

Shifting Shores

Living with a changing coastline



Front cover: The eroding cliff at
Compton Bay, West Wight, Isle of Wight.
NTPL/JOE CORNISH

Right: The windswept sand dune,
saltmarsh and shingle ridge of
Scolt Head Island, Norfolk.
NTPL/PAUL WAKEFIELD



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In the United Kingdom no one lives more than 75 miles from the sea. For us, as an island nation, the sea has an all-embracing presence. Spiritually and physically we are intimately connected with our shores. The sea has immense power, which we ignore at our peril.

Introduction

This pamphlet draws on the National Trust's experience as Britain's largest coastal landowner. With 1130 kilometres of coastline in its care, the Trust now owns nearly one tenth of the coast of England, Wales and Northern Ireland.

The extent of our coastal holdings – and the variety of development and coastal features that they encompass – gives the Trust a unique window on the issues of coastal change.

The coast is an immensely dynamic environment. Sea-level rise and climate change are forecast to increase the scale and pace of coastal change. To help plan for the future the Trust commissioned research to assess how the coastline is likely to change over the next 100 years.

The results suggest that many of the Trust's important sites are at risk from coastal erosion and flooding. As a result we face some difficult choices in managing this change, and need to make well-informed decisions that stand the test of time. Learning from experience, our policy now favours adaptation, to give us time and space to change with the coast and work with the forces of nature.

Far right: Formby Sands.
NTPL/JOE CORNISH

Right: Seven Sisters, East Sussex.
NTPL/LEO MASON

Main picture: High tides breaching the causeway at East Head, West Sussex.
NT/ GLYNN JONES

It is not just the Trust that faces challenges from climate change and sea-level rise. People's homes and livelihoods are at stake, so wider solutions are needed to help vulnerable communities live with a changing coast.

The impetus behind this pamphlet was to share experiences of managing coastal change and help strengthen the case for a new approach to planning and managing the future coast. It highlights some key questions that have to be addressed to meet the needs of society now and in the future when facing up to coastal change.



1130

kilometres of Britain's coastline are under the care of the National Trust.



A legacy of change... and more to come

History shows us that the coast is a dynamic environment.

The medieval villages of Dunwich (now lying under the North Sea) are a testament to how society has always had to adapt to coastal change. Some of the country's most famous seaside landmarks are subject to constant change. Coastal erosion created the Needles on the Isle of Wight, for example, and will eventually destroy them.

A changing coastline is not just about loss. Ships used to dock near Smallhythe in Kent when much of what is now Romney Marsh was underwater. But here the sea has retreated and the house is now fifteen kilometres inland.

All around the coast is evidence of such changes, which research suggests are inevitable and will

continue. For example, south-east England has been sinking slowly and steadily as the Earth's crust has adjusted following the end of the last Ice Age. As a result, sea levels on the east coast have risen 20 centimetres since 1900.

The effects of climate change are even more profound. The UK Climate Change Impacts Programme (UKCIP) predicts that sea levels around the United Kingdom will have risen another 26 to 86 centimetres by 2080. In addition, extreme high tides and severe storms will occur more frequently.

The coast is a canary for climate change. It shows how the effects are happening today and close to home. This should strengthen the call for action to cut greenhouse gases, but we also need to adapt to the changes underway.



National Trust coastal change study

To gain a better understanding of how coastal change will affect National Trust properties, the Trust commissioned Halcrow Group Ltd to study how erosion and flooding might affect its coastal sites over the next 100 years.

Using Defra's FutureCoast data and the Environment Agency's Indicative Flood Risk Maps, together with the UKCIP predictions of sea-level rise due to climate change, the National Trust Coastal Risk Assessment has given striking results.

Above: A badly eroded cliff at Charmouth near Golden Cap in Dorset.

NT/HELEN MANN





169

of the Trust's properties could lose land by erosion over the next 100 years.



126

of the Trust's coastline properties are at risk from tidal flooding.

The results

The assessment indicates that over the next century:

169 sites along some 608 kilometres (60%) of National Trust-owned coastline could lose land by erosion

10% of this loss could be between 100-200 metres inland

5% more could be losses of over 200 metres inland

126 sites with land covering 4040 hectares are currently at risk from tidal flooding

33 further low-lying sites are at risk of combined tidal and river flooding within the next 100 years.

Implications of the risk assessment

The scale and pace of the change shown by the risk assessment has strengthened the Trust's awareness of both the immediate and long-term effects on its sites. We now need to take into account these forecasts of change in everything we do, from acquiring coastal land to the daily management of coastal sites.

Breakdown of the Coastal Risk Assessment results: Trust-owned coast at risk from erosion and flooding over the next 100 years.

Region/country	Kilometres of Trust coast affected by erosion	Hectares of Trust land at risk of flooding
South West	279	852
South East	44	467
East of England	45	1837
London	-	1
North West	9	70
Yorkshire	12	1
North East	52	26
Wales	167	786
Total	608	4040

Note: Northern Ireland coastline to be covered in a future study.

Main picture: Coastal footpath, Seven Sisters, East Sussex. NTPL/LEO MASON

The Trust's options and policy

The next task is to understand the detailed changes at each of our affected sites and plan ahead with local communities and other partners. Broadly, our options are to try to prevent change by 'holding the line' or to adapt to change, either immediately or through 'buying time' with interim measures.

The Trust realises that sometimes this choice will be hard because there may be adverse consequences whatever the decision. Our policy is to take a long-term view, working with natural coastal change wherever possible. Therefore, we favour adaptation, because this will give the time and space to adjust with the coast.

Above right: Westbury Court Garden, Gloucestershire. NTPL/STEPHEN ROBSON

Above left: Compton Bay car park, Isle of Wight. NTPL/TONY TUTTON



Key National Trust sites:

For erosion

- 1 Golden Cap
- 2 West Wight, Isle of Wight
- 3 Formby Sands
- 4 East Head
- 5 Orford Ness

For flooding

- 6 Llanrhidian Marsh
- 7 Porlock
- 8 Blakeney
- 9 Northey Island
- 10 Westbury Court Garden

Hard choices

Holding the line and resisting change through hard defences, often in the form of rock or concrete, have been the traditional responses to coastal change.

Through evidence and experience we now have a better understanding of the forces of nature and the consequences of working against them.

Many of our sites on undeveloped natural coast are now suffering the knock-on impacts of hard engineering further along the coast. East Head on the Sussex coast is being starved of its essential supply of sand and shingle from the shoreline to the east due to the hard defences protecting housing on the

Manhood peninsula. The defences are increasing and concentrating change to an internationally important sand dune formation and giving rise to problems for other coastal users.

There is no guarantee that hard defences work in the long term: they are often only a temporary solution. As sea levels rise and severe storms increase, it will become ever more difficult and expensive to build and maintain strong defences. They can also disfigure the coast and cause environmental harm by moving the problem to another location. We believe therefore that hard defences should only be used as a last resort.



Far left: Hard defences are costly and cause environmental harm to undeveloped coastline.

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Left: Coastal defences causing greater erosion on the narrow spit between East Head and the mainland.

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£45m

has already been given by the public to our Neptune Coastline Campaign.



There are many reasons why adapting as early as possible is desirable. It is likely to be the most realistic and cost-effective approach over the long term. It helps people understand the risks they face and gives them time to adjust and adapt their communities, so reducing the risk of suffering catastrophic flooding and erosion. The Trust acknowledges that for some it is a painful approach, particularly while there is a lack of financial help to enable vulnerable communities to adapt.

We favour working with the grain of nature because it has multiple benefits for people and wildlife and provides long-term solutions. Creating space at the coast for natural features, such as saltmarshes and sand dunes, not only provides

essential habitats for wildlife, they can act as natural coastal defences.

Adapting to change gives the best possible chance of conserving the natural coastline, which is of great cultural and economic value. Public appreciation of the beauty and wildlife of the natural coastline is shown by the £45 million contributed over the last forty years to the National Trust's Neptune Coastline Campaign. The transformation of the 'black beaches' of County Durham by the huge clean-up of coal mining waste demonstrates the desire of coastal communities to recover their natural coast.

Top: The sand dunes behind Woolacombe beach in North Devon have been managed to increase vegetation and control trampling by summer visitors, to help slow the erosion of the dunes.

NTPL/IAN SHAW

Main picture: Horden, Durham.

NTPL/JOE CORNISH

Making space for change

The Trust manages a myriad of coastal features from cliffs, beaches, mudflats, saltmarsh, dunes, farmland and estuaries to islands, headlands and coves; and a wide range of infrastructure such as harbours, settlements, sea walls and lighthouses.

In a number of locations we are already facing up to the challenges of sea-level rise and coastal erosion by adapting to a changing coastline. Our coastal risk assessment shows we must quickly learn and apply the lessons from these sites to give all our sites the best chance to adapt.



Far left: Stormy conditions at Porthdinllaen on the north coast of the Llyn Peninsula in Wales. Finding a sustainable way of protecting these properties will be a challenge for the future. NT

Main picture: The coastguard cottages near the cliff at Birling Gap. Since this picture was taken, the two cottages nearest the sea have been demolished, as the cliff receded and made them unsafe.

NTPL/JOHN MILLAR



Adapting buildings and infrastructure

The Trust has many structures on or near the shoreline – such as houses, cafes, public lavatories, lighthouses, beach huts, car parks and roads. We need to consider their futures in the face of sea level rise and erosion.

At **Birling Gap**, on the chalk cliffs of the Seven Sisters in Sussex, the Trust had to make the hardest choice of all: not to protect, buy time or relocate. In 2002 the Trust demolished one of the coastguards' cottages on the cliff edge. We also own a small hotel and three of the remaining cottages. Our priority is for the coastline to evolve naturally and allow the undefended cliff to move.

Above: Winter gales causing damage to Mullion harbour in Cornwall. The Trust is working with the local community to consider the options for managing the harbour over the next 50 years.

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The Trust's activity centre at **Brancaster** on the North Norfolk coast is periodically flooded by high tides. The centre has been refurbished to accommodate flooding, for example re-routing cables on the ceiling, raising all electricity sockets one metre above the ground and covering the floors with washable materials. As a result the usable life of the building will be longer than it would otherwise have been.

Above: The activity centre at Brancaster has been designed to cope with periodic flooding.

NT

On the **Studland Peninsula** in Dorset, the six kilometres of sandy beach attract over a million visitors a year. The southern section of the beach is being eroded by two to three metres a year with the sand being deposited on the northern part, so the peninsula is not suffering a net loss overall. However, the cafes, toilets, a shop, car parking and beach huts on the eroding southern section are under threat. The Trust has moved the beach huts twice and is now seeking a way to relocate many of the other buildings and infrastructure.

Above: Studland beach huts – until recently the strategy was to protect, now they are being relocated and the defences will slowly disappear.

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400

metres of Formby Sands may be lost due to erosion over the next 100 years.

Right: Formby Sands before storms. Just 48 hours later the beach has eroded badly.

NTPL/ANDREW BROCKBANK

Making space for recreation and access

The Trust believes that maintaining access to the coast should also accommodate natural change. The South West Coastal Path Strategy now reflects this thinking.

Golden Cap in Dorset is the highest point on the south coast. The coast here has been eroding continually but, with climate change, the rate of erosion is likely to increase to more than two metres a year. The Trust has recently agreed with the local authority to allow the path to be moved inland by up to twenty-five metres, as the cliff erodes.

The beach at **Formby Sands** on the Sefton Coast in Lancashire has been eroding at a rate of three to four metres every year for the last 100 years. Severe storms can take twelve to fifteen metres from the front of the dunes, most recently in 2002. Over the next 100 years the Sands may recede more than 400 metres. Our primary objective is to allow the dunes to move back naturally. In order to continue to maintain it as an important recreational site attracting some 350,000 visitors each year, the Trust is planning to re-route the Sefton Coastal Path and relocate the car park.



Above: Summer visitors enjoying the popular beach at Studland, Dorset.

NTPL/JOE CORNISH



500

archaeological monuments
and historic structures are at
risk over the next 100 years.



Finding space for history

Understanding the past can help tell the continuing story of relentless change and human adaptation to loss of land and settlement. History is therefore crucial to the Trust's contemporary message about living with change. However, we know that over 500 archaeological monuments and historic structures are at risk from erosion and flooding over the next 100 years. In many cases it would be unwise or impossible to protect them indefinitely.

On the **Isle of Wight** we are recording features before they are lost. Historical artefacts are being revealed by the eroding shoreline all the time – such as fine Bronze Age beakers, prehistoric hearth sites

and a mysterious ancient skeleton of a young girl. The most recent discovery was a very rare survival: a piece of prehistoric hurdle between 5,000 and 7,000 years old that fell to the beach from a peat layer in the cliff.

The Trust is assessing the rate of loss and will look at ways of working with heritage agencies, local authorities and local communities to record and recover the most important archaeological sites before they are lost forever. While some sites may be lost physically, it could give the opportunity to learn more about them.

Main picture: Formby Sands, Lancashire.
NTPL/JOE CORNISH

Above: An ancient piece of wattle
hurdle found on the Isle of Wight.
NT/FRANK BASFORD



Left: Terns.
NTPL/JOE CORNISH

Right: Saltmarsh near Blakeney, Norfolk.
NTPL/JOE CORNISH

Main picture: A view of the freshwater marshes near Blakeney Point, Norfolk.
NTPL/JOE CORNISH

Creating space for wildlife

Wherever possible the Trust will conserve and enhance wildlife at the coast and create new spaces to allow it to adapt. As sea levels rise, coastal habitats will be subject to flooding and erosion, especially where they are in front of man-made sea defences.

Some of the change is good news. At **Porlock** in Somerset the sea has been allowed to breach the shingle ridge and now that it floods behind the shingle a new saltmarsh is rapidly developing. It is already attracting waders, ducks and plants that had previously been rare visitors or completely absent. Otters, too, are using this new coastal feature.



Above: Before (left) and after (right) the shingle bank at Porlock was breached. Porlock Bay, Somerset.

NT/ROB JARMAN



At **Newtown harbour**, on the Isle of Wight, the Trust is developing a long-term plan for retreat in the face of flooding. We have purchased two areas of farmland beside the estuary and these will be allowed to flood as sea levels rise, creating space for the saltmarsh and its associated wildlife.

Sometimes, wildlife will be unable to adapt. At **Blakeney** on the North Norfolk coast we may see the loss of freshwater marsh and coastal reed bed which support species such as avocet, bearded tit, bittern, marsh harrier and water vole. We urgently need to find space for new freshwater habitats, giving wildlife the chance to adapt to change.

A Trust project to expand **Wicken Fen** in Cambridgeshire, although not near the coast, is intended to restore freshwater habitats. Many more sites are needed to create new habitats in this way.

Above: Newtown Harbour, Isle of Wight.
NT/DAVID WATSON

Moving into the next century

Given that the National Trust's aim is to conserve and promote the nation's natural and cultural heritage, we have learnt five key lessons about managing a changing coastline.

1

Long-term planning is essential

To adapt effectively to sea-level rise and climate change we need to plan at least 50 to 100 years ahead. In many cases it will be necessary to relocate people, habitats and buildings and to do so cost-effectively requires early action. The future is inherently unpredictable, even more so with climate change and a dynamic coastal environment, so we need to allow flexibility in our management and planning.

2

Think and act in a wider context

The boundaries of the Trust's coastal sites take no account of the real boundaries of the 'coastal cells'* in which coastal processes operate. In order to take a flexible and responsive approach to dealing with coastal change, we need to think and act in a much wider spatial context, managing our sites within freshwater catchments and coastal cells.

* A 'coastal cell' is a section of coastline which reflects the natural physical processes acting along it – where the movement of coarse sediment (sand and shingle) is largely self-contained.

3

Work with nature not against it

Our experience has demonstrated that working with natural processes is the most sustainable approach. In some cases this will mean undoing past mistakes, taking out hard defences and letting the coast realign naturally. In others we will need to phase our approach, buying time with temporary solutions while finding space to allow natural defences to form.



Left: Runswick Bay, North Yorkshire.
NTPL/IAN SHAW

Main picture: Coastal warden and
volunteers, Cornwall.
NTPL/IAN SHAW

4

Solutions need partnership

We cannot operate in isolation as the decisions we make nearly always impact beyond the immediate site. Tackling the problems facing our sites also requires action by others, especially neighbouring coastal owners and managers. Finding mutually beneficial solutions like large-scale realignment projects requires a strong partnership approach.

5

Involving the public is critical

Raising awareness of the impacts on our coastal sites is vital to winning public confidence. Any form of realignment of the coast can create uncertainty and even hostility. Building consensus and providing information takes time and effort, but is crucial to finding sustainable solutions.





The wider challenges

Left: Broadstairs in Kent.
NTPL/JOE CORNISH

Right: Playing in the sea.
NTPL/JOE CORNISH

The National Trust is not alone in facing these risks. Our experience reflects that of all coastal communities. In the face of climate change and sea-level rise a new approach is needed to plan for our future coast and to manage the risks the changes will bring.

In our view there are four key questions to be addressed, which involve everyone concerned with coastal management.

1

How can people's awareness and understanding of the risks they face be raised?

People need to understand how a changing coastline affects them and to rediscover how to live with the implications in order to make choices that will reduce the risks to life, property and the environment.

There is currently no mechanism for the public to find out if their home or business lies within a coastal erosion risk zone.

2

What is the best way to decide the most sustainable approach to managing these risks?

We need clear direction and an accountable decision-making process for coastal governance that result in solutions that work for the whole of society, now and in the future.

With nearly 30 agencies or authorities involved, achieving a coherent coastal planning and management policy is difficult.

3

How should tomorrow's coastline be planned today?

Integrated and informed long-term planning is needed to provide greater certainty in decision-making and investment, to ensure we give the coast room to move and to be able to relocate people and buildings away from high-risk areas.

The current approach is fragmented, with statutory plans rarely taking meaningful account of coastal change.



4

How can the costs of adaptation be minimised and shared equitably?

We need innovation in financial products and mechanisms, (e.g. compensation and insurance) that help manage these significant risks and enable vulnerable communities and the environment to adapt cost-effectively.

Over the next 75 years over a million properties throughout England and Wales are at risk of sea and tidal flooding and more than 110,000 properties are at risk from coastal erosion.

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For further information including how to help
the National Trust with its challenge of protecting
and managing the coastline, please visit our website

www.nationaltrust.org.uk

where you will find out more about becoming a
member, a donor or a volunteer.



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