



Coastal Flooding

in the North West



ENVIRONMENT
AGENCY



Flooding

introduction

Today the threat of coastal flooding is a constant reminder of the vulnerable nature of large areas of North West England. Huge areas of agricultural land, isolated properties, commercial and residential properties in rural and urban areas are at risk. All of them rely on an extensive network of flood defences principally maintained by either the Environment Agency or local authorities.

Twenty years ago during November 1977, the whole of the Lancashire and Cumbria coastline was affected by extremely high and rough sea conditions, with a massive surge of water along the North West coast. In addition to the surge, high winds generated waves that became increasingly severe as the tide rose. The Institute of Oceanographic Sciences has since indicated that the tide levels experienced in the North West on 11 November 1977 exceeded the 1 in 100 year tide level. Not surprisingly damage was caused to sea defences in the area, which the previous year had successfully withstood 1 in 50 year tide levels. Before this flood the only records of conditions approaching a similar scale of devastation are from 1898, 1907 and 1927.

the flood

Early on 11 November 1977, the southerly wind over the Irish Sea was Force 8 gusting to Force 10. Throughout the day the wind speed increased, and by 11pm it was at Force 10 gusting to Force 12. The Heysham Harbour tidal gauge was put out of action as it couldn't cope with the excessive swell. During the night the tide reached a level of 24ft above normal. Before this, the previous highest recorded tide was 20.4ft in 1954. Whilst considerable lengths of embankment stood up to the wave action, there were approximately 60 breaches, eight of which were of major proportions.

The flooding was extensive. Hundreds of acres of agricultural land and numerous properties were affected.

The storm was so severe that a large amusement pier in Morecambe was washed away, fortunately without loss of life.

In South Fylde, Clifton Marsh Sewage Treatment Works was put out of action for six weeks due to several major breaches.

South of the River Ribble there were breaches in the Hesketh Bank embankments leading to the flooding of large areas of land and the loss of livestock. Inland flooding was experienced when the River Douglas over topped. Residential flooding was extensive along the entire North West coast. Flood defence staff monitored the situation and liaised with the police and local authorities. Flood control rooms were opened at our Area offices and at the Regional Headquarters which acted as a central co-ordinating and information centre. The storm came out of the blue and at that time there were no arrangements for giving advanced warnings of exceptional tides to the public.

after the flood

At first light on Saturday 12 November remedial action began after liaison with staff who had been monitoring the flooding throughout the night. Work concentrated on the breaches and it was a race against time to repair the embankments before the next Spring tides, which were due on the weekend of 10 and 11 December.

Assessment of the damage was hampered by the inability to gain access to affected lengths of embankment and aerial inspections were carried out to ascertain the full extent of the damage. Staff, workmen and machinery worked throughout the Region and, such was the scale of the work, a considerable amount of equipment was hired in from civil engineering contractors to help repair the damage.

Surveys were carried out on privately owned embankments. Technical assistance and equipment were made available by the Flood Defence department.

Vast quantities of sand and gravel were deposited on the flooded areas, which not only added to the cost of the clean-up operation, but also blocked the surface water drains and thus delayed the subsidence of the flood waters.

Homes, business premises and public buildings were affected as well as sewage treatment works, roads and electricity and telecommunications installations. Thankfully, there was no loss of life and no reports of serious injury, despite flooding to ceiling level in a number of inhabited basement dwellings.

Fortunately, all the breaches were sealed before the high tides on 10 and 11 December.

Once the initial repair work had been completed Flood Defence staff turned their attention to deciding on ways to help prevent coastal flooding happening on this scale again. A number of improvements were carried out over the whole region as a result.

Work carried out in Lancashire included schemes at Preesall, Pilling and Cockerham, Knott End, Lytham, Freckleton Pool to Savick Brook at Lea, Penwortham and Overton and Middleton.

The Overton and Middleton Scheme in Morecambe Bay, near Lancaster, involved raising/constructing earthen embankments along some 3km, together with installation of rock armour bank protection and replacement of old outfalls at a total cost of approximately £1.9 million. The Pilling and Cockerham Embankment Scheme was completed within four years of the November 1977 flooding. More than a million tonnes of soil was moved in 12 months to help to create a 7.5km (almost 5 miles) long, 3.5 metre high embankment at a cost of approximately £2.8 million.

Since 1977 13 sea defence schemes have been completed in Cumbria at a total cost of approximately £7.2 million. Haverigg Flood Alleviation Scheme was completed in 1994 and cost £3 million. It will benefit 250 properties which had previously suffered the effects of flooding. Also completed at a cost of £1.4 million was the Windermoor Scheme.



In Cheshire and Merseyside, flood defence schemes have been completed at the following locations within the South Area since 1977:-

- River Mersey at Warrington*
- Ditton Brook at Widnes*
- Sankey Brook at Warrington*
- River Gowy at Stankow (Bank protection works)*

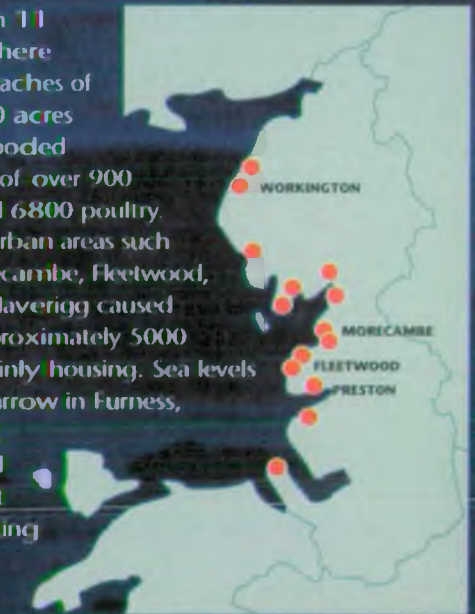
These flood defence schemes cost in total £1.8 million.



Over the next 10 years the Environment Agency plan to spend £15m along the North West coast to further enhance protection against coastal flooding.

flood statistics

During the Flood Event on 11 and 12 November 1977 there were approximately 60 breaches of flood embankments, 7900 acres of agricultural land was flooded which resulted in the loss of over 900 cattle, sheep and pigs and 6800 poultry. The extensive flooding in urban areas such as Knott End, Pilling, Morecambe, Fleetwood, Blackpool, Crossens and Haverigg caused significant damage to approximately 5000 properties of all types, mainly housing. Sea levels reached 6.50 metres at Barrow in Furness, 6.20 metres at Fleetwood, 7.50 metres at Preston and 6.12metres at Liverpool. At Freckleton Pool the retreating tides scoured a 4.90m deep hole beneath the embankment.



Key areas at risk from coastal flooding

flood warning

An early warning system was designed in 1978 to enable appropriate authorities to take action in advance of coastal flooding. Operation Neptune was launched.

The Environment Agency's telephone flood warning service gives you recorded information on all flood warnings which may be in force at any time for rivers and the coast in England and Wales. Over the next five years the Environment Agency will be improving the warning service so that more information reaches those who need it.

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Environment Agency
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ENVIRONMENT AGENCY

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The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

**ENVIRONMENT AGENCY
 EMERGENCY HOTLINE
 0800 80 70 60**



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