

NORTH NORFOLK COAST – MANAGEMENT ISSUES

In common with other stretches of coastline, both in the UK and elsewhere in the world, the North Norfolk coastline is under threat:

- increasing sea level, associated with climate change, is leading to the flooding of low-lying areas
- coastal erosion is threatening property, farmland and wildlife habitats (this natural process often being aggravated by coastal defence strategies elsewhere and by offshore dredging for marine aggregates)
- urbanisation, pollution, tourism and port development are all destroying the natural environment.

This article will examine these threats and look at the coastal management schemes being used to find solutions to the wide-ranging problems experienced along this important stretch of coastline.

Why is the North Norfolk coastline so important?

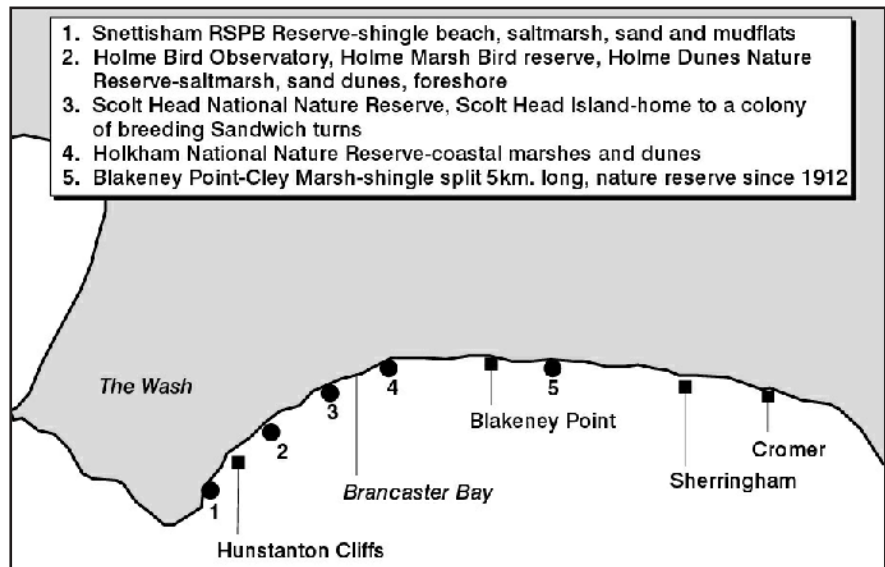
Virtually the entire North Norfolk coast is designated under either domestic or international legislation as Sites of Special Scientific Interest (SSSI), Areas of Outstanding Natural Beauty (AONB), Special Protection Area or as a Biosphere Reserve. In addition, including the Wash, it is a Special Area of Conservation.

Apart from the large areas devoted to residential and recreational land uses, much of the North Norfolk coast contains important wildlife habitats and AONBs.

The threat of rising sea levels

Latest figures suggest that global sea levels could rise by an average of up to 1m over the next 100 years, due to climate change. In 1995 the Intergovernmental Panel on Climate Change (IPCC – the official scientific body assigned to investigate climate change and made up of over 2000 of the world's leading climate and social scientists) delivered a decisive verdict on climate change. They had come to the conclusion that 'the balance of

Figure 1: Natural habitats under threat in North Norfolk



evidence suggests a discernible human influence on global climate'. Even if greenhouse gas emissions were stabilised immediately, sea level rise linked to global warming would continue, as there is a time lag of about 50 years between emissions into the atmosphere and the corresponding response from the oceans.

In 1996 the Department of the Environment published a comprehensive assessment of the potential impacts in the UK of sea level rise due to climate change in a report from its Climate Change Impact Review Group (CCIRG). North Norfolk is one of the UK's most vulnerable areas, along with Suffolk, Teesside, the South West and coastal Lancashire. Whilst most commercial and residential property is likely to be protected by a variety of sea defence measures, some of our most valuable coastal wildlife habitats and natural features may be lost for ever. Most at risk are the salt marshes and mudflats, home to a wide variety of migratory birds and containing many SSSIs.

Loss of habitats from rising sea levels is known as 'coastal squeeze'. Especially at risk are shingle beaches and sand dunes; the salinisation of wetlands will cause rapid changes in their ecosystems. Most concern is currently focused on those habitats

that support millions of migratory waders and wildfowl. More than 2.5 million wildfowl currently overwinter in the UK, mostly on inter-tidal flats and salt marshes. The North Norfolk coast is one of these important areas in the UK. Yet at several points along the coast, these habitats back onto urban areas or higher relief and will be unable to retreat naturally as sea level rises.

The major losses will be of freshwater grazing marsh and reedbeds, amounting to 588 hectares, mainly at Titchwell and Cley-Salthouse. Titchwell is the RSPB's most visited reserve and Cley, a reserve owned by the Norfolk Wildlife Trust, attracts 100,000 human visitors per year. Both are threatened by flooding and erosion. In February 1996 a severe storm broke through the shingle bank at Cley Marshes, inundating marshes and reedbeds with saltwater. Damage was costed at £500,000 and the trust immediately launched an appeal to fund repair work at the site. Cley is protected under international legislation as a Special Protection Area under the Birds Directive and as such there is a general obligation to protect the reserve. Figure 1 shows the variety of natural habitats under threat in North Norfolk.

Many people live and work in this area of the UK and must cope with the increasing threats of floods and

Figure 2: Typical Norfolk scenery which could be lost to flooding



Source: Corel (NT)

Figure 3: Inadequate protection for North Norfolk residents? Extracts from *Coast and Sea (Eastern Counties Newspaper Group Ltd)*

- 1998 – a crumbling shingle sea defence at Weybourne, near Sheringham, is to be abandoned because it is too expensive to maintain at £10,000 a year.
- 1997 – a survey has shown that plans to improve sea defences between Hunstanton South Beach and Snettisham are below standard and would only last 3–5 years before maintenance work was needed. The plan involves improving hard concrete defences, providing concrete revetment to strengthen some shingle ridges, beach nourishment and the recycling of beach material.
- 1997 – central government is to pay North Norfolk Council £80,000 of the £115,000 bill for a mop-up of storms which smashed through Salthouse and Happisburgh in February 1996.

erosion. The cliffs in Happisburgh are eroding faster than ever before. Homes and businesses along the coastline have already been lost and local residents fear their homes may be next. Diana Wrightson, the owner of a Happisburgh teasop said: 'We could lose our home, our business and everything we've got, and have to draw on our savings and go into rented accommodation. That would be the end for us, really.'

Also associated with climate change and posing a considerable threat to coasts such as North Norfolk is the likely increase in frequency and severity of storms and storm surges, which will not only add to the flood risk but will also increase coastal erosion in susceptible areas. In the CCIRG scenario, for example, there is

a 30% increase in the frequency of gales in the UK by 2050. North Norfolk will be particularly at risk (Figure 2).

Coastal erosion and coastal defences

Flood defences that should last 50 years are already letting in seawater. Brian Farrow of the North Norfolk District Council said: 'The best information we have at the moment is that in the next 50–60 years the sea levels will rise by about six centimetres so we will take that into account in our planning.' If defences between Happisburgh and Winterton were breached, 6,000 hectares of low-lying land could be flooded, turning farmland into saltmarsh. Whilst there are defences in place, these are not always adequate, as Figure 3 shows.

Often the threat of erosion is so great and the defences so inadequate that people are forced to abandon their property. At Hemsby, for example, people have lost bungalows to the sea; at Overstrand, coastal roads have crumbled into the sea as cliffs cut inland; and in Happisburgh, houses are now perched precariously on soft, eroding cliff tops.

Much coastal erosion is actually the direct result of efforts to defend against sea level rise. Coasts are mobile, dynamic systems which may be eroding, accreting or stable, but in the UK the policy has been to stabilise many areas of coast with defences to ensure that people and property are protected. This affects some 33% of the UK coastline, where some 700,000 hectares of agricultural, industrial and residential land below the 5-metre contour are protected. However, the construction of a small section of defence can have disastrous effects further along a coast. In addition, construction of a sea wall, while protecting the land behind it, may accelerate the erosion of the beach in front of it. When defences are strengthened in one area of the coast, it may become necessary to also strengthen those further along the coast, because of interruptions to sediment flow.

Despite the evidence of these knock-on effects, the Environment Agency has recently spent £18.5 million on a controversial scheme to build offshore reefs at Sea Palling in Norfolk, to protect the Broads from future flooding. The final cost is

likely to be £54 million, with 75% met through government funding. Three workers died during construction, and the reefs now represent a danger to tourists because they can be reached at low tide. There are also real concerns that these defences will merely increase erosion further down the coast. (See later section on Sea Palling for more detail.)

Erosion is also exacerbated by offshore dredging of marine aggregates, which are used for road building and the construction industry. For example, for every kilometre of motorway, 100,000 tonnes of aggregate are needed. The full impact of offshore dredging is still not known, but it does seem to lead to the loss of material needed for beach building. Yet in addition to providing building aggregate, it is being used to rebuild eroding beaches. Sand has been taken off the Norfolk coast to replace losses at Skegness and Mablethorpe. This may encourage erosion further down the coast. It is also thought that dredging can damage and destroy coastal fisheries and spawning grounds, with clear knock-on effects for those who live on the coast and depend on fishing for their livelihood. Although offshore sand and gravel is a finite resource, so far there has been little attempt to use it in a more sustainable way.

Other human activities – tourism

British people took 18.5 million seaside holidays in England in 1994, and the North Norfolk coast in 1993 received 2.9 million visits, generating an income of £425 million. Any impairment of the scenic value of the coastline could impact on this tourist revenue. As beach areas are reduced due to erosion and rising sea levels, there will be less space for each visitor. Sandy beaches may become stonier with an increase in storminess resulting from climate change, and this may also deter visitors. The scenic value of coasts is also diminished if more hard engineering defences like concrete sea walls and rock armour become necessary.

To protect or not?

Protecting human assets is costly, as are the consequences of flooding if sea defences are breached or overtopped. Residential areas will be

protected if their value is greater than the cost of any defences. However, with recreation and tourism predicted to become the world's largest economic sectors, the substantial recreational value of the North Norfolk coast cannot be ignored.

Despite the threat of future flooding, new housing continues to be built in some parts of North Norfolk, requiring the updating of existing defences and the introduction of new measures. If the flood risk becomes too great, house owners will not be able to insure their property.

Given that it is desirable to minimise interference with natural coastal processes, attempting to protect areas such as Cley in its entirety may prove to be a losing battle. Opportunities must therefore be pursued to create habitats elsewhere along the coast, or even inland, to compensate for what will be lost. However, habitat recreation is a risky business, and in practice many habitats will be difficult to recreate. Habitat loss from coastal squeeze could be reduced if more ecologically sensitive policies for coastal defence and management are implemented – for example, replacing hard defences with natural ones such as dunes and saltmarsh. These coastal habitats provide natural defences by absorbing wave energy and protecting defences further inland from direct wave attack. If existing habitats are protected and new areas created, they will serve several functions:

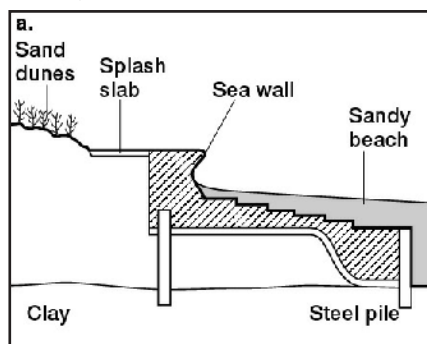
- providing a sea defence which is natural and less costly than many hard engineering schemes
- valuable wildlife refuges
- areas to attract tourist and maintain this vital economic activity.

The Agricultural Select Committee recommends a 'managed realignment' of the coastline, working with nature rather than against it. Whilst this would necessitate compensation for farmers and residents, it would also allow nature's natural defences to be restored, and prove more cost effective in the long term.

Case study – Sea Palling

The need for defence at Sea Palling was highlighted first in 1953 when many houses were washed away and

Figure 4a: The original sea wall at Sea Palling



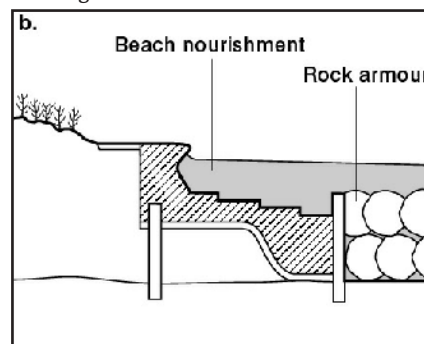
seven people died. As a result, sea walls were built, with sand dunes behind them as protection against future storms (Figure 4a). As has happened elsewhere, however, the beach lost sand and shingle, as it was unprotected from frequent northerly and easterly gales and subject to southward longshore drift. This continued unchecked, and by 1990 the steel pile foundations of the sea wall were visible, exposing the defence to wave attack and threatening the stability of the wall. The beach turned into clay mudflats and, with no windblown sand to replenish them, the dunes also began to erode due to wind action.

In 1992 150,000 tonnes of rock armour was placed at the foot of the seawall and the beach was replenished with 1.4 million cubic metres of sand (Figure 4b). In 1995 the first of four offshore reefs was completed, at a cost of £5.9 million. These were chosen because they would still allow some longshore drift and not disrupt the supply of sand to beaches lower down the coast. The effects have been dramatic, as Figure 5 shows. Tombolos have formed in the sheltered waters behind the reefs, separated by bays. Overall beach levels have been maintained, but longshore drift has been interrupted by the tombolos and there is severe erosion south east of Sea Palling. New reefs are planned, lower in height, shorter and closer together, in the hope that sand will still be transported down the coast. As with many schemes, those at Sea Palling have only served to transfer the problem elsewhere, with engineers still trying to find suitable solutions.

The final solution – shoreline management plans?

Shoreline management plans represent a co-ordinated approach, so

Figure 4b: Reinforced sea wall at Sea Palling



that the actions taken in one area do not adversely affect another. SMPs offer four general levels of response:

- hold the existing line
- advance the existing line
- retreat the line
- do nothing.

The greatest proportion of the costs of coastal defence is met by MAFF. If some of the funds available could be used for the compulsory purchase of vulnerable property, this would both compensate existing property owners and remove the need to defend certain stretches of relatively undeveloped coast. Stricter planning controls are needed to prevent new developments being built in areas likely to be eroded or flooded in the future.

SMPs alone, however, will not be sufficient unless there is a national coastal strategy which incorporates the wider issues affecting our coastlines. This national strategy might include the following elements:

- plans to reduce carbon monoxide emissions and, ultimately, the threat of rising sea levels
- a greater integration of nature conservation into SMPs, to include new habitat creation schemes
- research into the impacts of offshore marine aggregate dredging
- compensation for people whose property will be affected by SMP decisions.

Maintaining a balance between use of our coastlines and protection for both natural and man-made features is not an easy task but one towards which we must strive if the livelihoods of coastal communities are to be preserved.

Figure 5: Sea Palling offshore reefs and tombolos



Source: *GCSE Wide World*, vol. 12 no. 3 February 2001 (Philip Allan Updates). Reproduced by permission of Nick Gee.

Further Reading

Friends of the Earth (1995) *Losing Interest*, Friends of the Earth, London.

MAFF (1996) *Shoreline Management Plans. A guide for coastal defence authorities*, Ministry of Agriculture, Fisheries and Food, London.

Pos, J. D., Upton and Henry, (1996) *North Norfolk Shoreline Management Plan, Sherringham–Snettisham Scalp*, Volume 1.

FOCUS QUESTIONS

1. Explain the meaning of the following terms in relation to coastal management:

Holding the existing line	Sea Wall
Beach nourishment	Overtopping
Breakwater	Managed Retreat
Coastal Squeeze	Hard Defences

2. Using this case study and your own, list the different viewpoints concerning coastal management. Try and categorise them according to the type of defence they will necessitate. Finally, state and justify your own views.

3. Climate change threatens us all. Try and think of 5–6 different ways in which the individual can make a difference to greenhouse gas emissions. For each idea, identify problems in putting it into practice.

4. A sketch map is often a useful (and sometimes a required) method of answering an exam question. Draw the outline of the North Norfolk Coast from Figure 1. Add annotations to represent problems of and solutions to coastal erosion and flooding in North Norfolk.