

As one of the world's largest manufacturers of cars, Ford may be indirectly responsible for one of our biggest problems: climate change.

Ironically a former chairman of the company, Sir Leonard Crossland, lived with the effects of climate change in his own backyard.

His home until his death was Abbots Hall Farm on the low-lying Essex coast. It was the site of one of the earliest experiments in managed retreat, or managed re-alignment as it was re-branded in an effort to shake off its connotations of defeat

In September, trials of managed re-alignment at Abbots Hall farm enter a second phase. Essex Wildlife Trust, which bought the property in 2000, is working with the Environment Agency to breach the three-kilometre sea wall that skirts the estate breached in five places. This time a significant amount of land will be allowed to flood. It is anticipated that the sea will inundate at least 80 hectares of arable land before its progress is blocked by rising land and two side walls that will prevent neighbouring properties from being affected.

Graham Game, a spokesman for Essex Wildlife Trust, said: "This is the most ambitious coastal re-alignment project to date in the UK.

"Abbots Hall farm is particularly suitable for a coastal re-alignment programme.

The current sea wall defends a relatively narrow, linear strip of arable land between the sea wall and the five-metre contour. The natural gradient of rising land is such that a considerable proportion of the area that can be flooded would be expected to regenerate as natural inter-tidal habitats."

If the engineers have calculated the hydrodynamics correctly, this will be a rich wildlife site. Its creation will compensate for the loss of habitats in other areas where the natural processes of erosion and re-creation of coastal habitats further inland have been stopped by sea walls. But it is only a drop in the ocean. Of the 40,000 hectares of salt marsh that existed in East Anglia 400 years ago, before sea walls were constructed, only 2,600 hectares remain.

Wildlife organisations are desperate to prevent further loss. The Essex coast has been compared to the Serengeti because of its diverse wildlife. Without schemes such as Abbots Hall, they believe that richness is jeopardised.

But there is also a financial argument for managed re-alignment. Salt marsh, mudflats, and coastal grassland act as natural buffers, reducing the impact of the sea on defences inland. The EA has calculated that a strip of salt marsh 80 metres wide can save £4,600 a metre in the cost of coastal defence.

Despite this, managed re-alignment is not a significant coastal defence measure in the UK.

Defra minister Elliot Morley said his department was aware of ten schemes undertaken since 1995.

The department has commissioned research into why managed re-alignment has not been widely used as a strategic option.

Tim Collins, of English Nature, has one suggestion that might increase its uptake. "Where property or land is lost as a result of a decision not to undertake coastal defence work for environmental, economic or technical reasons, there is widespread demand for compensation. Government is unlikely to concede this,

but a possible way forward might be the use of incentives. Instead of compensating for loss, land and property owners could receive payment for not defending their land or property in situations that benefit the nation in terms of sustainable defences and wildlife habitats.

"In its response to the Agricultural Select Committee inquiry, the Government indicated that 'payments may be made to landowners in circumstances where quantifiable beneficial use arises'. In our opinion, considerably more work is needed to define and quantify 'beneficial use'."

Managed re-alignment would be considered as part of a Shoreline Management Plans. Mr Collins said: "The first generation of SMPs have in many cases ignored or deferred the hard choices that need to be made and promote virtually no wildlife enhancement opportunities. SMPs are often produced by people deeply entrenched in the traditional hard engineering culture of the coastal defence sector and work is often hampered by limited knowledge of coastal processes.

"We are aware of cases where prior to finalisation, some SMPs advocating managed re-alignment for example, have been diluted by local Flood Defence Committees wanting to maintain the status quo."

Essex Wildlife Trust also identified that some coastal engineers and politicians needed more convincing about the benefits of managed re-alignment. Mr Game said: "A demonstration of sufficient scale was desperately-needed to trigger a sea change in attitudes and demonstrate coastal defence benefits. Abbots Hall farm - 283 hectares of arable farmland, salt marsh, coastal grassland and mud flats - is this project."

The work at Abbots Hall consolidates lessons learned on a nearby re-alignment experiment at Tollesbury, which was started in 1995 by MAFF.

Mr Richardson said the experiment did not highlight any gaps that needed to be plugged in the understanding of managed re-alignment. The department is now funding schemes that use managed realignment as flood defence measure. On the Humber, a system of sea defences is being built, partly on an internationally-important wildlife site. To compensate for this loss, a sea wall that protects marginal land at Thorngumbald will be breached to create wetlands.

Mr Richardson said: "Managed re-alignment is always going to be one option in an array of coastal strategies, but it's only appropriate in those limited areas where it's going to cost very much more to protect the sites than the sites themselves are worth."

Scarborough Borough Council has just commissioned £26 million of coastal protection work from Edmund Nuttall to safeguard assets estimated to be worth £100 million and currently protected by ageing defences.

John Riby, SBC's project manager, said: "We considered building a new sea walls, offshore breakwaters, etc, but we came to the conclusion that we would have a revetment - place some sort of armour against the existing structure."

The choice was then whether to go for rock armour or angular concrete units called Accropodes. Mr Riby said: "When we modeled the solution, we found that we could not get rocks big enough to stay in position. We would have needed

20- tonne rocks. You can't get rock of that sort of size." So for most locations, SBC chose Accropodes, except for areas where the revetment would receive less pounding and there was a greater need to keep up appearances.

Accropodes' advantages are that their interlocking structure allows lighter units to be used to build steeper slopes. Mr Riby said the large amount of space within the structure fills with sea water, reducing overtopping, while the air trapped inside by a breaking wave acts as a cushion. Other benefits were cost and reduced maintenance.

Dr John Loveless, of Bristol University's civil engineering department, is seeking a test site for another concrete flood defence unit - the BRUNO (BRistol UNiversal Octagonal armour unit).

When the units are stacked together, they create additional voids, further reducing overtopping. However, Dr Loveless said that a tyre could be inserted into the centre of the hollow unit. "That would prove to be a very cheap means of resisting the flow of material out from underneath the structure," he said.

In some cases, the aesthetic considerations are so strong that temporary or demountable flood defences must be considered. That was the case at picturesque Bewdley, Worcestershire.

Residents rejected permanent defences that would obscure their view of the River Severn, even though it had been responsible for repeated flooding. So the EA imported demountable defences from Germany.

EA project manager Roger Prestwood said: "These are only appropriate for situations where you get sufficient warning of a flood to allow you to erect the defences and you need to justify the additional expense as they are more costly than normal defences."

Bewdley usually gets 48 hours' notice of a flood – enough time for EA staff to erect the barrier.

Aluminium posts will be attached to stainless steel plates set into the road.

Aluminium planks will then be slotted between the posts. They will have rubber seals to prevent seepage.

The first phase of the works, an 180-metre wall, will protect 40 properties on Severnside North against a one- in- hundred- year level flood.

The second phase on the other bank will result in 140 properties being protected.

The wall from IBS cost £300,000. A far bigger component of the costs is the £2m foundations which will extend six metres below ground to prevent water seeping underneath defence.

Although demountable defences are extensively used in mainland Europe, this is a first for the UK and yet the preparation work has been turned around in a fraction of the time, according to the EA.

What would Telford who constructed a bridge at Bewdley have made of it? Well, hopefully he would have been proud.

