

HOLDERNESS : HUMAN INTERACTION WITH THE COAST

The boulder clay (glacial till) coastline of Holderness is subject to rapid coastal erosion and recession.

The main causes are :-

- A. The soft, unconsolidated nature of the boulder clay
- B. The lack of a large energy absorbing sandy beach
- C. Sub-aerial action (slumping etc) on the clay which becomes saturated with water
- D. Rising sea level since the last ice age

Since Roman times the coastline has receded by at least 2 km. At Mablethorpe the recession was up to 3 m a year.

Attempts to prevent or retard erosion and recession have been piecemeal and limited in success. It may be that the whole of the Holderness coast will eventually disappear.

Two major decisions have to be made:-

1. Whether to attempt to protect the coastline and prevent erosion and recession.
2. What method/methods to use.

The decision to attempt costly coastal defensive work is based on cost-benefit analysis. The cost of the coastal defensive work is set against the likely benefits in terms of land value and any costs in allowing the erosion to occur.

At present the cost-benefit analysis equation appears to have promoted the piecemeal response to coastal erosion.

Agricultural land and individual farms and houses along with isolated caravan parks are seen as expendable and are lost to the sea. Villages and Towns, however, appear to bear the cost of defensive work, Hornsea and Withernsea have defensive sea walls and Mablethorpe has a fairly recent defence scheme. The gas terminal at Easington at the southern end of Holderness just north of Spurn Point has required the recent addition of rip-rap/rock armour at the base of the cliff and further action may be needed again in the near future.

The problem with isolated schemes is that they generally require the accumulation of sand on the beach, the best natural wave energy absorber. Any scheme which accumulates sand necessarily prevents or slows down the natural north to south movement of material by longshore drift. Areas downdrift of schemes therefore lose sand and are then subjected to increased rates of erosion. In the longer term this may have an important effect on Spurn Point whose existence is dependent on the supply of sand from the north.

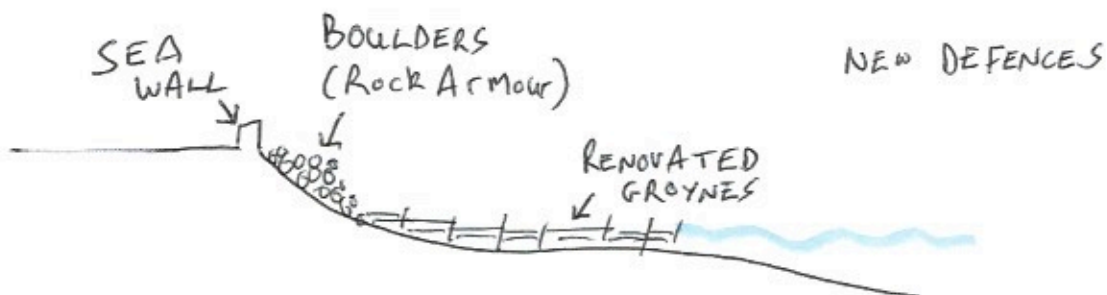
Withernsea

Coastal defence at Withernsea involves both hard and soft responses to marine erosion.

A sea wall was built and in front of this a system of wooden groynes attempt to retain enough sand to absorb much of the wave energy.

There have been recent problems caused by the sea wall and the groynes nearing the end of their design life. During extreme high tides and storm conditions the sea has come over the defensive wall and flooded sea front properties

Recent improvements to the defensive system have included renovating the groynes, bringing in extra sand (beach replenishment) and protecting the foot of the sea wall by armouring it with large boulders, which along with the air spaces between them are efficient at dissipating incoming wave energy.



Mappleton

At Mappleton rapid erosion had begun to endanger the village, up to 100 m of land had been lost since 1950. A new defence scheme was proposed and completed in 1993. The cost-benefit analysis probably swung in favour of the scheme due to the B1242, a major coastal route, approaching close to the shore in the village.

The main features of the new scheme are :-

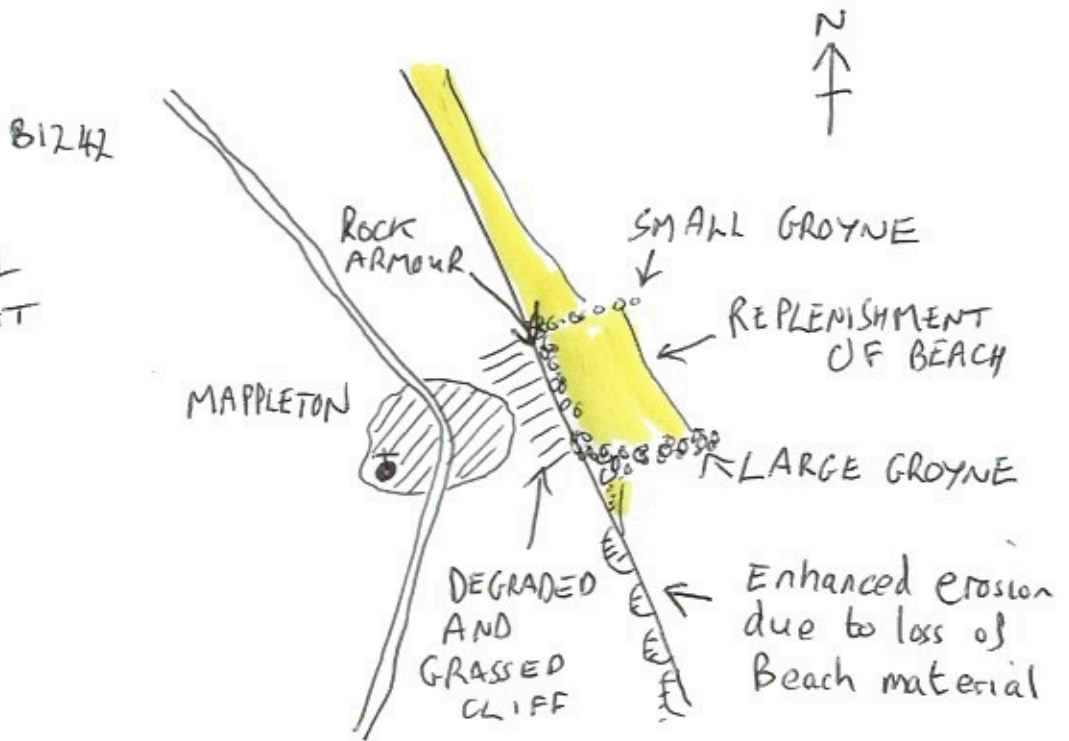
1. A pair of stone groynes, a small one to the north and a larger one to the south to prevent longshore drift and the loss of beach material in the southerly downdrift direction.
2. Beach replenishment between the two groynes to build up the beach and help to absorb wave energy and prevent waves from reaching the soft boulder clay cliffs.
3. A defensive boulder wall of rock armouring or rip-rap at the base of the cliff to prevent undercutting and slumping of the cliff.
4. Degradation of the angle of the cliff to reduce the effect of gravity and prevent sub-aerial processes such as slumping and sliding of the soft, unconsolidated cliff material.
5. Improved drainage of that section of cliff to prevent saturation by water which had increased the probability of sub-aerial downslope loss of material. The new lower angle cliffs were also grassed and in places fixed with plastic material to help consolidate it and stop surface failure and surface wash.

Although the scheme has generally been very successful in preventing the erosion and recession of the cliff at Mappleton, there have been problems. Some slipping and soil/earth flow has already occurred on the degraded cliff, and in places where people have taken a short cut from the cliff top car park to the beach the grass has been worn away and runoff has removed material.

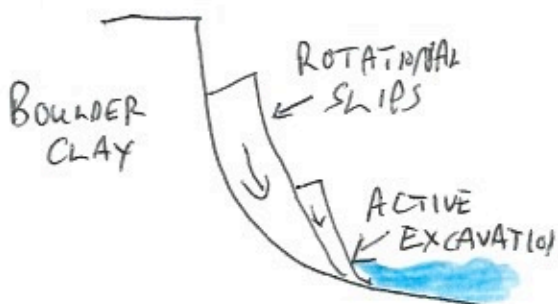
To the south of the scheme the beach has been starved of beach material due to the larger of the two groynes preventing longshore drift in that direction. This has allowed the full impact of the waves to attack the base of the cliff, and slumping, sliding and general erosion have caused increased recession in this area.



NEW COASTAL DEFENCES AT MAPPLETON



OLD CLIFF SECTION



NEW CLIFF SECTION

