

LINCSHORE '97



A STRATEGY FOR THE LINCOLNSHIRE COAST



NRA

*National Rivers Authority
Anglian Region*

INTRODUCTION

The Lincolnshire coast is one of the most exposed and vulnerable shorelines in Britain. Heavy seas, violent storms and massive tidal surges have fashioned its dependence upon its sea defences.

More than 35,000 people live behind the 24 kms of defences between Skegness and Mablethorpe. The defences protect 20,000 hectares of low lying land including more than 15,500 residential properties and 18,000 residential caravans as well as extensive agricultural, commercial, industrial and service related activities.

In 1953 the defences were breached in several places and 41 people died. Widespread flooding caused extensive damage and affected thousands of people.

THE DEFENCES

Before 1953 the defences consisted of revetments of various types, concrete slab or stepwork structures complete with seawalls. Many were severely damaged in the 1953 East Coast floods.

Rebuilding started immediately after the 1953 event and has continued ever since. Over the intervening years many of the earlier structures have required repair and rebuilding and the opportunity has been taken to upgrade the standard of defences where it could be justified. As a result of constant works there are a wide variety of different types of defences along the coast.

THE STUDY

Storm surges in 1976, 1978 and 1983, together with the continuing deterioration of the beach and foreshore reinforced the need to carry out a comprehensive and detailed review of the future development of the area's sea defences.

The National Rivers Authority was formed in 1989 and the following year its Anglian Region commissioned consultants to carry out a strategic study of the coast between Mablethorpe and Skegness.



THE COASTLINE

The coastline is exposed to severe wave action originating in the North Sea. Concrete seawalls in some instances backed by sand dunes provide defences over 19 kms. On the remainder of the coast the primary defences are revetted dunes. About 280 timber groynes of varying length and condition are located along the central 24 kms of the coast.

The foreshore in front of the defences comprises a thin layer of sand on top of clay. At times, due to wave action, the sand cover is removed and the clay underneath is exposed and eroded.

Of particular environmental importance to the area are :

- Gibraltar Point which lies at the southern limit of the coastline. A Site of Special Scientific Interest and one of Europe's most important nature reserves in terms of bird populations it provides a range of habitats which are unique in Great Britain. Internationally important populations of breeding and over wintering birds are dependent on mudflats and saltings in the area;
- Tourism which plays a major part in the economy of the region with large numbers of seasonal visitors and static residential caravans.

THE BEACHES

North of Mablethorpe the beaches are wide and shallow and consist of a thick layer of fine sand backed by dunes. These beaches are showing a long term tendency to accumulate sand.

The central section - Mablethorpe to Skegness - has narrow, relatively steep beaches with little sand cover over the clay. The beach material varies in thickness and particle size from a thin layer of coarse gravel after a storm to fine sand in the summer.

The southern section - Skegness to Gibraltar Point - is a wide shallow beach system with abundant fine sand which is gradually increasing.

THE STUDY FINDINGS

The main findings of the study were:

- the majority of the beaches in the central area are narrow, steep and lack beach material;
- the potential movement of sand southwards along the coast is considerable;
- there is a long term erosion of clay in some places which is likely to increase;
- wave attack on the defences will increase due to lowering of beaches and sea level rise;
- many of the existing defences will need rebuilding within 10 years;
- there is a high risk of many defences failing due to seawater and spray coming over the top of them.

THE OPTIONS

Armed with the findings of the investigation, the NRA examined a wide range of options, either singly or in various combinations, including:

- **Seawall reconstruction.** A 'continue as you are' approach. This is a well established and cost effective option and was one which strongly influenced the development of the other strategies.
- **Beach nourishment.** Effectively rebuilding beaches. This 'soft' engineering solution was first studied as an overall strategy in its own right and also in conjunction with other options such as rock groynes and/or offshore breakwaters.
- **Rock groynes.** The introduction of such major structures would lead to significant and adverse changes in local rates of erosion and accumulation of material because of the limited amount of material available at present. They could not be considered suitable without the inclusion of major beach nourishment measures. Because of severe wave action on the coast they would have to be extremely substantial structures.
- **Offshore breakwaters/reef.** The comments on rock groynes would also apply to this option.
- **Headlands.** The use of artificial headland type structures on a coast whose behaviour is already influenced by massive concrete seawalls prevents this option operating effectively except in conjunction with beach nourishment.



THE BEST SOLUTION

Having looked in detail at the engineering, environmental and financial issues involved in each of the options the NRA chose BEACH NOURISHMENT as the most suitable solution. This involves rebuilding beaches by pumping ashore imported sand to raise their level which will help them to better absorb the power and action of the waves. At present during high tides, the sea reaches about 75% of the defences. After beach nourishment similar tides would not reach any of the defences. Some of the existing defences along the coast will also need repairing as part of the overall project.

Beach nourishment schemes already exist in the Anglian region on the Norfolk coast between Snettisham and Hunstanton and at Clacton in Essex.

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The NRA aims to start beach nourishment in 1993 and complete it in 1997. In future there will be a continuing need to monitor what is happening to the beaches and to carry out further nourishment work to maintain them as the main defence system. The monitoring will be integrated with regional monitoring programmes and beach management plans. The initial cost of the scheme is estimated at £45 million.

The National Rivers Authority

Guardians of the Water Environment

The National Rivers Authority is responsible for a wide range of regulatory and statutory duties connected with the water environment.

Created in 1989 under the Water Act it comprises a national policy body coordinating the activities of 10 regional groups each one mirroring an area served by a former regional water authority.

The main functions of the NRA are:

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| Water resources | — The planning of resources to meet the water needs of the country; licensing companies, organisations and individuals to abstract water and monitoring the licences. |
| Environmental quality and Pollution Control | — maintaining and improving water quality in rivers, estuaries and coastal seas; granting consents for discharges to the water environment; monitoring water quality; pollution control. |
| Flood defence | — the general supervision of flood defences; the carrying out of works on main rivers and sea defences. |
| Fisheries | — the maintenance, improvement and development of fisheries in inland waters including licensing, re-stocking and enforcement functions. |
| Conservation | — furthering the conservation of the water environment and protecting its amenity. |
| Navigation and Recreation | — navigation responsibilities in three regions — Anglian, Southern and Thames and the provision and maintenance of recreational facilities on rivers and waters under its control. |

ENVIRONMENT AGENCY



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