediment Transport study which is due for completion in May 1996	- No concerns at this stage
Ms J Goddard Government Office for the East Midlands Transport and Planning Division	19/10/95 (letter)	- No comment	

SUMMARY OF RESPONSES TO STAGE 1 DOCUMENTS - PARISH COUNCILS

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mrs N Robinson (Clerk) Huttoft Parish Council	17/10/95 (letter)	- Is Huttofts Submerged Forest, where shown on Map 16, correct?	- No concerns at this stage

RESPONSES TO DRAFT SMP

SUMMARY OF RESPONSES TO DRAFT SMP - NATURE CONSERVATION

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr J Sharpe (Conservation Officer) Royal Society for the Protection of Birds, East Anglian	14/3/96 (letter)	<ul style="list-style-type: none"> - Welcome production of draft SMP - Support recommendations for future monitoring and research - Support management objectives set for the natural environment 	<ul style="list-style-type: none"> - Deeply concerned at the way in which the concepts of CNC and CNA have been applied to some SMPs. However, welcome cautious approach adopted for Lincs SMP
Mr P Murby (Coastal Conservation Officer) Lincolnshire Trust for Nature Conservation	26/2/96 (letter)	<ul style="list-style-type: none"> - Preferred strategic options broadly acceptable to Trust - Welcome recommendations for future research and monitoring - Request for research and monitoring data to be made available to Trust - A number of detailed comments on maps and text 	<ul style="list-style-type: none"> - Monitoring for 'coastal squeeze' should be undertaken in Units 1, 2, 10 and 11 - SMP should state the need to maintain the sedimentary input into the system from the receding Holderness coast

SUMMARY OF RESPONSES TO DRAFT SMP - FISHERIES

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Dr N S Gilbert (Director of Fisheries Research) MAFF, Burnham-on-Crouch	20/2/96 (letter)	- SMP generally looks very good	- No concerns
Mrs P Midgely General Council Wash Seafoods	30/1/96 (letter)	- Comments on options selected for Management Units 10 and 11 and coastal processes	- Selection of "do nothing" for Units 10 and 11 is shortsighted - Concerned that there is insufficient information available on coastal processes to support the selected strategic options
Mr B Symes Marine Protection 'C' MAFF, London	04/4/96 (letter)	- Co-ordinated comments from within MAFF re fisheries - Integration with adjacent SMPs and other coastal initiatives	- Corrections and inclusion in text - Need to expand further fisheries work necessary in core report (Vol 1) - Correction to fishing seasons noted in Atlas - Information on concerns of fishermen regarding beach recharge
Mr N Wellum (District Inspector) MAFF, Lowestoft	26/2/96 (letter)	- See MAFF, London entry	

SUMMARY OF RESPONSES TO DRAFT SMP - FISHERIES (CONTINUED)

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr C F Beach (Deputy Clerk and Fisheries Officer) Eastern Sea Fisheries Joint Committee	16/2/96 (letter)	- Points raised previously incorporated into draft SMP	- No concerns

SUMMARY OF RESPONSES TO DRAFT SMP - WATER QUALITY AND DRAINAGE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr P Linwood (Senior Marine Scientist) Anglian Water	29/1/96 (letter)	- Potential impact of coastal defence to effluent dispersion	- Update of Section 6.3.1 (supplied information) - Impact of gravel extraction to fishery of Race and Dudgeon Banks

SUMMARY OF RESPONSES TO DRAFT SMP - LANDSCAPE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr D Vose (Senior Countryside Officer) Countryside Commission	23/2/96 (letter)	- Welcomed reference within SMP to Heritage Coast policies	- Amend text on landscape - Information on PPG's - Changes to countryside stewardship scheme

SUMMARY OF RESPONSES TO DRAFT SMP - LAND USE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr O P Judges (Marine Estates) The Crown Estate	28/2/96 (letter)	- No comments	- Keep Crown Estate informed
Mr D Patterson (Hon Secretary) Council for the Protection of Rural England	16/2/96 (letter)	- Welcome the development of the SMP - Strongly support intention to work with the natural forces in coastal defence	- No concerns

SUMMARY OF RESPONSES TO DRAFT SMP - RECREATION AND AMENITY

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr J Lee (Secretary) Skegness Yacht Club	26/2/96 (letter) and 28/2/96 (letter)	- Discussed SMP with Club Committee - In broad agreement with aim and objectives of the management plan	- General agreement with information on waves - Concerned about affect beach nourishment may have on Wainfleet Haven - Provided further comments on coastal processes
Mr D C Pendrigh (Treasurer) Skegness Boating Club	29/2/96 (letter)		- Raised possibility of a marina development at Skegness - Information on potential damage to boat access at Lagoon Walk - Concern over boundary line between Management Units 9 and 10.
Mr J Palmer East Midlands Region Sports Council	15/1/96 (letter)	- Corrections concerning locations of	
Mr P Green (Conservation Officer) British Association for Shooting and Conservation	16/2/96 (letter)	- No further information to add or comments to make recreation facilities	- No concerns

SUMMARY OF RESPONSES TO DRAFT SMP - ARCHAEOLOGY AND HERITAGE

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Ms L Stephens (East Midlands Team Conservation) English Heritage	28/2/96 (letter)	- Welcomed inclusion of Archaeology and Heritage within SMP	- Retitle Map 17 of Vol II to 'Archaeological Sites' - Keep English Heritage informed
Mr S J Catney (Archaeological Officer) Lincolnshire County Council	22.2.96 (letter)	- Considered final SMP would be a useful document	- Additional information for inclusion on Map 17 - Additional comments concerning Sites and Monuments Record (SMR)

SUMMARY OF RESPONSES TO DRAFT SMP - PLANNING

Name and Organisation	Response Date	Summary of Responses	Major Concerns
Mr J S Watson (Asst Director of Environmental Services) Lincolnshire County Council	1/3/96 (letter)	- General satisfaction with SMP - Welcomed layout of SMP	Observations on: - Economics - Definition of offshore boundary - Hinterland boundary
Mr R Stoddard (Secretary) Anglian Coastal Authorities Group	21/2/96 (letter)	- Pleased with layout and presentation of document	- No concerns
Mr P J Chillingworth (Regional Planning Advisor) Land Use Planning Unit MAFF, Cambridge	25/1/96 (letter)	- Ministry is content with proposed options	- No concerns

**APPENDIX B
EXISTING COASTAL DEFENCES**

**APPENDIX B
EXISTING COASTAL DEFENCES**

Frontage No	Length (m)	Existing Type of Construction	Location	Standard of Defence (years)	Estimated Residual Life (years)
S1*	700	Natural Dunes	Gibraltar Point to Bulldog Bank	5	-
S2*	400	Clay Embankment	Bulldog Bank	200	-
S3*	3900	Natural Dunes	Bulldog Bank to Lagoon Walk/South Bracing	200	-
S4*	700	Concrete Seawall	South Bracing	100	40-60
S5*	350	Concrete Seawall	North Bracing	100	40-60
0.1	600	Concrete Seawall with Concrete Armour Units	Amusement Park to Sea View Pullover	100	40-60
0.2 & 0.3	1600	Revetment (Rock)	Sea View Pullover to North Shore Golf Course	100	40-60
1	830	Concrete Seawall	Winthorpe to Carey House	200	6-7
2	450	Concrete Seawall	Carey House to N of Jacksons Corner	200	7-8
3	450	Concrete Seawall	N of Jacksons Corner to Midpoint Butlins	200	35-55
4	710	Concrete Seawall	Midpoint Butlins to Whitehouse Corner	190	7-8
5.1	300	Concrete Seawall	Whitehouse Corner	45	20-31
5.2	500	Concrete Seawall	Whitehouse Corner to Ingoldmells Point	20	40-60
5.3	150	Concrete Seawall	Ingoldmells Point	140	40-60
6	740	Concrete Seawall	Ingoldmells Point to access S of Vickers Point	200	40-60
7	390	Concrete Seawall with Concrete Armour Units	Access S of Vickers to N of Vickers Point	100	40-60
8	210	Concrete Seawall	N of Vickers Point	200	40-60
9	450	Concrete Seawall with Rock Armour Toe	S of Chapel Lake	100	40-60
10	440	Concrete Seawall with Rock Armour Toe	N of Chapel Lake	100	28-41
11	510	Concrete Seawall with Rock Armour Toe	Trunch Lane	200	24-38
12	1800	Concrete Seawall with Rock Armour Toe	North of Trunch Lane	170	40-60
13	100	Concrete Seawall	Chapel Basin	35	9-14
14	190	Concrete Seawall with Rock Armour Toe	Chapel Point	10	24-38
15&16	380	Concrete Seawall	North of Chapel Point	30	24-38
17	2030	Revetment	Foxholes to S of Anderby Outfall	5	3-5
18	190	Revetment	Anderby Sewage Works	150	3-5
19	360	Revetment	Anderby Creek	200	5-8
20	790	Revetment	Anderby Creek to Moggs Eye	175	0-2
21.1	730	Revetment	Moggs Eye to Huttoft Boat Ramp	200	40-60
21.2	1200	Concrete Seawall with Concrete Armour Units	Huttoft Car Terrace	150	40-60

EXISTING COASTAL DEFENCES (Continued)

Frontage No	Length (m)	Existing Type of Construction	Location	Standard of Defence (years)	Estimated Residual Life (years)
22&23	490	Concrete Seawall with Rock Armour Toe	N of Huttoft Car Terrace	200	35-55
24	350	Concrete Seawall	S of Fairway Cottage	5	0
25	200	Concrete Seawall	Fairway Cottage	5	0
26	370	Concrete Seawall with Concrete Armour Units	Fairway Cottage to Boygrift Outfall	10	20-31
27	350	Concrete Seawall	Boygrift Outfall	15	13-20
28	210	Concrete Seawall with Rock Armour Toe	Sandilands Club House	25	35-55
29	480	Concrete Seawall with Rock Armour Toe	Sandilands	25	35-55
30	220	Concrete Seawall with Rock Armour Toe	Sandilands Pullover to Acre Gap	30	35-55
31	460	Concrete Seawall	Acre Gap to Church Lane Pullover	50	40-60
32	280	Concrete Seawall	N of Church Lane Pullover	100	6-9
33	260	Concrete Seawall	S of Garden Cafe	70	28-44
34	220	Concrete Seawall	Garden Cafe to Sutton Pullover	115	40-60
35.1	400	Concrete Seawall	Sutton Pullover to Bohemia Point	20	40-60
35.2	70	Concrete Seawall	Sutton Pullover to Bohemia Point	15	24-38
36	160	Concrete Seawall	Bohemia Point	75	18-25
37	160	Concrete Seawall	N of Bohemia Point	40	18-25
38	370	Concrete Seawall	N of Bohemia Point	20	40-60
39	170	Concrete Seawall	Trusthorpe	15	29-46
40.1	350	Concrete Seawall	S of Trusthorpe Outfall	35	29-46
40.2	405	Concrete Seawall	S of Trusthorpe Outfall	30	20-31
41	200	Concrete Seawall with Rock Armour Toe	N of Trusthorpe Outfall	5	35-55
42	230	Concrete Seawall	S of Gibraltar Road	135	29-46
43	170	Concrete Seawall	Convalescent Home	110	35-55
44	150	Concrete Seawall	N of Convalescent Home	45	35-55
45	180	Concrete Seawall	Mablethorpe	35	5-10
46	830	Concrete Seawall	Mablethorpe	55	40-60
N1*	7200	Natural Dunes	Mablethorpe to Saltfleet Haven	200	-
N2*	8000	Clay Embankment	Saltfleet Haven to Donna Nook	200	-

Notes

- *PD reference No. (no frontage no. assigned)
- The standard of defence is defined as the return period of the storm event that the defences are able to provide protection against
- The residual life of the defence is the number of years the structure is estimated to last before its integrity is compromised as a result of progressive deterioration
- The table does not take into account the effect of the NRA's beach nourishment scheme on the standard of defence

Reasons for recommendation as a possible Special Area of Conservation

Area Name: North Norfolk Coast and Gibraltar Point Dunes

County/District Lincolnshire
Norfolk

Component SSSI: Gibraltar Point
North Norfolk Coast

This area is being considered as a possible Special Area of Conservation (SAC) because it contains habitat types and/or species which are rare or threatened within a European context. The SSSI citation describes the special interests for which the site was notified in the British context. [NB Not for marine interests below mean low water mark]. The interests for which the site was selected as SSSI may differ from the interests selected in a European context.

The habitats and/or species for which this area has been proposed as a possible SAC are listed below. The reasons for their selection are listed, together with a brief description of the habitats and species as they typically occur across the UK. This area contains the interests described although it may not contain all the typical features. (Please see the accompanying Natura 2000 booklet for further information on the approach to site selection.)

The area is considered to have a high diversity of habitats/species of European importance.

European priority interest(s):

1. Dune grasslands.†

- for which this is considered to be one of the best areas in the United Kingdom.

†Fixed dunes with herbaceous vegetation (grey dunes): This species-rich habitat includes a broad range of dune grasslands where the dunes are stable. The exact nature of the vegetation depends on grazing, the degree of stability and on the amount of lime in the sand but species commonly found include sand sedge *Carex arenaria*, red fescue *Festuca rubra*, and lady's bedstraw *Galium verum*.

2. Lagoons.†

- for which this is considered to be one of the best areas in the United Kingdom.

†Lagoons: These are areas of shallow coastal saltwater of varying salinity separated from the sea by sandbanks or shingle or, less frequently, by rocks.

European interest(s):

3. Mediterranean saltmarsh scrubs.†

- for which this area is one of only 3 outstanding localities in the United Kingdom;
- which is considered to be rare as its total extent in the United Kingdom is thought to be less than 1000 hectares;
- for which the area contains more than 10% of the United Kingdom resource.

†Mediterranean and thermo-Atlantic halophilous scrubs (*Arthrocnemum fruticosae*): This is a type of Mediterranean saltmarsh vegetation that occurs in the UK at the upper limit of the tide. It takes the form of low, shrubby vegetation often dominated by shrubby sea blite *Suaeda vera* and sea purslane *Halimione portulacoides*. It may also contain species such as sea heath *Frankenia laevis*, rock sea lavender *Limonium binervosum*, common sea lavender *L. vulgare* and the rare matted sea lavender *L. bellidifolium*. In the UK this habitat is restricted to the coasts of South and East England.

4. Shifting dunes.†

- for which this is considered to be one of the best areas in the United Kingdom;
- which is considered to be rare as its total extent in the United Kingdom is thought to be less than 1000 hectares;
- for which the area contains more than 10% of the United Kingdom resource.

†Embryonic shifting dunes: These are low dunes that develop along the upper shore above the high tide line. Only a few plant species are able to survive in these conditions, such as sand couch *Elymus farctus*, lyme-grass *Leymus arenarius*, sea sandwort *Honckenya peploides* and sea rocket *Cakile maritima*.

5. Shifting dunes with marram grass.†

- for which this is considered to be one of the best areas in the United Kingdom.

†Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes): These are actively building or growing dunes, found in areas receiving large quantities of blown sand. Continual burying by sand restricts the number of plants that can survive but provides ideal conditions for the growth of the sand-binding marram grass *Ammophila arenaria*. A small number of other specialised dune plants can also tolerate these conditions.

6. Humid dune slacks.†

- for which this is considered to be one of the best areas in the United Kingdom.

†Humid dune slacks: These are seasonally wet hollows in dunes. This habitat can also include some more permanently wet areas within dunes that support wet heath and swamp vegetation. The vegetation forms a short turf in which mosses and liverworts are often abundant, with small grasses, herbs and sedges. Dune slacks are a rare habitat and may support rare species such as variegated horsetail *Equisetum variegatum* and fen orchid *Liparis loeselii*. Humid dune slacks are found more frequently in western parts of the UK.

7. Coastal shingle vegetation outside the reach of waves.†

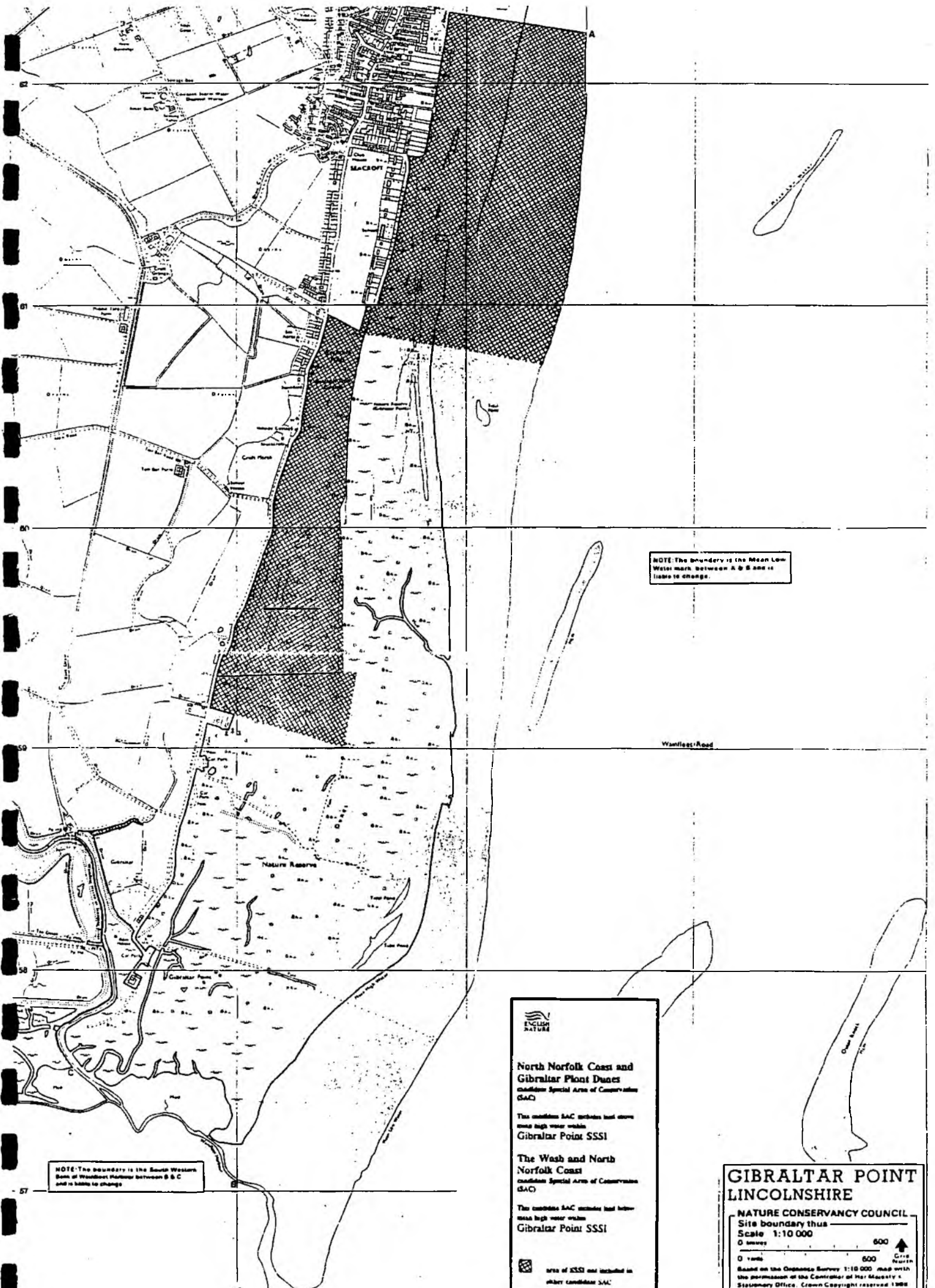
- for which this is considered to be one of the best areas in the United Kingdom.

†Perennial vegetation of stony banks: This encompasses a wide range of vegetation found on coastal shingle above the reach of waves. It includes the open pioneer stages close to the limit of the tide, in which there are a number of specialised flowering plants. It also includes the grasslands, heath, scrub and moss and lichen-dominated vegetation of very old, stable shingle further inland.

For agency use only:



Date compiled: 17 MAR 1995


Reference number or date of map: _____



NOTE: The boundary is the Mean Low Water mark between A & B and is liable to change.

NOTE: The boundary is the South Western Bank of Wanfleet Harbour between B & C and is liable to change.


North Norfolk Coast and Gibraltar Point Dunes
 candidate Special Area of Conservation (SAC)
 This candidate SAC includes land above mean high water within
Gibraltar Point SSSI
The Wash and North Norfolk Coast
 candidate Special Area of Conservation (SAC)
 This candidate SAC includes land between mean high water and
Gibraltar Point SSSI
 area of SSSI not included in other candidate SAC

GIBRALTAR POINT LINCOLNSHIRE
 NATURE CONSERVANCY COUNCIL
 Site boundary thus
 Scale 1:10 000
 0 metres 600
 0 yards 600 
 Based on the Ordnance Survey 1:10 000 map with the permission of the Controller of Her Majesty's Stationary Office. Crown Copyright reserved 1988

Reasons for recommendation as a possible Special Area of Conservation

Area Name: The Wash and North Norfolk Coast

County/District: Lincolnshire
Norfolk

Component SSSI: Gibraltar Point
North Norfolk Coast
The Wash

This area is being considered as a possible Special Area of Conservation (SAC) because it contains habitat types and/or species which are rare or threatened within a European context. The SSSI citation describes the special interests for which the site was notified in the British context. [NB Not for marine interests below mean low water mark]. The interests for which the site was selected as SSSI may differ from the interests selected in a European context.

The habitats and/or species for which this area has been proposed as a possible SAC are listed below. The reasons for their selection are listed, together with a brief description of the habitats and species as they typically occur across the UK. This area contains the interests described although it may not contain all the typical features. (Please see the accompanying Natura 2000 booklet for further information on the approach to site selection.)

The area is considered to have a high diversity of habitats/species of European importance.

European interest(s):

1. Subtidal sandbanks.†

- for which this is considered to be one of the best areas in the United Kingdom.

†Sandbanks which are slightly covered by sea water all the time: Sandbanks permanently covered by sea water to depths of up to 20 metres below low water. These include muddy sands, clean sands and maerl beds (carpets of small, unattached, calcareous seaweed).

2. Glasswort and other annuals colonising mud and sand.†

- for which this is considered to be one of the best areas in the United Kingdom;
- for which the area contains more than 10% of the United Kingdom resource.

†*Salicornia* and other annuals colonising mud and sand: These are areas of saltmarsh on intertidal mud and sand dominated by annual plants. The vegetation is dominated by open stands of glasswort *Salicornia* spp. and annual sea blite *Suaeda maritima*. These plants often form the lowest and most seaward zone of a saltmarsh where they are frequently flooded by the tide.

3. Atlantic salt meadows.†

- for which this is considered to be one of the best areas in the United Kingdom;
- for which the area contains more than 10% of the United Kingdom resource.

† Atlantic salt meadows (Glaucio-Puccinellietalia): This habitat encompasses saltmarsh vegetation containing perennial flowering plants that are regularly inundated by the sea. The species found in these saltmarshes vary according to duration and frequency of flooding with seawater, geographical location and grazing intensity, but may include salt-tolerant species such as common saltmarsh grass *Puccinellia maritima*, sea aster *Aster tripolium* and sea arrowgrass *Triglochin maritima*.

4. Mediterranean salt meadows.†

- for which this area is one of only 2 outstanding localities in the United Kingdom;
- which is considered to be rare as its total extent in the United Kingdom is thought to be less than 10 hectares.

† Mediterranean salt meadows (*Juncetalia maritimi*): This is a form of saltmarsh vegetation that is more characteristic of the Mediterranean. The vegetation is dominated by tall tussocks of sea rush *Juncus maritimus* and may include plants such as sea arrowgrass *Triglochin maritimum*, common sea lavender *Limonium vulgare*, sea aster *Aster tripolium*, autumnal hawkbit *Leontodon autumnalis* or parsley water dropwort *Oenanthe lachenalii*.

5. Mediterranean saltmarsh scrubs.†

- for which this area is one of only 3 outstanding localities in the United Kingdom;
- which is considered to be rare as its total extent in the United Kingdom is thought to be less than 1000 hectares;
- for which the area contains more than 10% of the United Kingdom resource.

† Mediterranean and thermo-Atlantic halophilous scrubs (*Arthrocnemetalia fruticosae*): This is a type of Mediterranean saltmarsh vegetation that occurs in the UK at the upper limit of the tide. It takes the form of low, shrubby vegetation often dominated by shrubby sea blite *Suaeda vera* and sea purslane *Halimione portulacoides*. It may also contain species such as sea heath *Frankenia laevis*, rock sea lavender *Limonium binervosum*, common sea lavender *L. vulgare* and the rare matted sea lavender *L. bellidifolium*. In the UK this habitat is restricted to the coasts of South and East England.

6. Intertidal mudflats and sandflats.†

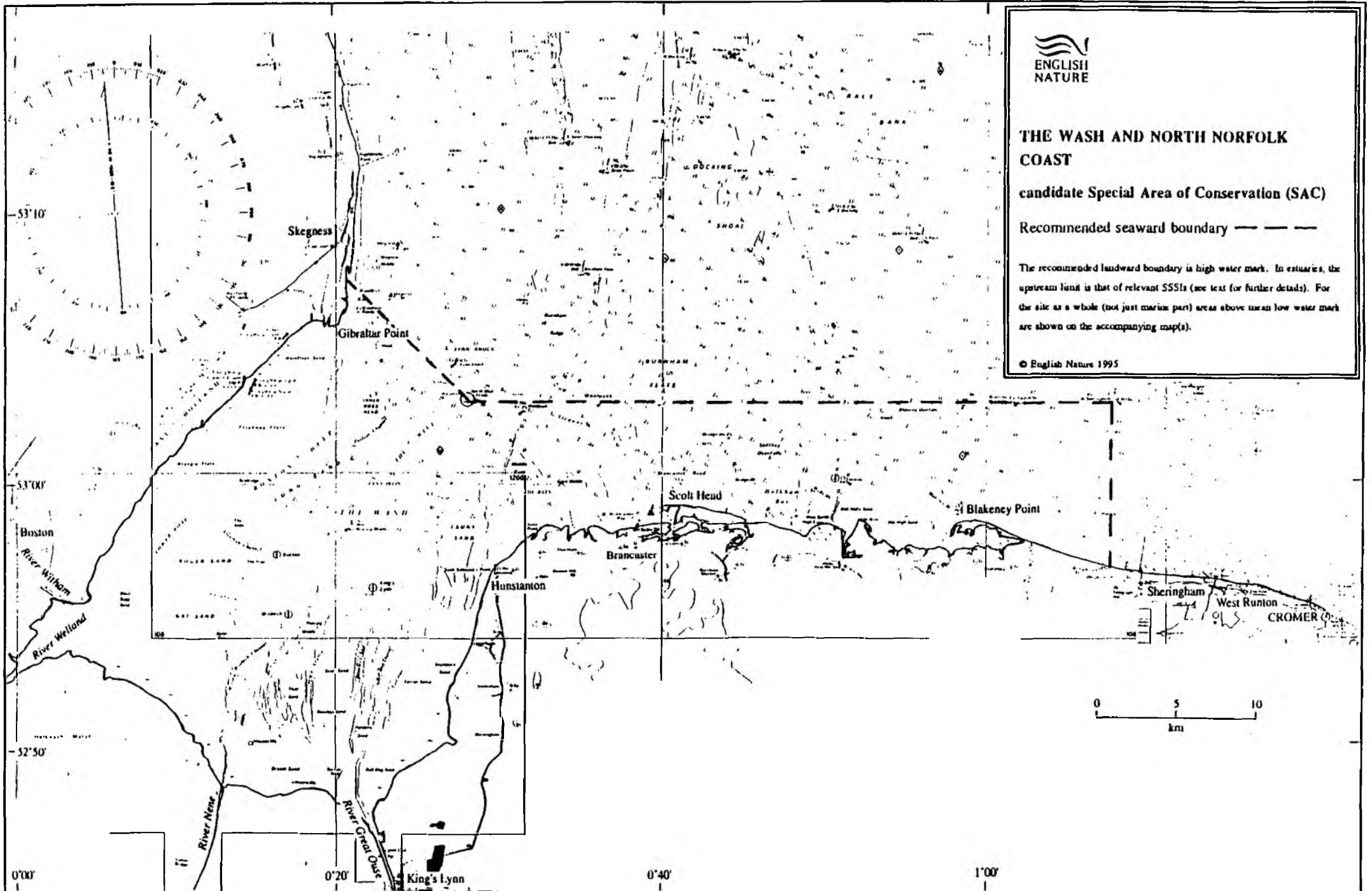
- for which this is considered to be one of the best areas in the United Kingdom.

† Mudflats and sandflats not covered by seawater at low tide: These are mud and sand sediments on the shore that are exposed at low tide.

7. Shallow inlets and bays.†

- for which this is considered to be one of the best areas in the United Kingdom.

† Large shallow inlets and bays: These are bays and inlets such as rias and voes (drowned river valleys in south-western parts of the UK and Shetland respectively), and fjards (shallow inlets in western Scotland and Northern Ireland). They are often large physiographic features which may contain a range of marine habitats.



THE WASH AND NORTH NORFOLK COAST
 candidate Special Area of Conservation (SAC)

Recommended seaward boundary — — —

The recommended landward boundary is high water mark. In estuaries, the upstream limit is that of relevant SSSIs (see text for further details). For the site as a whole (not just marine part) areas above mean low water mark are shown on the accompanying map(s).

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8. Common seal.

- for which this is considered to be one of the best areas in the United Kingdom.
- *Phoca vitulina*: About 50% of the European Union population of common seals breed in the UK. Common seals range around the shore of the UK and are the characteristic seal of sandflats and estuaries, but are also found on rocky shores in Scotland.

The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat.

Gibraltar Point. (Wash Phase 2)

Gibraltar Point is an actively accreting dune system which forms extensive sand dunes on the Lincolnshire coast. Dune ridges representing all stages of dune development have formed roughly parallel to the coast and between these are salt marshes. The older dunes are extensively colonised by scrub particularly sea buckthorn *Hippophae rhamnoides* and there are also freshwater pools, freshwater marshland and grassland, some of which is grazed. Gibraltar Point is also of great importance for its coastal geomorphology. It is the north-eastern most part of the Wash and is an integral part of that site.

The dune and saltmarsh habitats present at Gibraltar Point are representative of all stages of colonisation and stabilisation. There is a fine example of freshwater marsh containing sedges *Carex* spp., rushes *Juncus* spp. and ferns, including adders tongue fern *Ophioglossum vulgatum*. The areas of open water support the nationally rare brackish water crowfoot *Ranunculus baudonii* and is fringed by both the common reed *Phragmites australis* and marsh-mallow *Althaea officinalis*. Notable plants occur in the Gibraltar Point dune systems such as sea holly *Eryngium maritimum*, sea bind weed *Calystegia soldanella* and sea campion *Silene maritima*.

The boundary of the Gibraltar Point (Wash Phase 2) proposed Ramsar site follows the SSSI boundary in the south but excludes the Seacroft golf course, a small area of land to the south of the golf course and the foreshore area north of the National Nature Reserve boundary (Seafront of Skegness). The seaward boundary follows the mean low water mark.

The site qualifies under Criterion 1a of the Ramsar Convention by being a good representative example of a near natural wetland characteristic of the biogeographical region.

The site also qualifies under Criterion 2a by supporting an appreciable assemblage and number of rare wetland invertebrate species. Gibraltar Point is an important habitat for a number of Red Data Book invertebrates, four of which are listed as vulnerable including the micro moth *Gymnacyla canella* and a fungus gnat *Rhymosia connexa* and eight species listed as rare, including the marsh moth *Athetis pallustris* and the scarce pug *Eupithecia extensaria*. Gibraltar Point supports a notable number of dragonfly species with up to 13 being recorded notably the large hawkler *Brachytron pratense* and large blue-green hawkler *Anax imperator*.

It also qualifies under Criteria 3a by regularly supporting over 20,000 waterfowl with an average peak count of over 70,000 birds recorded in the five year winter period 1987 to 1991.

Gibraltar Point also qualifies under Criterion 3c by regularly supporting internationally important wintering populations of the following three species of migratory waterfowl (average peak counts for the 5 year winter period between 1987 to 1991): 1,140 sanderling *Calidris alba* (4.0% of the Western European population and 8.2% of the British), 8,800 bar-tailed godwit *Limosa lapponica* (7.2% of the East Atlantic Flyway population, 14.4% of British) and 3,100 dark-bellied brent geese *Branta bernicla bernicla* (1.8% of the North West European population, 3.4% of British). It also supports a nationally important breeding population of little terns *Sterna albifrons* with a total of 40 pairs in 1992 being 1.7% of the British breeding population.

Ramsar Citation (Montreaux 1990 Criteria)
DMC August 1992.

APPENDIX C
NATURE CONSERVATION CITATIONS

EC Directive 79/409 on the Conservation of Wild Birds
Special Protection Area

Gibraltar Point, (Wash Phase 2)

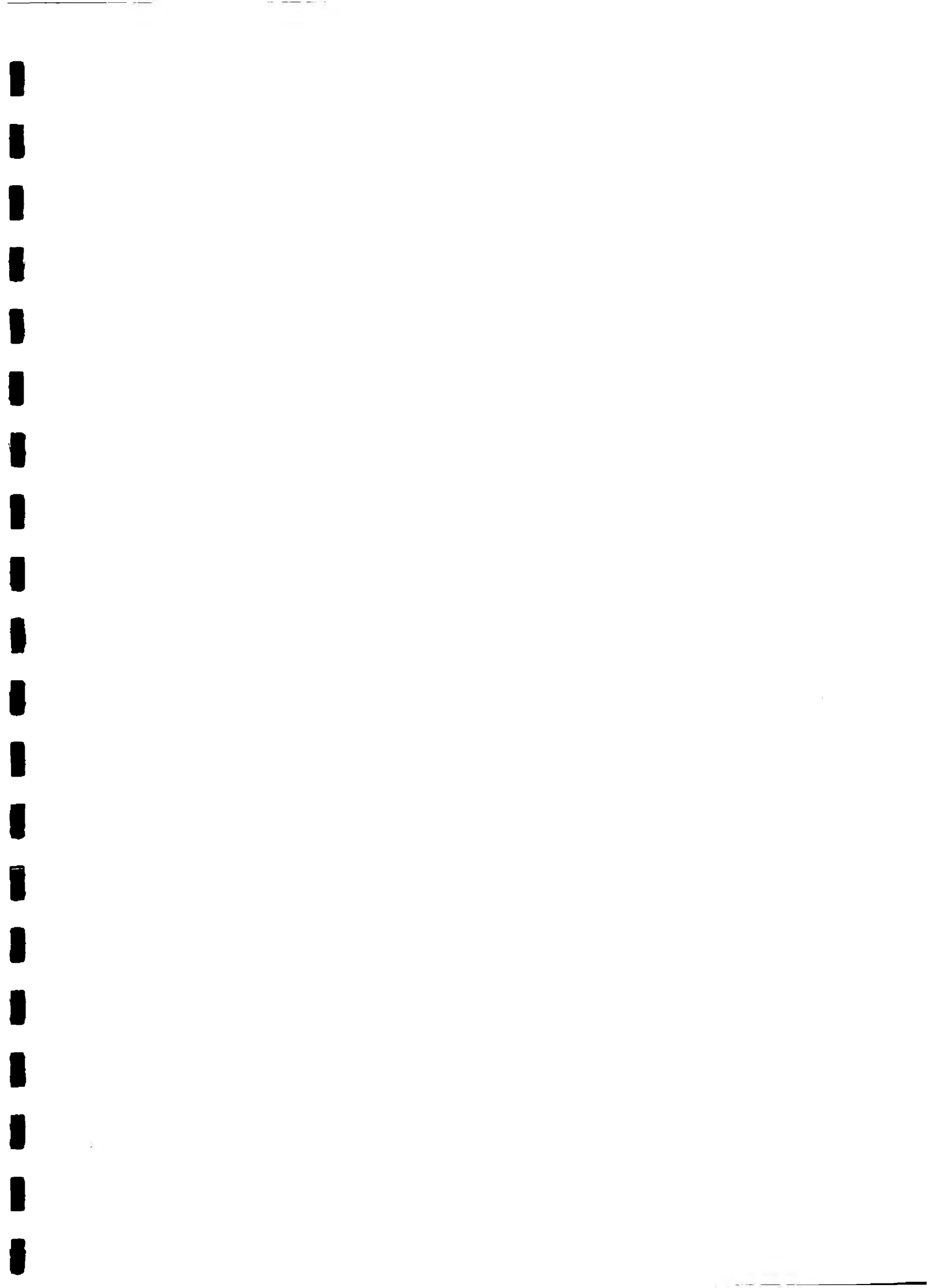
Gibraltar Point is an actively accreting dune system which forms extensive sand dunes on the Lincolnshire coast. Dune ridges representing all stages of dune development have formed roughly parallel to the coast and between these are salt marshes. The older dunes are extensively colonised by scrub particularly sea buckthorn *Hippophae rhamnoides*. There are also freshwater pools, freshwater marshland and grassland, some of which is grazed. Gibraltar Point is the north-eastern most part of the Wash and is an integral part of that site.

The boundary of the Gibraltar Point (Wash Phase 2) proposed Special Protection Area follows the SSSI boundary in the south but excludes the Seacroft golf course, a small area of land to the south of the golf course and the foreshore area north of the National Nature Reserve boundary (seafront of Skegness). The seaward boundary follows the mean low water mark.

Gibraltar Point qualifies as a Special Protection Area under Article 4.1 of the EC Birds Directive by regularly supporting in summer, a nationally important breeding population of little terns *Sterna albifrons*. A total of at least 40 pairs were present during the summer of 1992 representing 1.7% of the British breeding population.

It also qualifies under Article 4.2 by regularly supporting internationally or nationally important wintering populations of the following three species of migratory waterfowl (average peak counts for the five year winter period 1987 to 1991): 8,800 bar-tailed godwit *Limosa lapponica* (over 7% of the East Atlantic flyway population and over 14% of the British population) 1,140 wintering sanderling (over 4% East Atlantic Flyway population and over 8% of the British population) and 3,980 grey plover *Pluvialis squatarola* (over 2% East Atlantic Flyway population and over 10% of the British population).

SPA Citation
DMC August 1992



COUNTY: LINCOLNSHIRE

SITE NAME: GIBRALTAR POINT

DISTRICT: EAST LINDSEY

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: East Lindsey District Council

National Grid Reference: SK 562 595

Area: 581.3 (ha) 1436.4 (ac)

Ordnance Survey Sheet: 1:50,000: 122

1:10,000: SK 55 NE, 56 SE

Date Notified (Under 1949 Act): 1951

Date of Last Revision: 1981

Date Notified (Under 1981 Act): 1988

Date of Last Revision:

Other Information The majority of the site is a National Nature Reserve and is managed by the Lincolnshire and South Humberside Trust for Nature Conservation. Part of the site is also a Local Nature Reserve. Gibraltar Point, together with the Wash, which lies adjacent, is described in 'A Nature Conservation Review'.

Description and Reasons for Notification

This is a nationally important site due to its sand dunes and other coastal habitats, and associated fauna, notably invertebrates and passage and breeding birds. Gibraltar Point is also of great importance for its coastal geomorphology.

Biology

The dune and saltmarsh habitats present at Gibraltar Point show all the stages in the colonization and stabilization of sand and mud by plants.

The seaward-most dunes have been colonized by sea-rocket Cakile maritima, prickly saltwort Salsola kali subsp kali and sand couch Elymus farctus, while further inland the dunes are more stable and are dominated by marram grass Ammophila arenaria, associated with lyme-grass Leymus arenarius, sand sedge Carex arenaria and the sand dune form of red fescue Festuca rubra. Pyramidal orchid Anacamptis pyramidalis is common on the mature lime-rich dunes which are locally dominated by sea-buckthorn Hippophae rhamnoides. Notable plants which occur in the dune system include sea-holly Eryngium maritimum, sea bindweed Galystegia soldanella and sea campion Silene maritima.

Glassworts Salicornia spp characterize the youngest saltmarsh which rapidly gives way to extensive marshes dominated by common saltmarsh grass Puccinellia maritima, sea-purslane Halimione portulacoides and common sea-lavender Limonium vulgare. The highest marshes, reached only by exceptionally high tides, support sea couch Elymus pycnanthus, sea wormwood Artemisia maritima and sea-milkwort Glaux maritima in addition to sea-heath Frankenia laevis, which is at its northern-most station in Great Britain.

Sandwiched between two arms of dunes and protected from the sea by Bulldog Bank is a fine example of freshwater marsh which is grazed by cattle. Sedges Carex spp and rushes Juncus spp are common in a rich sward which includes adder's tongue fern Ophioglossum vulgatum. Areas of open water fringed by common reed Phragmites australis with marsh-mallow Althaea officinalis support the nationally rare brackish water-crowfoot Ranunculus baudotii.

Gibraltar Point supports important communities of invertebrates, notably Lepidoptera, Diptera and Coleoptera, including 12 species which are nationally rare. The diversity of coastal habitats present supports a good variety of breeding birds such as mallard, shelduck, ringed plover, little tern, oystercatcher and redshank. Gibraltar Point is also an important site for wintering and passage waders. Numbers of oystercatcher, grey plover, knot, sanderling and bar-tailed godwit are of international significance, and the area is of national importance for its numbers of ringed plover.

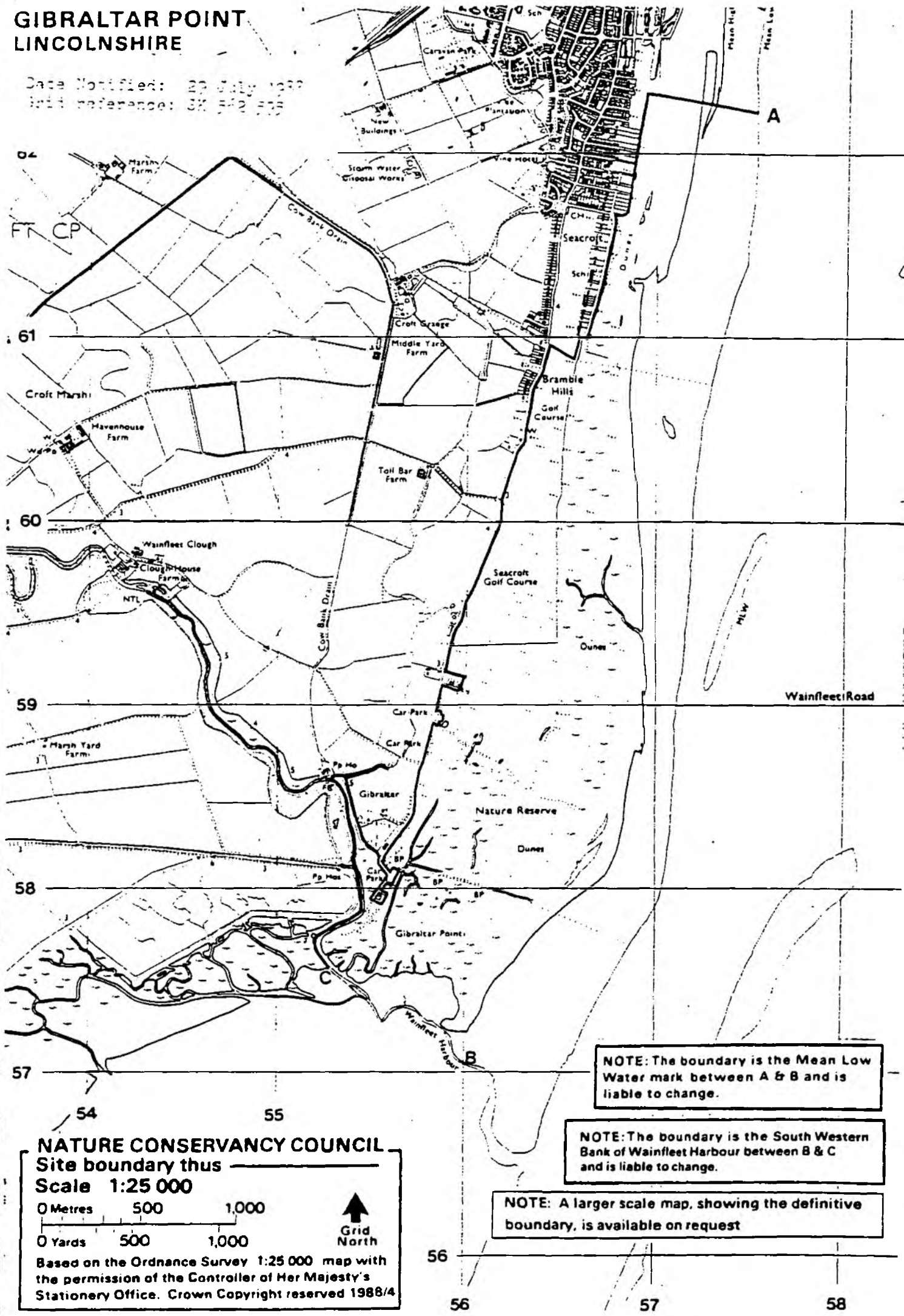
Geology

Gibraltar Point is a key site for studies of coastal geomorphology. It covers a wide range of types of coastal accretion on a low, macrotidal coast in a relatively sheltered environment. It has been studied in detail over several decades and illustrates very clearly the interaction of tidal and other coastal processes in a complex and actively developing environment. Key features include tidal sandbanks offshore, a well-developed ridge and runnel foreshore, a spit, sand dunes and saltmarshes in various stages of evolution. Gibraltar Point is particularly important for the dynamism of the coastal environment and also the relationships that can be studied over different timescales between landforms and the processes responsible for their evolution.

Nat Grid Reference: SK 562 595
Date Notified: 29 July 1988

GIBRALTAR POINT LINCOLNSHIRE


Date Notified: 29 July 1988
 Grid reference: SX 542 505




NOTE: The boundary is the Mean Low Water mark between A & B and is liable to change.

NOTE: The boundary is the South Western Bank of Wainfleet Harbour between B & C and is liable to change.

NOTE: A larger scale map, showing the definitive boundary, is available on request

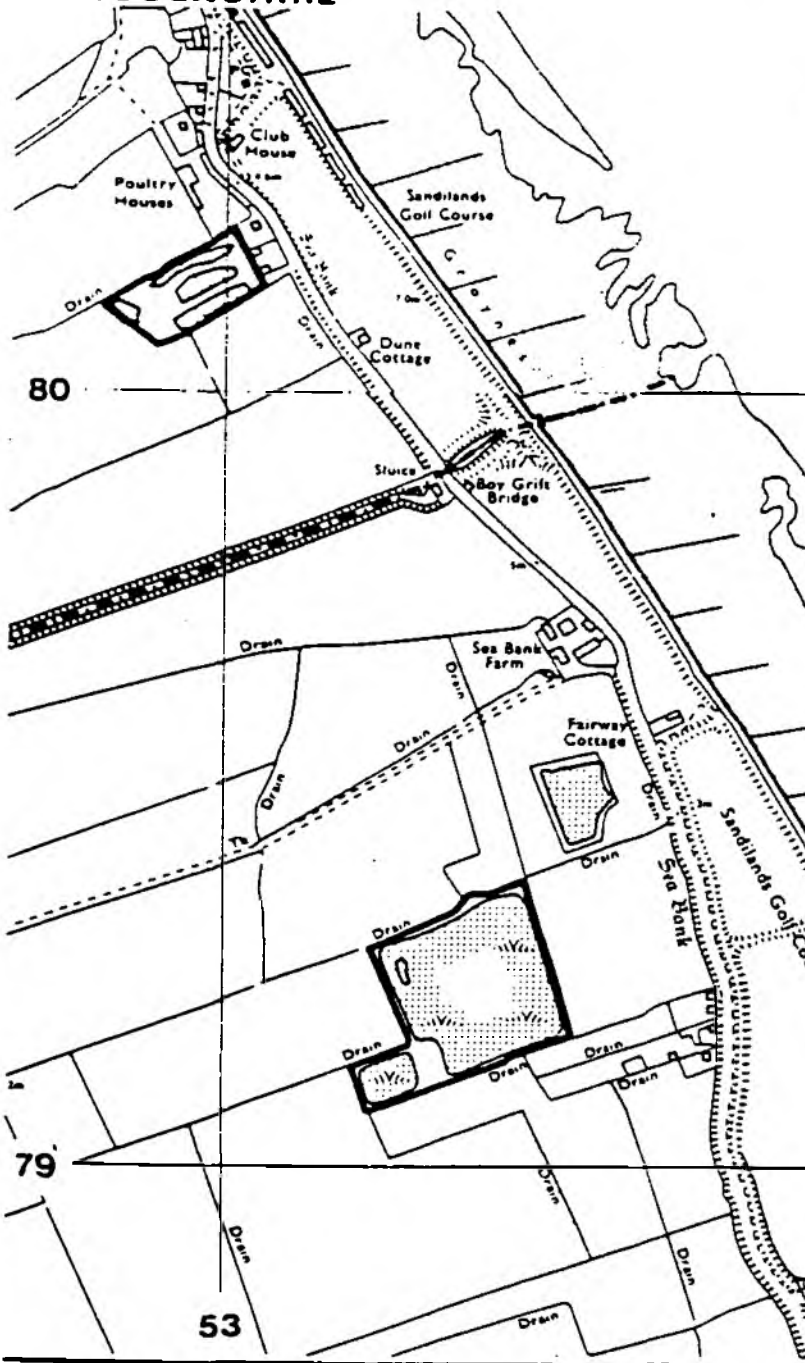
NATURE CONSERVANCY COUNCIL
 Site boundary thus 
 Scale 1:25 000

0 Metres 500 1,000
 0 Yards 500 1,000

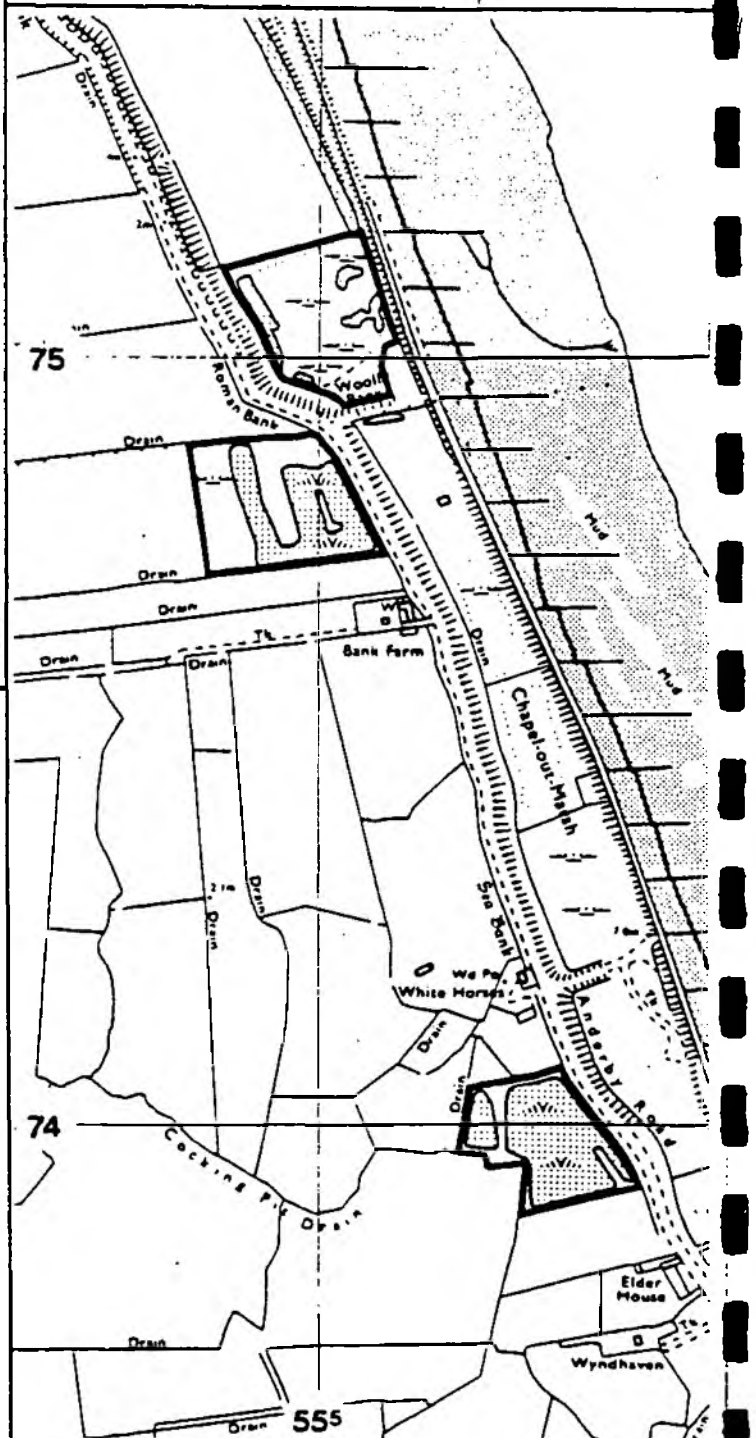
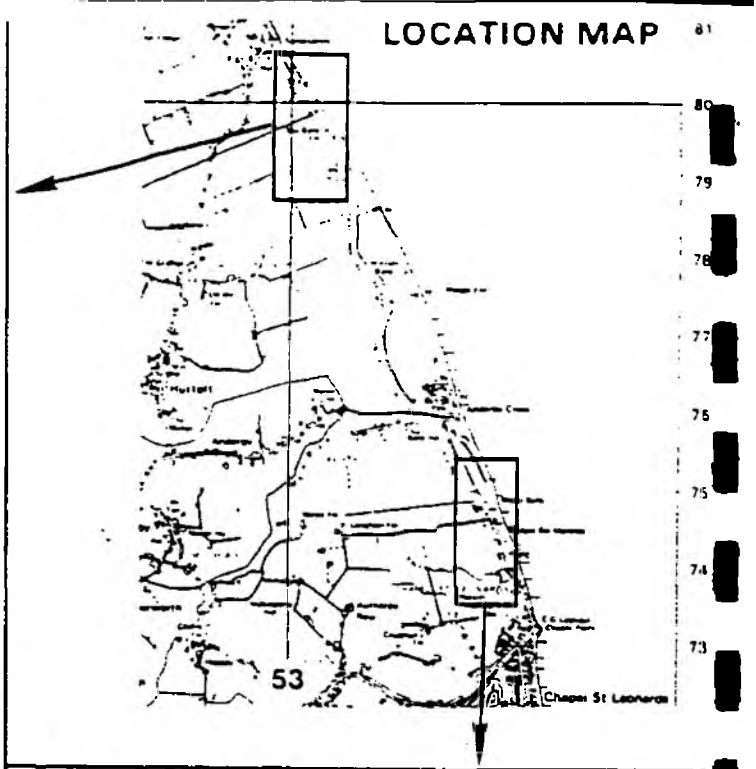
 Grid North

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SEA BANK CLAY PITS LINCOLNSHIRE



LOCATION MAP



NATURE CONSERVANCY COUNCIL

Site boundary thus

Scale 1:10 000

0 Metres 600

0 Yards 600

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COUNTY: LINCOLNSHIRE

SITE NAME: SEA BANK CLAY PITS

DISTRICT: EAST LINDSEY

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: East Lindsey District Council

National Grid Reference: TF 558 740 Area: 16.8 (ha) 41.5 (ac)
TF 555 748
TF 556 750
TF 533 793
TF 530 802

Ordnance Survey Sheet: 1:50,000: 122 1:10,000: TF 57 SE, TF 57 NW
& TF 58 SW

Date Notified (Under 1949 Act): 1959 Date of Last Revision: 1968

Date Notified (Under 1981 Act): 1987 Date of Last Revision: -

Other Information: The pits are either owned or leased as nature reserves by the Lincolnshire & South Humberside Trust for Nature Conservation

Description and Reasons for Notification

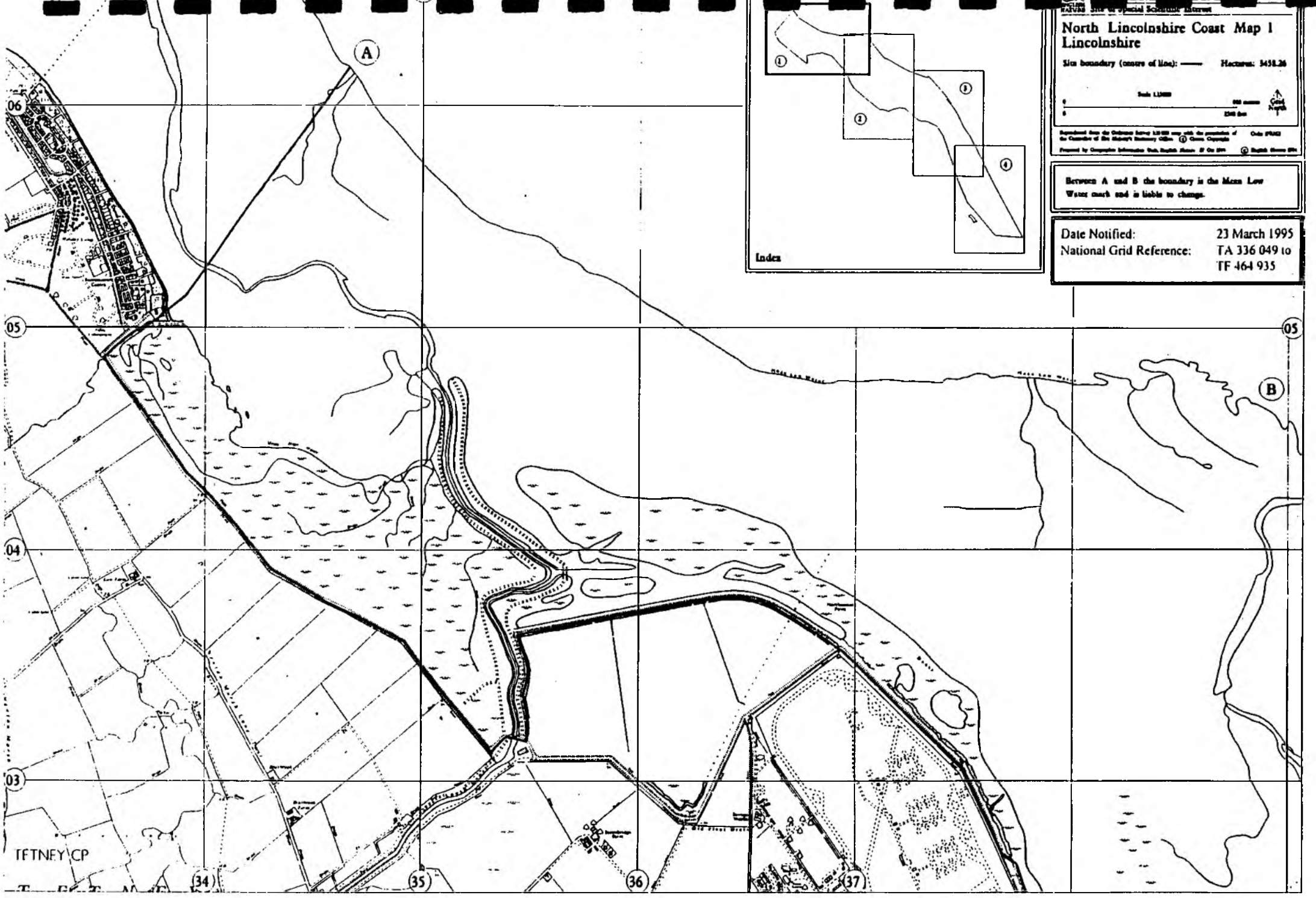
The Sea Bank Clay Pits comprise a series of isolated flooded clay workings of varying size, depth and topography which now support uncommon aquatic plant communities characteristic of the slightly brackish, eutrophic (nutrient-rich) water in addition to extensive reedbeds and a rich marginal wetland flora. The pits were excavated in 1953 to provide material for the repair of the sea wall between Mablethorpe and Chapel St Leonards on the Lincolnshire Coast. The pits are also important for breeding, wintering and passage birds. They are known to support a rich aquatic invertebrate fauna, notably beetles, including several nationally scarce species and others new to the County.

The water plant communities of the pits are characterised by fennel pondweed Potamogeton pectinatus, lesser pondweed P. pusillus, horned pondweed Zannichellia palustris, spiked water-milfoil Myriophyllum spicatum, algae of the genus Enteromorpha and two nationally scarce species: brackish water crowfoot Ranunculus baudotii and soft hornwort Ceratophyllum submersum. Superimposed upon this basic suite of species are variations such as the local dominance of Canadian waterweed Elodea canadensis and the moss Fontinalis antipyretica. In addition there is abundant amphibious bistort Polygonum amphibium and rigid hornwort C. demersum. Large stands of common reed Phragmites australis occur as a broad margin, especially at Huttoft. Associated with the reedbeds are sea clubrush Scirpus maritimus, branched bur-reed Sparganium erectum, reedmace Typha latifolia and false fox and greater pond sedges Carex otrubae and C. riparia.

Large colonies of common spotted orchid Dactylorhiza fuchsii occur at Wolla Bank in marshy ground. Here, the flora clearly reflects a brackish influence since wild celery Apium graveolens, sea couch Elymus pycnanthus, saltmarsh rush Juncus gerardii and sea arrowgrass Triglochin maritimus are present.

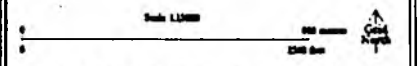
Nat Grid Reference: TF 558 740
TF 555 748
TF 556 750
TF 556 793
TF 530 802

Date Notified: 3 April 1987

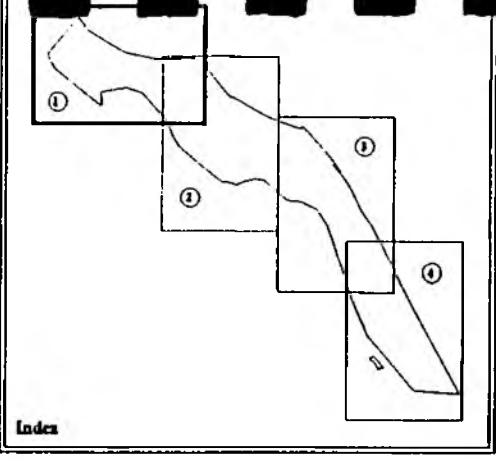


North Lincolnshire Coast Map 1 Lincolnshire

Site boundary (course of line): ——— Hectares: 3458.26



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Between A and B the boundary is the Mean Low Water mark and is liable to change.

Date Notified: 23 March 1995
 National Grid Reference: TA 336 049 to TF 464 935

IFTNEY CP

COUNTY: LINCOLNSHIRE

SITE NAME: NORTH LINCOLNSHIRE COAST

DISTRICT: EAST LINDSEY

STATUS: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: EAST LINDSEY DISTRICT COUNCIL

National Grid Reference: TA 336 049 to TF 464 935 (centre point: TA 430 000)

Area: 3458.26 (ha) 8541.90 (ac)

Ordnance Survey Sheet: 1:50,000: 113 1:10,000: TA 30 NE, NW, SE, SW
TA 40 SW
TF 49 NE, NW, SE, SW

Date Notified (under 1949 Act): 1981

Date of Last Revision:

Date Notified (under 1981 Act): 1985

Date of Last Revision: 23 March 1995

Other Information: The site is listed in a 'Nature Conservation Review'. An area at Tetney is leased and managed as a reserve by the RSPB. An area at Donna Nook is licensed by the Ministry of Defence to the Lincolnshire Trust for Nature Conservation, as a nature reserve, and a second area at Donna Nook is leased by the County Council to the Lincolnshire Trust for Nature Conservation as a nature reserve. The site has been extended to include an area of mature, inland dunes. Additionally, the site has recently been recognised as being important for research into the processes of coastal development due to the rapid accretion of saltmarsh and dunes.

Reasons for Notification

An extensive area of intertidal sand, shingle bars and mudflats backed by mature and developing saltmarsh and low dunes with marshy slacks and brackish pools. A detached remnant of the original ancient sand dune ridge occurs inland. The site is of considerable ornithological interest and holds Britain's most south-easterly breeding grey seal colony.

The pioneer saltmarsh, dominated by glasswort *Salicornia* species, grades to lower and middle marsh areas characterised by common saltmarsh grass *Puccinellia maritima*, sea aster *Aster tripolium* and sea purslane *Halimione portulacoides*. The botanically diverse upper marsh supports sea lavender *Limonium vulgare*, thrift *Armeria maritima* and the uncommon long-bracted sedge *Carex extensa*. Saline lagoons at Humberstone Fitties exhibit a high diversity of brackish water species including marsh samphire *Salicornia* species and tassel pondweed *Ruppia maritima*.

The more mature lime rich dunes have a varied flora including the pyramidal orchid *Anacamptis pyramidalis*, yellow-wort *Blackstonia perfoliata*, common centaury *Centaureum erythraea* and lady's bedstraw *Galium verum* with lesser meadow rue *Thalictrum minus* and rue-leaved saxifrage *Saxifraga tridactylites* on the oldest dunes. The dune slacks are characterised by reedbeds and support marsh orchids *Dactylorhiza* species. Old borrow pits are colonised by sea club rush *Scirpus maritimus* and brackish water crowfoot *Ranunculus baudonii*. Lepidoptera in the dunes include two uncommon moths, crescent striped *Apamea oblonga* and starwort shark *Cucullia asteris*.

The breeding colonies of little terns are of national importance. The site is host to over 134 wintering bird species including internationally significant populations of knot, grey plover, bar-tailed godwit, turnstone, sanderling, shelduck and dark breasted brent geese.

COUNTY: LINCOLNSHIRE

SITE NAME: SALTFLEETBY-TREDDLETHORPE DUNES

DISTRICT: EAST LINDSEY

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: East Lindsey District Council

National Grid Reference: TF 480 910

Area: 952.2 (ha) 2,352.8 (ac)

Ordnance Survey Sheet: 1:50,000: 122, 113

1:10,000: TF 49 SE, TF 48 NE, TF 58 NW

Date Notified (Under 1949 Act): 1951

Date of Last Revision: 1981

Date Notified (Under 1981 Act): 1988

Date of Last Revision:

Other Information: The whole of the area is managed as a Nature Reserve. The Nature Conservancy Council either own or lease most of the area, 38 hectares are managed part on a license agreement with the Ministry of Defence and part on a lease from Lincolnshire County Council by the County Trust. The site is described in "A Nature Conservation Review"

Description and Reasons for Notification

This nationally important site includes flats, dunes, salt and freshwater marsh which together support an exceptionally rich flora and fauna. There are outstanding assemblages of vascular plants, invertebrates and breeding birds and it is the most north-easterly breeding site in Britain for the Natterjack Toad. The rapid accretion of dunes and saltmarsh make this an important site for research into the processes of coastal development.

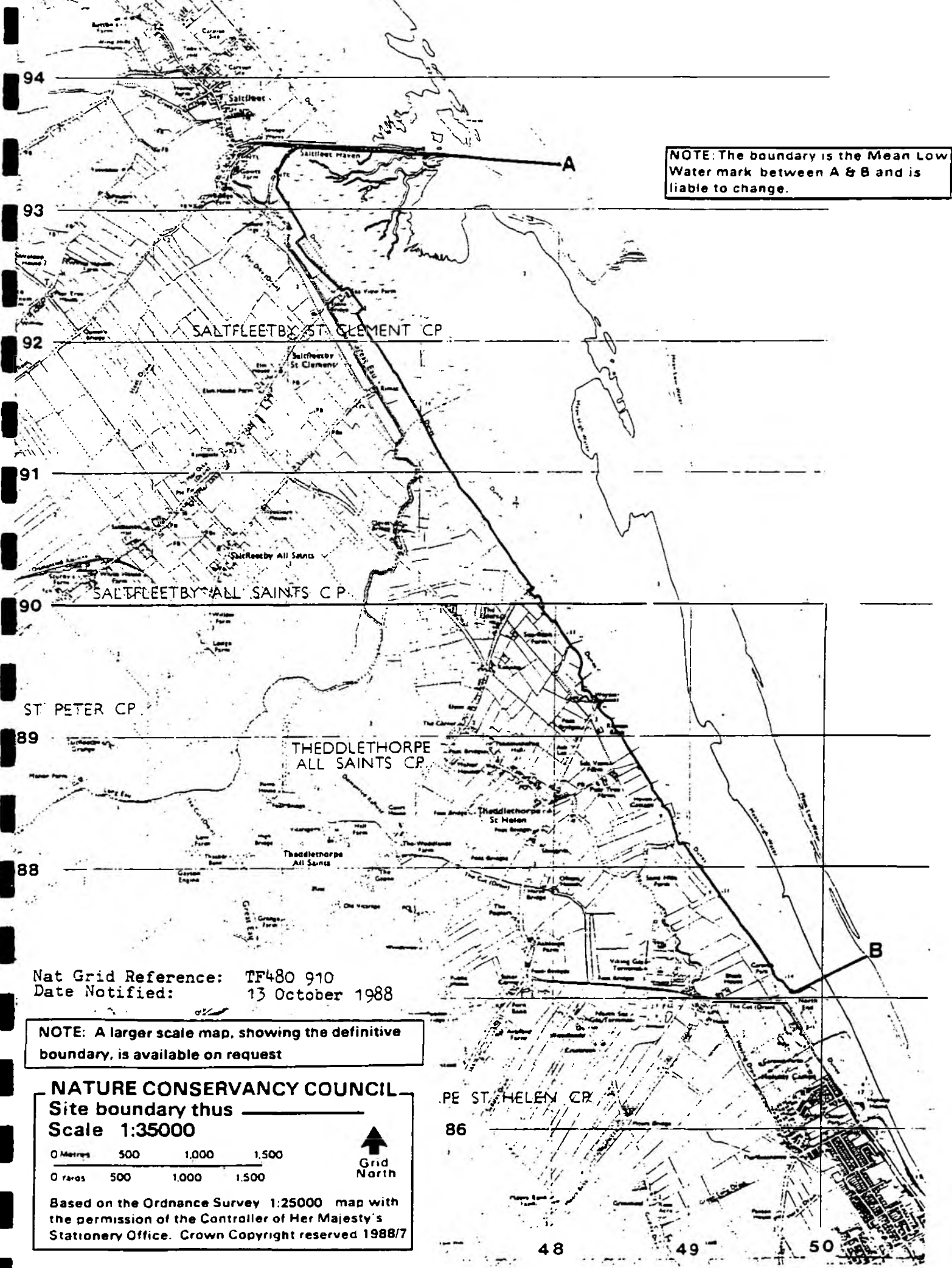
The intertidal sands and muds provide extensive feeding and roosting grounds for wildfowl and waders including brent geese, shelduck and dunlin. A succession of saltmarsh communities is dominated in turn by glasswort Salicornia spp, sea lavender Limonium vulgare associated with sea plantain Plantago maritima and thrift Armeria maritima, sea purslane Halimione portulacoides and common saltmarsh grass Puccinellia maritima. Sea rush Juncus maritimus and sea clubrush Scirpus maritimus are frequent where salt water inundates the landward edge. Distant sedge Carex distans and long-bracted sedge C. extensa are abundant here. Yellow wagtails breed on the saltmarsh and there is a small colony of little tern on the shingle bank.

The freshwater marsh and dune slacks have rich fen communities dominated by greater pond sedge Carex riparia and water dock Rumex hydrolapathum with gypsywort Lycoopus europaeus and skullcap Scutellaria galericulata. Rarer plants like needle spike rush Eleocharis acicularis, divided sedge Carex divisa, marsh pea Lathyrus palustris and greater water-parsnip Sium latifolium are found in these habitats which are also the breeding grounds for natterjack toad Bufo calamita and commoner amphibians. Ten species of dragonfly breed in the open water provided by ponds and dykes. Breeding birds include water rail, snipe, and reed, grasshopper and sedge warblers.

At the interface between freshwater marsh and dunes, southern and early marsh orchids Dactylorhiza praetermissa and D. incarnata are found in abundance. The diverse flora of the mature lime-rich dunes include pyramidal and bee orchids Anacamptis pyramidalis and Ophrys apifera, and lesser meadow rue Thalictrum minus. In the absence of grazing the dunes become dominated by scrub of sea buckthorn Hippophae rhamnoides, hawthorn Crataegus monogyna, wild privet Ligustrum vulgare and elder Sambucus nigra, all frequented by migrant birds.

Invertebrates recorded include several notable moths and nationally rare species from the moth and beetle families. There are outstanding breeding densities of birds in the dune scrub, with whitethroat a major constituent. Also present are lesser whitethroat and long-eared owl. The oldest areas of scrub now contain breeding blackcap, garden warbler and nightingale.

SALT FLEET OF THEDDLETHORPE LONDON
LINCOLNSHIRE LEET HAVEN CP



NOTE: The boundary is the Mean Low Water mark between A & B and is liable to change.

SALT FLEETBY ST CLEMENT CP

SALT FLEETBY ALL SAINTS CP

ST PETER CP

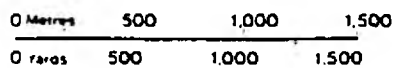
THEDDLETHORPE ALL SAINTS CP

PE ST HELEN CP

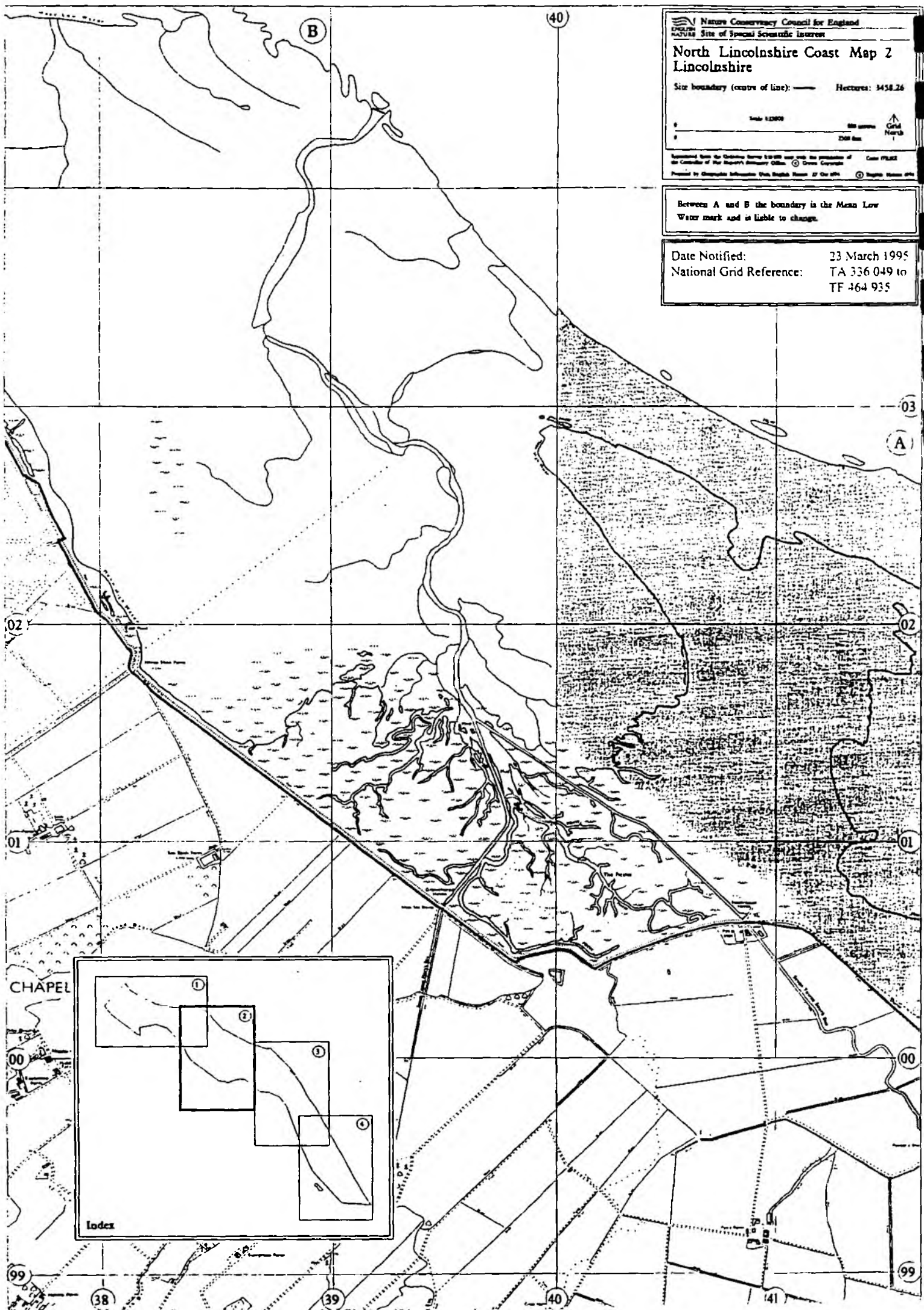
Nat Grid Reference: TF480 910
 Date Notified: 13 October 1988

NOTE: A larger scale map, showing the definitive boundary, is available on request

NATURE CONSERVANCY COUNCIL
 Site boundary thus 
 Scale 1:35000



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Nature Conservancy Council for England
 English Nature
 Site of Special Scientific Interest

North Lincolnshire Coast Map 2 Lincolnshire

Site boundary (centre of line): ——— Hectares: 3458.26

Scale 1:25000

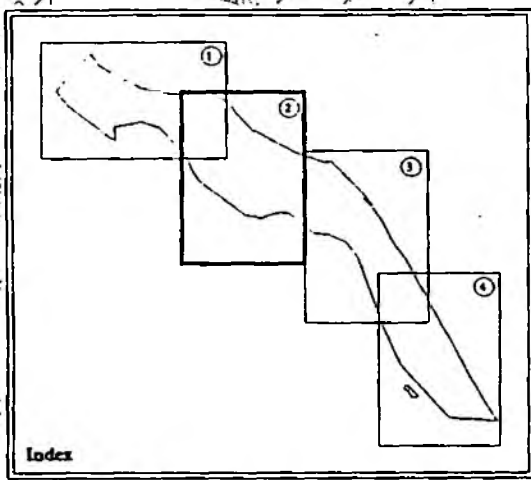
500 metres
 2500 feet

Grid North

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Between A and B the boundary is the Mean Low Water mark and is liable to change.

Date Notified: 23 March 1995
 National Grid Reference: TA 336 049 to TF 464 935



Nature Conservancy Council for England
 ENGLAND
 NATURAL Site of Special Scientific Interest

North Lincolnshire Coast Map 3 Lincolnshire

Site boundary (centre of line): ——— Hectares: 3458.26

Scale 1:25000

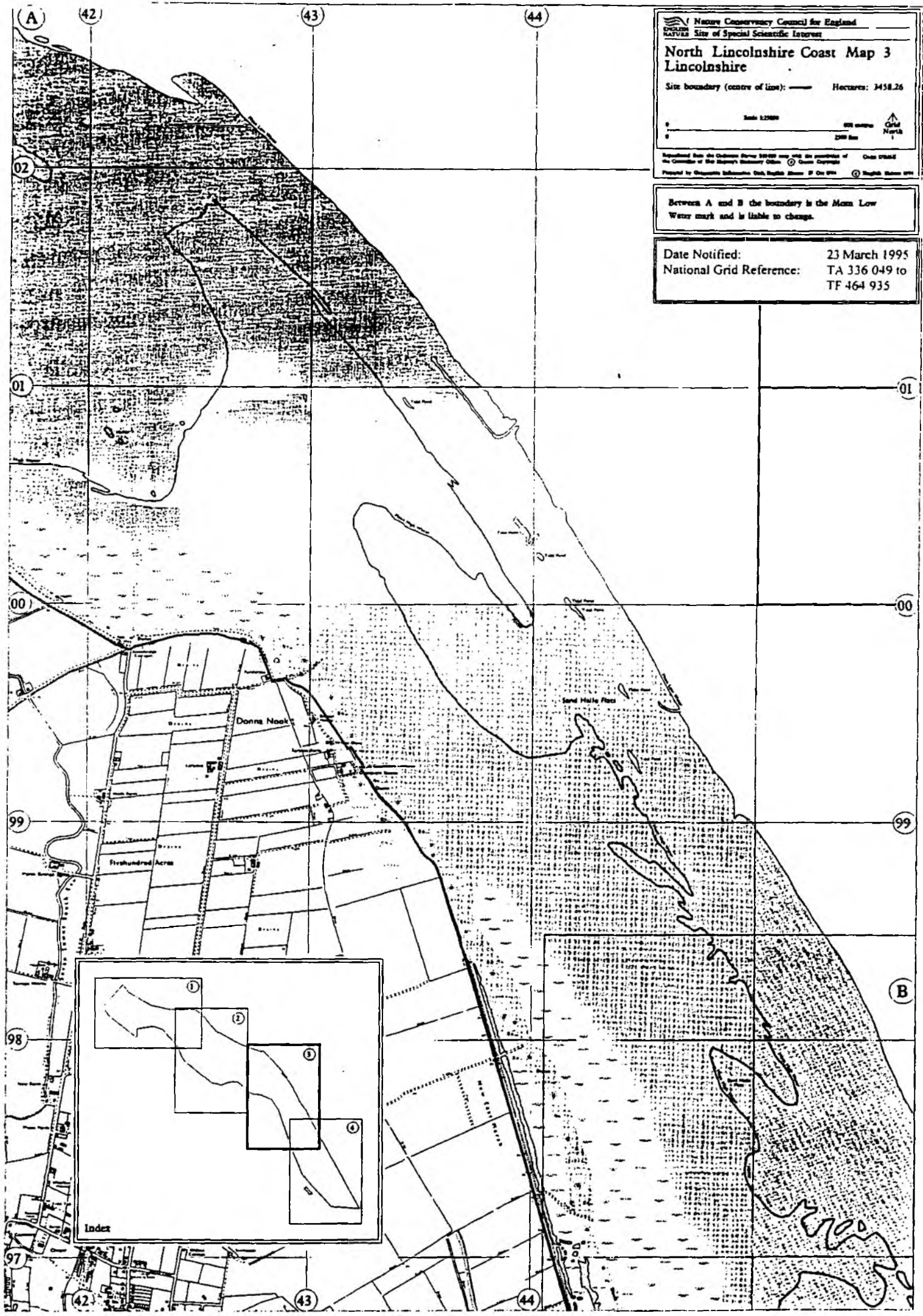
0 250 metres 0 250 feet

Grid North

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OS/DA/NI
 Natural Site of Special Scientific Interest
**North Lincolnshire Coast Map 4
 Lincolnshire**
 Site boundary (centre of line): ———— Elevation: MSL+2.6
 Scale 1:25000
 100 metres
 2000 feet
 Grid
 North
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