Coastal Erosion

How local authorities are dealing with increased levels of coastal erosion linked to climate change

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About APSE

The Association for Public Service Excellence (APSE) is a not-for-profit local government body working with over 300 councils throughout the UK.

Promoting excellence in public service, APSE is the foremost specialist in local authority frontline services and operates one of the UK's largest research programmes in local government policy and frontline service delivery matters.

About the Author

Wayne Priestley was previously the Principal Advisor for APSE's environmental suite of services which included: Parks and Greenspaces, Waste and Recycling and Cemeteries and Crematoria. Following early retirement, he is now an active APSE Associate with a continuing interest in these areas and environmental issues in general.

Before APSE, he had a long career in local government and has built up a broad knowledge base.

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During his time at APSE Wayne was involved in a number of environment related projects including the development of the new Land Audit Management System (LAMS) and contributed to the development of the National Litter Strategy for England. He also provided information to support APSE'S contribution to the Government's Parks Action Group.

Wayne has also written a number of research reports including:

'State of UK Public Parks 2021',

'Post Pandemic: Green Urban Spaces' (2022)

'Making space for nature in our burial grounds' (2023).

'Plant Biosecurity – The role of local councils in delivering a healthier future for the UK's plants and trees' (2024)

'Grassland Management - A guide for local councils' (2024)

'Rewilding for the Future – Insights and best practice from local councils' (2025)

'Adapting Parks – Climate change and local authority greenspace' (2025)

'Coastal Erosion' – how local authorities are dealing with increased levels of coastal erosion linked to climate change' (2026)

Wayne on behalf of APSE also provides a number of training courses on the above reports.

Wayne continues to keep up to date with the latest environmental developments and has a growing interest in how local authorities are addressing issues such as increasing biodiversity, 'rewilding' and the impact of climate change on sustainable green spaces.

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Foreword

APSE member councils face many challenges but those member authorities in areas responsible for large stretches of the coastal environmental face very specific and unique challenges.

Alongside the day to day management of keeping areas safe and pleasant for local people, and also as often valuable tourist destinations, coastal areas also present dangers from sea defences being breached to unseen environmental hazards, which over many years, risk the coastline including beaches, wildlife habitats, roads and local assets, alongside of course the very devasting impact of homes, being lost to coastal erosion.

As the UK experiences extreme weather events, such risks have become increasingly pronounced. In recent years, pockets of additional funding have been very welcome, but the resources to support coastal erosion mitigations remain limited.

In this report we explore the interface between national and local agencies; the evidence as to what measures are working and which measures may in fact produce adverse and unintended consequences; the balance of priorities and of course the realisation that in some situations areas may simply be beyond interventions.

As the APSE National Chair I commend this timely report to you.

Cllr Tracey Dixon, APSE National Chair 2025-2026

Executive Summary

This report recognises that coastal erosion is not a new phenomenon. Natural processes such as wind, waves and weather have long brought changes to the shape of the UK's coastlines.

However, it is now the case (supported by peer-reviewed scientific evidence) that the effects of climate change such as the melting of the world's ice caps, extreme global weather events and associated sea level rises and environmental degradation is also adding to natural processes resulting in exacerbated coastal erosion. This speeding up of coastal erosion in all its forms is causing growing problems for coastal communities which are experiencing greater levels of flooding and landslips. Despite well intentioned interventions to support communities through the construction of large scale barriers, it has become apparent that unintended consequences can occur, an example being the how the displacement of waves by sea defences can create more intense damage further along unprotected areas of the coast, often with the added negative impact on local marine and coastline biodiversity.

Coastal communities are already being negatively impacted by coastal erosion, and this report highlights that an estimated 17% – 28% of the UK coastline is now facing significant risk caused by rising sea levels. This situation of increased flood risks now threatens the future viability of some coastal communities, such as those along the fastest-eroding coastline in Europe, the Holderness coast in East Yorkshire. It is currently estimated that this 61km stretch of coastline is eroding at a rate of 2m every year. This is an alarming statistic of itself, but behind this data are real communities, businesses and livelihoods that are now at risk of being displaced or simply lost for good.

Local community infrastructure is also being threatened by coastal erosion, and significantly so, with a reported 520,000 properties in England alone at risk. Of these, 370,000 homes are in locations which are now at risk of damage from future coastal flooding. Local authorities are expected to help their affected residents and businesses, but with already overstretched budgets for general road maintenance and repairs, the impacts of coastal erosion and associated flooding are further concerns. In fact, data suggests that 1,600 kilometres of major roads face increased

risks from coastal erosion.

Central and local governments are charged with trying to bolster and improve public transport systems, but yet again these assets are also affected by the impacts of coastal erosion, with data suggesting that 650 kilometres of railway line, alongside 92 railway stations, are threatened. More worryingly still, legacy landfill sites which are built in areas where coastal erosion and flooding are likely to manifest in the future place 55 of these sites at risk, raising serious concerns about further environmental damage in these already vulnerable areas.

A further key finding in this report is that whilst not all risks can be fully mitigated by financial resources, much more funding will be needed in the future to enable local authorities to implement plans to tackle issues of coastal erosion. Whilst the Environment Agency is investing £5.2 billion between 2021 and 2027, this is not going to meet the aims and ambitions of Shoreline Management Plans – which are seen as a key line of defence in protecting communities, marine and local infrastructure from the most extreme consequences of coastal erosion.

The issues raised in the report show the very real threats from coastal erosion in its varied forms, but it also shows how government, local authorities and other agencies are trying to take both strategic and practical actions to reduce the impacts. Whilst communities and strategic assets will try to be protected as far as is humanly possible, it is accepted in some cases nature will have to be allowed to take its course.

Introduction

APSE covers a wide range of issues raised by local authorities' services and provides advice and examples of best practice on how to deal with queries or concerns raised. Over the past few years, climate change and the impact it is having, and could have on future service provision, has become very topical. One area which has been raised by APSE members linked to the possible effects of climate change is coastal erosion, and the impact it is having on both communities and the local environment.

Coastal erosion is usually defined as 'the gradual wearing away and removal of land, sediment, and rock from the shoreline by powerful sea forces like waves, currents, tides, and wind, leading to the retreat of the coastline inland'.

Coastal erosion as a geological process has been happening since the first stable land masses appeared over 3 billion years ago and is a part of the Earth's natural processes. Because of this process, coastlines are constantly changing; however, the intensity of these changes can vary from gradual, long-term shifts to rapid events caused by powerful storms. Storms in particular can speed up erosional processes through the creation of high energy waves which crash into coastlines causing significant damage, particularly to softer rocks. and sediments. It should be noted however, that the loss of soil and rocks will rebuild elsewhere over time as part of a natural continuous cycle.

Therefore, whilst coastal erosion is not a new phenomenon, what is being noted is that the effects of climate change, in particular warmer seas and associated melting of ice caps, are leading to accelerating sea level rises and increases in extreme weather events, which together are adversely affecting the rapidity of coastal erosion.

Coupled with this is the growing impact of human activities such as coastal constructions and settlements, dams and river modifications, which can cause a reduction in sediment flow from inland waterways and via longshore drift, depriving coastlines of new deposits and thereby leaving these areas susceptible to accelerating erosion on nearby beaches. The loss of sediment input means beach levels fall and could lead to increased flooding in these areas, particularly as sea levels rise.

Some may question how do we know all of this to be true? By using a wide range of data gathered across a number of different fields, results are showing significant coastline changes are taking place. Types of research being used include the study of old coastline maps, investigation of lost settlements, ariel photography, satellite imagery, and even measuring the level of specific isotopes in rocks which help calculate the age of cliffs. These same approaches are also being used to try to quantify the rate of coastal erosion and identifying those areas most at risk.

What causes the coast to erode?

To understand the issues caused by coastal erosion we must first understand how the process of coastal erosion works.

The main way coasts erode is through a number of different processes:

Hydraulic Action: This is when the force of waves hitting rocks, traps and compresses air in cracks within the rock (e.g. a cliff face), causing the rock to shatter and break apart.

Abrasion (or Corrasion): This occurs when waves rolling towards a coastline pick up sand and pebbles and throw them at the base of cliffs. This action slowly wears away the rock.

Attrition: As rocks and pebbles are moved around by the action of waves, they crash with each other, becoming smaller, smoother, and rounder. Over time, harder rocks are washed away and moved along the beach from one place to another, leaving softer rocks exposed.

Solution (or Corrosion): Saltwater, as a weak acid, chemically dissolves soluble rocks like limestone and chalk, which are primarily composed of calcium carbonate, a material that is soluble in weak acids. This acid (carbonic acid) reacts with the calcium carbonate in the rock, converting the solid rock into soluble substances (calcium bicarbonate), which are then carried away by the seawater.

These processes are now being exacerbated by climate change, which is causing more frequent higher tides and storms that can increase wave energy and flooding. Furthermore, increasing levels of rainfall can lead to landslips and slumps along the coastline as soils become saturated.

Although erosion can be destructive, it can also create new landforms such as sea caves, sea arches, sea stacks and wave cut platforms, many of which have become sites of national interest.

However, as impressive as these erosional features may be, most have taken hundreds or possibly thousands of years to form naturally, whereas climate change is potentially increasing coastal erosion, some of it severe, in a matter of years.

Coastal Erosion and flooding - a global perspective

For the past 6,500 years, global sea levels have been fairly constant. However, since the start of the Industrial Revolution approximately 250 years ago, global coastal erosion has increased significantly, with the greatest increase in the last 100 years due to human-induced climate change, sea-level rise, and coastal development. Although erosion rates vary by location, studies indicate that in some areas, erosion has accelerated up to **ten-fold** in the past 200 years. Nowhere has this been more visible than in areas like Sussex in the UK, where coastal erosion was at a relatively stable rate of 2–6 cm/year preindustrial revolution, to today where erosion rates have accelerated to around 22–32 cm/year.

It is estimated that global sea levels have risen by 15–25 cm (6–10 in) between 1901 and 2018, which is faster than any time in at least the last 3,000 years. This acceleration in sea-level rise directly corresponds to increased and faster speeds of erosion.

By 2100, cliff erosion rates are forecast to be three to seven times higher than present-day rates, and up to tenfold in some areas. Of the causes of this increased coastal erosion, sea-level rise, and storm surges, it is believed that 58% can be attributed to climate change.

Coastlines, particularly in low lying island communities, will suffer significant loss of property, infrastructure, and ecosystems. One of the most threatened areas is the Maldives. Located in the Indian Ocean, this archipelago of low-lying islands and atolls is at severe risk of disappearing under rising sea levels. Research suggests by as early as 2050, as much as 80% of the country could become uninhabitable due to sea level rises and associated flooding caused by global warming. More dire estimates suggest by 2100, that 100% of the islands could be submerged.

A further influence causing sea level rises is the increased rate of ice melt at the polar ice caps. The Greenland ice sheet is currently losing mass at a faster rate than the Antarctic ice sheet, making it the largest contributor to sea-level rise among the polar ice caps, losing an average of 251 gigatonnes per year. This ice sheet is responsible for approximately 60% of total polar ice loss between 1992 and 2017. It has been losing mass for over 25 consecutive years.

However, the West Antarctic Ice Sheet is also rapidly accelerating its ice loss, in particular around a glacier commonly known as the 'doomsday glacier', or to give its geographical name, The Thwaites Glacier. This is the widest glacier in the world covering an area larger than the US state of Florida.

The glacier is losing so much ice that it accounts for almost 4 percent of global sea level rises, and this loss has been doubling over the last 30 years. This loss has been caused by deep warming ocean currents a further result of global warming. Total ice loss from Greenland and Antarctica combined is now six times faster than it was in the 1990s.

Isostatic adjustment

One other cause of change to the shape of coastlines is isostatic adjustment, or as it is sometimes known 'glacial isostatic adjustment'. This is the process whereby land, previously depressed by ice-age glaciers, starts to rise (rebound) after the ice melts. This is common to many areas in the northern hemisphere and can be found in places such as Scandinavia, Canada and the UK. These adjustments are slow and can continue for thousands of years after a load is removed i.e. ice melting at the end of the last Ice Age.

In the UK, Scotland, which was previously under heavy ice with maximum thickness estimated at 1500mtrs, is rising at a rate of up to 1.5mm/year, while southern England is sinking (approx. 1mm/year) as the Earth's crust adjusts. This causes relative sea-level rise in the south and, conversely, brings old shorelines above sea level in the north.

Evidence of this process includes raised beaches above current sea levels in Scotland, contrasted with submerged forests and coastal features below sea level in the south. The subsidence in the south of the UK, combined with global sea level rises caused by climate change, increases flood risks in southern England.

Human Impacts on Coastal Erosion

However, as mentioned previously, coastal erosion is not solely the result of climate change or rising sea levels. The Gulf Coast of Mexico is one of the worst places in the world for coastal erosion.

Although climate change is a contributory factor, modifications to the Mississippi River, including dams and river armouring, has reduced underwater sediment accumulation by 73% over the past 40 years. River armouring, including damming, levee construction, and channelisation, has severely reduced the flow of sediment from rivers like the Mississippi into the Gulf of Mexico, causing widespread coastal erosion and land loss.

By trapping sediment upstream and cutting off natural floodplain replenishment, these structures prevent wetlands from rebuilding against rising sea levels. This lack of sediment deposits, which would also normally create underwater sandbars that help refract wave energy, has become a major factor in severe beach erosion. It is the lack of sediment replacement which is accelerating seafloor erosion, leaving beaches more vulnerable to waves and storms, particularly large recurring waves, which are a feature of storm activity. These types of waves erode beaches faster than smaller infrequent ones.

Other examples of where the actions of humans, albeit trying to halt the impact of erosion and rising sea levels, have exacerbated the problem include the building of seawalls and dikes. Often built to protect one area, they have resulted in deflecting wave energy but, in doing so, have accelerated erosion on adjacent, unprotected beaches or cliffs. In fact, in some cases, seawalls act as barriers to inland drainage, worsening flooding from heavy rain on the landward side.

A more unusual example of how human activity is increasing erosion and flooding is taking place in Jakarta, the capital of Indonesia. The city is sinking at one of the fastest rates in the world, with some northern areas dropping up to 25 cm (nearly 10 inches) annually due to excessive groundwater extraction, far outpacing global sea-level rise. Almost 40-50% of the city now lies below sea level, with 95% of North Jakarta projected to be submerged by 2050.

Therefore it is clear that the impacts of increased coastal flooding and coastal erosion, whether natural or the result of human activity, is not simply confined to altering our physical coastlines. These processes also have major social and economic impacts which include: the destruction of property and infrastructure in those areas located near to coastlines, habitat loss along beaches, wetlands and mangrove swamps, which can act as coastal defences, under normal conditions, are lost. This loss can lead to further coastal and inland flooding, which apart from the obvious damage caused, can also lead to increased soil salinisation, which has a major impact on crop productivity and the possible contamination of groundwater resources.

The state of coastal erosion in the UK

It is widely recognised that the UK has the longest stretch of artificially protected coastline in Europe (2,300 km).

This protection is necessary due to the high vulnerability of the coastline, with roughly 17% (or over 3,000 km) of the UK coast experiencing erosion. In England and Wales, roughly 44-45% of the coastline is protected by some form of structure. Over one-third of the coastline is designated as having "no active intervention" (no planned maintenance of defences), meaning these areas will be left to erode naturally. In Scotland, only about 6% is defended.

The need for coastal protection is increasing, with annual damages from coastal erosion expected to rise significantly by the 2080s. It has been estimated that implementing protection for England's coast alone could cost between £18–30 billion.

Coastal erosion in the UK is a critical issue, with approximately 17%–28% of the coastline, particularly in England and Wales, facing significant risk due to rising sea levels and increased storm intensity, which together are accelerating erosion to such an extent that annual damage is projected to increase 3-9 times by the 2080s.

The fastest-eroding coastline in Europe is the Holderness coast in East Yorkshire, where erosion and flooding risks are accelerating because of increased storm frequency and sea-level rise driven by climate change, threatening thousands of homes and infrastructure. It is currently estimated this 61 km stretch of coastline is eroding at a rate of 2m every year.

This rapid rate of erosion is due primarily to soft clay cliffs that run along the coast, which are easily eroded by powerful North Sea waves, and longshore drift.

The east coast of England is, in general, a high-risk area, in particular Norfolk (e.g., Happisburgh), Yorkshire, and Essex, which have an increased risk of coastal erosion due to soft sediment cliffs. Other hotspots include Cornwall, Cumbria, Dorset, and the Isle of Wight.

Coastal erosion in Wales is a significant, ongoing threat, with projections suggesting the coastline's size could change over the next century due to rising sea levels and increased storminess, impacting communities and infrastructure. This situation is leading to difficult decisions about managing land loss and potentially relocating some communities, even though extensive coastal defences protect much of the area.

Whilst 19% of Scotland's coast is considered "soft/erodible," much of its coastline is robust hard rock, reducing overall vulnerability compared to the rest of the UK.

It is anticipated that the UK will have to adapt to at least one metre of sea-level rise in the future. According to the Committee on Climate Change (CCC), even a 0.5-metre rise is projected to make a further 20% of England's coastal defences vulnerable to failure as a result of increasing wave stress on the coast.

Added to this, the CCC has identified 520,000 properties in England alone, including 370,000 homes, in areas at future risk of damage from coastal flooding. Looking to the future and relying on the coastal defences we currently have in place, data from the British Geological Society (BGS) suggests that some one million properties are at potential risk from inundation by 2050, increasing to 1.25 million by the 2080s and 1.35 million by 2100. Furthermore, looking at national infrastructure, the BGS calculates that 1,600 kilometres of major roads, 650 kilometres of railway line, 92 railway stations and 55 historic landfill sites are at risk of coastal flooding or erosion by 2100.

The CCC report, *'Managing the Coast in a Changing Climate'*, (October 2018), adds that in the future,

'Some coastal communities and infrastructure are likely to be unviable in their current form'.

Committee on Climate Change (2018). Managing the Coast in a Changing Climate. [online] London: Committee on Climate Change, pp.1–70. Available at: https://www.theccc.org.uk/publication/managing-the-coast-in-a-changing climate/.

Planning for Coastal Erosion/ Management Strategies

National Legislation

The Flood and Water Management Act 2010 places a statutory duty on the Environment Agency to develop a National Flood and Coastal Erosion Risk Management Strategy for England (although further details on measures in Wales, Scotland and Northern Ireland can be found on page 35). This strategy describes what needs to be done by all risk management authorities (RMAs) involved in flood and coastal erosion risk management for the benefit of people and places. This includes:

- the Environment Agency
- lead local flood authorities (county councils and unitary authorities)
- district councils
- internal drainage boards
- highways authorities
- water and sewerage companies

As part of this approach, The 2020 Flood and Coastal Erosion Risk Management Strategy was developed.

This strategy's long-term vision is for: a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100.

Environment Agency (2020). National Flood and Coastal Erosion Risk Management Strategy for England. [online] London: Environment Agency, pp.1–117.

Available at: https://assets.publishing.service.gov.uk/media/5f6b6da6e90e076c182d508d/023_15482_Environment_agency_digitalAW_Strategy.pdf.

It has 3 long-term ambitions, underpinned by evidence about future risk and investment needs. They are:

- **Cimate resilient places:** working with partners to bolster resilience to flooding and coastal change across the nation, both now and in the face of climate change
- **Today's growth and infrastructure resilient in tomorrow's climate:** making the right investment and planning decisions to secure sustainable growth and environmental improvements, as well as infrastructure resilient to flooding and coastal change
- **A nation ready to respond and adapt to flooding and coastal change:** ensuring local people understand their risk to flooding and coastal change and know their responsibilities and how to take action.

The Environment Agency as the lead partner is required to update their understanding of current and future flood and coastal erosion risk as part of their statutory roles under the 2010 Flood and Water Management Act. Understanding of flood and coastal erosion risk is important to a wide range of users from policy makers and practitioners to planners and developers, emergency responders and members of the public to help them to be ready to adapt to a changing climate.

The Environment Agency has been transforming how they understand current and future risk by improving two key evidence tools:

- **The National Flood Risk Assessment (NaFRA)** provides a single picture of current and future flood risk from rivers, the sea and surface water for England.
- **The National Coastal Erosion Risk Map (NCERM)** provides the most up to date national picture of current and future coastal erosion risk for England. The NCERM also accounts for the latest Shoreline Management Plans which set out a long-term approach to managing flood and coastal erosion risk around the coast.

NCERM provides the latest information on the source and characteristics of flood and coastal erosion risk, distribution of risk across England and the potential for these to change in the future. For the first time, both NaFRA and NCERM account for the latest UK Climate Projections (UKCP18) and the potential impact of climate change on flood and coastal erosion risk.

Environment Agency (2025). National assessment of flood and coastal erosion risk in England 2024. [online] Bristol: Environment Agency, pp.1–43. Available at: https://assets.publishing.service.gov.uk/media/6797a4e6e0edc3fbb060633c/E03253099_EA_Flood_Coastal_Erosion_Risk_Assessment_accessible_v2.pdf.

Based on the data, the report describes how the assessment of flood and coastal erosion risk is changing due to a combination of changes to physical factors such as climate change projections, a greater understanding and assessment of risk and improved modelling, and new data.

Flood and coastal erosion risk is not static but constantly changing as the UK adapts to a changing climate. Therefore, the map contains projections of erosion risk around the coast set to the time periods defined in the **Shoreline Management Plans.** These time periods are:

- Mid-century year of 2055
- The end of century year of 2105

The Environment Agency has worked in collaboration with coastal local authorities to produce the new NCERM in order to provide

- A valuable tool for coastal managers, infrastructure providers and local authority planners
- Help to inform decisions including the designation of CCMAs
- Help everyone understand coastal erosion risk where they live or plan to invest, so they can make informed decisions

Met Office (2018). UK Climate Projections (UKCP). [online] Met Office. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp.

The NCERM will be regularly updated with the latest flood and coastal erosion risk information, including updates about The Environment Agency's digital services on GOV.UK such as 'Check your long term flood risk', which will help customers understand what this new information means for them at a local level. The Agency will be able to show users information on potential flood depths as well as future flood risk taking into account climate change. It is also envisaged that this information will allow the Agency to assure that their investment programmes are prioritising the places and projects where current and future risk is greatest.

Finally, it is felt that the new NCERM will deliver improvements as it will:

- Make erosion information more accessible to coastal managers, planners, and the public by using clearer online visualisations
- Include the impacts of climate change on coastal erosion risk
- Use improved methodologies, recent data, and new research on the acceleration of erosion due to rising sea levels
- Provide new information on coastal land instability caused by rainfall and rising groundwater levels, which can contribute to cliff erosion and landslides

Other useful sources of information include the UK Government's latest research on exploratory sea-level projections for the UK, which provides future projection ranges to the year 2300. Under all scenarios, sea level is expected to continue to rise. Estimates range across (approximately) 0.5m to 4.3m dependent upon the levels of carbon emissions over this period.

GOV.UK (2023). Check the long term flood risk for an area in England. [online] GOV.UK. Available at: https://www.gov.uk/check-long-term-flood-risk.

Environment Agency (2019). Exploratory Sea Level Projections for the UK to 2300 Project Summary . [online] Bristol: Environment Agency, pp.1–2. Available at: https://assets.publishing.service.gov.uk/media/60378c08d3bf7f0399c6a08d/Exploratory_sea_level_projections_for_the_UK_to_2300_-_summary.pdf.

Shoreline management plans and the role of local authorities

Local authorities in the UK, primarily unitary, district, and borough councils, historically took the lead in managing coastal erosion and local flood risks, operating as "Coast Protection Authorities" under the Coast Protection Act 1949. Whilst this is still the case, this role has been augmented and updated by subsequent legislation to operate within a broader, more integrated framework for risk management. Local authorities now operate alongside the Environment Agency (EA), which took on a "strategic overview" role in 2008.

With the passing of The Flood and Water Management Act (2010), this updated the framework, classifying local authorities as "Risk Management Authorities" (RMAs). The Act requires local authorities to cooperate with the Environment Agency and other bodies to manage both coastal erosion and flood risk.

Shoreline Management Plans

The National Flood and Coastal Erosion Risk Management Strategy set out how risk management authorities, partners and communities can help ensure the UK is ready for, and resilient to, flooding and coastal change now and throughout the 21st century.

Defra Guidance on developing Shoreline Management Plans (2006) help to deliver the ambitions of the National Strategy by setting out a planned approach to managing flood and coastal erosion risk around the coast of England to 2105.

It is recognised that shorelines constantly change due to waves and tides. The changing coastline has also been influenced by people's actions, particularly in attempts to stop erosion or flooding. In some cases, this activity has affected other places along the coast. For example, defending one place from erosion can interrupt the movement of sediment down the coast, starving other places of material for beaches that help manage their own flood or erosion risk.

Social, economic, and environmental pressures are increasing in the coastal area. People enjoy living by and visiting the coast, and there is a demand for housing and regeneration. Climate change, rising sea levels and more intense storms are accelerating the changes to our coast. Communities are already being affected by sea flooding and loss of land due to coastal erosion, including cliff falls. These events are expected to become more frequent.

Therefore, **Shoreline Management Plans (SMPs)** allow relevant bodies to focus on the future so they can work out how to manage changing coasts. It is important that the management choices of today allow coastal settlements to thrive in a way that is resilient to this change. It is recognised that actions taken or proposed now should not restrict the opportunity for change later or raise expectations that current management will always continue.

SMPs were developed by coastal groups using guidance developed by Defra in 2006. They were approved and adopted by local authorities and the Environment Agency between 2006 and 2012. Supplementary guidance was produced by the Environment Agency in 2020 to 'refresh' the SMPs to ensure they are up to date.

Those local authorities that have a coastline within their jurisdiction are designated as Coast Protection Authorities and are responsible for developing Shoreline Management Plans (SMPs), which determine the long-term policy for protecting the coastline. SMPs are detailed, technical documents that consider how to manage the influence of coastal processes on the natural and human environment, focusing on how to manage risk from flooding and erosion.

SMPs are designed to seen as living plans updated by coastal groups. They guide coastal management investment decisions on the coast such as:

- Building and maintaining sea defences
- Implementing adaptation plans
- Creating coastal habitats

They are adopted by local authorities and used as part of the town and country planning system to designate **Coastal Change Management Areas (CCMAs)**. They also inform local plans and development decisions

SMPs are non-statutory, high-level documents that assess risks to people, property, and the environment, informing local development planning. The plans are reviewed, updated, and managed as "living documents" to manage coastal erosion and flooding risks over short, medium, and long-term horizons.

These 'horizons' cover short (0-20 years), medium (20-50 years), and long-term (50-100+ years) periods to adapt to climate change.

Twenty SMPs currently cover the entire coast of England and divide the coast up into units. Using local evidence, a generic management approach is decided for each unit over three broad planning horizons within a 100-year period, starting from 2005. These are:

- **Hold the Line (HL)**, maintain or upgrade protection from flooding or erosion by holding the shoreline in broadly the same position.
- **No active intervention (NI)**, maintain or encourage a more natural coastline. This may involve discussing adaptation to the risk from flooding or erosion.
- **Managed re-alignment (MR)**, change the position of the shoreline in a controlled way, such as by slowing erosion or creating areas of habitat to help manage flooding.
- **Advance the Line (AL)**, actively move shoreline defences significantly seawards.

The Shoreline Management Plan Explorer explains how these approaches can be achieved along different sections of the coast. All are dependent upon funding being available.

The Shoreline Management Plan Explorer allows you to view:

- SMP management approaches and actions for each section of coast
- Where changes to management approaches have been made and why
- Areas protected for their environmental, historic or landscape importance which must be considered when deciding the approach to managing flood and erosion risk
- Guidance on how shoreline management plans are developed and updated

It should be noted that SMPs are long-term plans each covering large areas of coast, so they focus on setting the direction of management rather than the full detail of how that direction will be implemented. Specific investment options are developed locally, sometimes using a focused coastal strategy for a particular stretch of coast.

environment.data.gov.uk. (n.d.). Home | Shoreline Management Plans. [online] Available at: https://environment.data.gov.uk/shoreline-planning.

Management approaches can change if new evidence shows a different approach would be more sustainable. The Environment Agency reviews all changes proposed to management approaches.

As well as coastal local authorities, The Environment Agency and Natural Resources Wales, there are other contributors to SMPs. These include environmental bodies such as Natural England, landowners, and regional flood defence committees. In addition, communities were also consulted.

These, along with other stakeholders like DEFRA, create these non-statutory policies, which are then approved by the Environment Agency and local council cabinets.

Coastal groups (key partnerships formed by local authority engineers, planners, and the Environment Agency) continue to maintain each plan, manage any changes, share experiences and report progress. Where a coastal group contains more than one SMP, smaller **SMP Management Groups** have been formed to report progress back to the coastal group.

These groups are not themselves responsible for the delivery of SMP Action Plans. Different actions will be led and delivered by different parties, depending on the type and location of the action approved by the Environment Agency and local council cabinets.

Different **technical consultants** were commissioned to develop SMPs around England, so the full SMP documents are often presented and organised slightly differently to each other.

Data.gov.uk. (2020). Shoreline Management Plans and local development planning |. [online] Available at: https://environment.data.gov.uk/shoreline-planning/help/smps-and-local-planning.

The actions needed to achieve these management approaches (such as building any coastal defences) depend upon approvals such as planning permission and environmental assessments. They also require funding from government or others, which is not guaranteed by the SMP. If with time an agreed management approach is considered unsustainable, it can be changed using a clear procedure. More information on this procedure can be found on the Updating and changing Shoreline Management Plans page.

The Environment Agency is continuing to work with coastal groups on further improvements to SMPs. These include updating management approaches where needed and providing new assessments of coastal flood and erosion risks.

Department for Environment, Food and Rural Affairs (Defra) has committed to review national policy for shoreline management plans by 2026. This will be informed by the Environment Agency's SMP refresh.

It will make sure:

- Local plans are transparent
- They continuously review outcomes and enable
- Local authorities can make robust decisions for their areas

Regional Coastal Groups

Coastal Groups bring together a region's key partners in flood defence and coastal management – principally the coastal managers from maritime Local Authorities, Port Authorities and the Environment Agency. Other interested organisations, such as Natural England, English Heritage, landowners and Defra, will also be members.

There are seven regional coastal groups in England, as prescribed by Defra in March 2008, each of them formed with regard to local coastal processes (sediment cells) and River Basin Management Plans.

Regional Coastal Groups are voluntary groups with significant strategic influence. They do not receive funding from central government but are resourced through a range of mechanisms generally involving membership contributions.

- **North East Coastal Group:** St Abb's Head to Gibraltar Point.
- **East Anglia Coastal Group:** Gibraltar Point to the Thames Barrier.
- **South East Coastal Group:** Thames Barrier to Beachy Head (previously merged with South Downs).
- **Southern Coastal Group (SCG) & SCOPAC:** Selsey Bill to Portland Bill, including the Isle of Wight.
- **Southwest Coastal Group:** covers the southwest peninsula.
- **North West England & North Wales Coastal Group:** Great Orme's Head (Wales) to the Scottish border (Solway Firth).
- **Severn Estuary Coastal Group:** manages the shoreline around the Severn Estuary, from Lavernock Point to Anchor Head.

Data.gov.uk. (2026). Updating and changing Shoreline Management Plans. [online] Available at: https://environment.data.gov.uk/shoreline-planning/help/updating-and-changing-smps

Coastal Change Management Areas (CCMAs)

Local Planning Authorities (LPAs) use SMPs to designate CCMAs in their local plans, identifying areas likely to be affected by coastal change and setting policies for development within them

CCMAs designate zones for those areas vulnerable to physical changes like erosion, coastal landslip, or permanent inundation.

They are used by local authorities to guide development, often restricting new building in high-risk spots, and are integral to SMPs. One of the key purposes of CCMAs is to manage risks from climate change and rising sea levels, ensuring development is appropriate for the risk level. This means any development within CCMAs is regulated and planning applications within these zones may require a Coastal Vulnerability Assessment (CVA) to determine the impacts of coastal change.

Despite being introduced in the 2012 National Planning Policy Framework (NPPF), adoption of CCMAs by local authorities is very low, leaving significant portions of vulnerable coastline without specific, designated protection policies.

Local authorities cite a lack of funding, resources, expertise, and guidance on which datasets to use for forecasting, which hampers the ability to delineate high-risk zones.

Where CCMAs are used, they are intended to manage development in areas vulnerable to erosion or flood over the next 100 years.

The Climate Change Committee and several parliamentary reports note that as climate change increases, a more robust, widespread adoption of these adaptive management areas is needed to move from merely defending to adapting to coastal change.

In Scotland, Shore Management Plans follow the same approach as those in England and Wales by identifying sustainable, long-term approaches for specific coastal segments, covering areas like Angus and Ayrshire. SMPs are developed by local authorities, in conjunction with Dynamic Coast data, to address accelerating sea-level rises. Dynamic Coast is funded by the Scottish Government, Centre of Expertise for Waters, NatureScot, and the St. Andrews Link Trust. The purpose of the project is to provide the strategic evidence base on the extent of coastal erosion in Scotland

Northern Ireland currently lacks a comprehensive, strategic Shoreline Management Plan (SMP) for its entire coast. However, whilst a Draft Marine Plan for Northern Ireland is in development to manage, protect, and guide the use of the marine area, there is no overarching, formal strategy existing to dictate whether to hold the line, manage realignment, or allow natural coastal processes to dominate. Although there is no blanket SMP, the developing Marine Plan is expected to provide a framework for future management.

The Practicalities of Combatting Coastal Erosion

Reducing coastal erosion in the UK often involves integrated approaches, using both hard engineering such as sea walls, groynes, rock armour together with soft engineering (beach nourishment, dune stabilisation).

Hard engineering

Hard engineering techniques to combat coastal erosion largely involve constructing artificial, high-cost, and often intrusive, structures designed to halt, rather than work with, natural processes.

Key methods include seawalls, rock armour/revetments, groynes, and gabions, which are typically used to protect high-value, high-risk, developed coastal areas.

- **Sea walls** act as physical barriers designed to withstand the strongest of waves. They are often incorporated into existing coastline infrastructure such as promenades. These features tend to be seen as the ultimate protection for areas where there is high wave activity and where the potential for erosion will have the most impact, such as the base of cliffs or in front of settlements. Even though they can be very effective, they are often placed at the end of long beaches and often only intended to be called into action as a final defence measure.

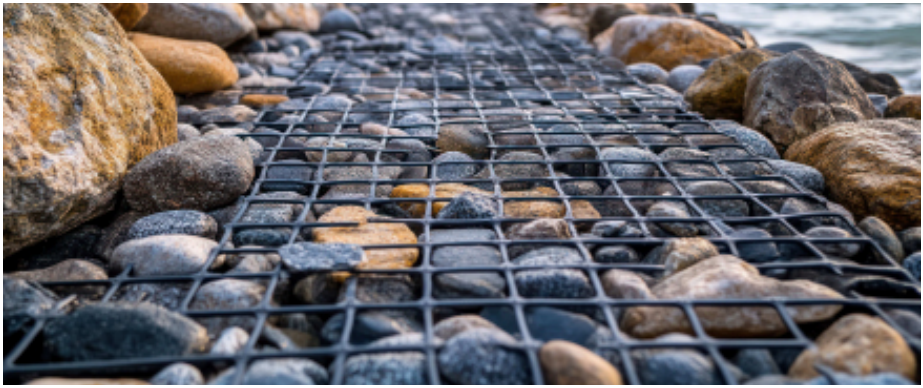
- **Rock Armour/Rock Revetments** Rock armour consists of large, durable, angular rocks (often igneous or metamorphic) placed to protect shorelines, riverbanks, and marine structures from erosion. These materials absorb and dissipate wave energy, with individual pieces often weighing 60 kg to 10 tonnes. Revetments are sloped structures, often constructed using rock armour, that armour a beach face or embankment. They are located, along the base of cliffs, although effective they can be difficult and expensive to build and maintain. In addition, they can sometimes

cause increased erosion in nearby unprotected areas.

However, they do dissipate waves rather than reflect them, which means there is little scouring action of beaches at the base of revetments. In fact, this dissipation can lead to a build-up of sand, pebbles and shingles at the base of the revetment, which further helps reduce the impacts of waves and their erosional capacity. Over time these features can provide habitats for wildlife.

- **Gabions** are durable, mesh wire cages filled with rocks or other materials, such as rock, concrete or stone, positioned at the base of cliffs to stabilise them. They are commonly used as cost-effective, free-draining and flexible solutions for retaining walls, erosion control, and slope stabilisation. They provide a robust, eco-friendly alternative to concrete, lasting 50–100 years, and are frequently used in civil engineering for sea walls, riverbanks, and landscaping, however they can be prone to, rapid, rusting and damage.

- **Groynes** are a key hard engineering method in the UK, using timber, rock, or concrete structures built perpendicular to the shore to trap sediment moved by longshore drift. They trap sand and shingle, widening the beach to protect the land behind from flooding and erosion. By widening beaches, they create natural buffers that absorb wave energy. While effective locally, they often starve down-drift areas of sand, increasing erosion elsewhere. It has been found that whilst highly effective in the short term, they require high maintenance and repair costs. Government has produced a report on how to develop more cost-effective approaches to groyne construction.



Hard engineering is often effective if not always attractive, but when nature decides to 'let rip', even hard engineering can fail, as was seen recently when parts of a major road between Torcross and Slapton in Devon broke apart due to the action of high winds and waves. This was caused by the loss of sand over recent years leaving the road more vulnerable to collapse.

Environment Agency and Flood and Coastal Erosion Risk Management Research and Development Programme (2021). Groynes in coastal engineering. [online] London: Construction Industry Research and Information Association, pp.1–200. Available at: https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/groyne-maintenance.

Soft engineering

Soft engineering coastal defences involve sustainable, natural approaches to manage erosion and flooding by working with natural processes rather than building rigid, artificial structures.

- More sustainable, lower-cost methods include **nourishing beaches** with imported sediment or recycling sand/grave. By adding more quantities of sand or shingle to a beach, this creates wider and more gradually sloping beaches, causing the destructive impact of waves to break earlier and consequently lose much of their energy before they reach sea defences and cliffs.
- Increasing the size and width of natural defences like **sand dunes** can create natural barriers to reduce the effect of storm surges by acting as a barrier. Through the introduction of additional planting on the dunes e.g. marram grass, this can further increase the stability of the dunes and their protection value.

Often, soft interventions are seen as being more environmentally friendly in the way they can enhance and even work with the natural environment in a way that protects coastlines whilst retaining a naturalistic in appearance.

Natural Solutions

Natural solutions to protect coastlines, sometimes known as Nature-based Solutions (NbS), use ecosystems like mangroves, coral reefs, salt marshes, and sand dunes to reduce erosion and storm surge. These approaches have often been found to perform better than hard engineering. These methods, including restoring seagrasses and building oyster reefs, offer sustainable, cost-effective defence that enhances biodiversity, locks away carbon, and adapts to rising sea levels.

- **Saltmarshes and mudflats** act as a buffer to absorb tidal energy and protect coastal land from erosion.
- **Sand dunes and planting native vegetation** helps stabilise sand, creating a natural barrier that grows with sea levels.

- **Reef Restoration (Coral/Oyster)** helps create underwater structures that act as breakwaters, reducing wave height and energy.
- **Living shorelines** is an approach that combines vegetation, sand, and organic materials to stabilise shorelines while maintaining natural habitats, further increasing the stability of the dunes and their protection value.

There are considerable benefits in adopting a nature-based solution approach including:

- **Long-Term Resilience:** Unlike concrete seawalls that may fail or exacerbate erosion elsewhere, natural systems can adapt to environmental changes.
- **Biodiversity Boost:** These solutions restore habitats, supporting coastal wildlife and fisheries.
- **Carbon Sequestration:** Coastal habitats like salt marshes act as carbon sinks, helping to combat climate change.
- **Cost-Effectiveness:** Often cheaper over the long term compared to building and repairing artificial, hard-engineered structures.

Nature-based solutions can play a key role in reducing flood risk, but they are rarely enough to make a step-change in the risk faced by communities and businesses alone during the most significant flood events.

They work best when a 'catchment-based approach' is taken to manage the flow of water from the source of our rivers to the sea, across our towns, cities, countryside and coasts. This way, nature-based solutions and engineered flood and coastal defences can complement each other to manage flood risk to communities.

There are over 100 catchment-based partnerships across England and cross border with Wales taking a community-led approach to engaging with risk management authorities, land managers, businesses and local communities.

Managed retreat or 'managed realignment'

Yet despite all these approaches, there is a need to acknowledge that some areas will need to adapt as coastal erosion increases, potentially involving managed retreat or as it has been renamed 'managed realignment' with the real possibility of whole communities having to be relocated. This situation means no longer maintaining coastal defences in a particular area but instead, allowing nature to take its course.

This change in approach has come about due to unsustainable costs and the speed at which climate change is increasing coastal erosion and flooding. In certain areas of coastline, hard engineering defences are being replaced by managed realignment (letting the sea in) or, in some cases, "no active intervention".

Fairbourne in Wales is one such community under threat from rising tides. The local council has had to tell the community of around 410 homes, that it will only keep sea defences going until 2050, and will start to 'decommission' the village before then, moving households out.

The surrender to climate change represented by planned abandonment of Fairbourne is not an isolated occurrence. Sea levels around the UK have risen by 15.4cm since 1900, and the Met Office predicts modern levels could increase a further 1.12m by 2100. Areas which are under particular threat include less sparsely populated rural communities where large areas of agricultural land are already being given up, causing once productive land to become useless as salt water encroaches.

The UK is facing rising sea levels, intense coastal erosion/flooding and an increase in surging storms more frequently than was previously predicted. It is estimated that currently over 100,000 homes are at risk and this will rise to 1.5 million by 2080. What is even more concerning is that storm surges (a combination of high winds and rising sea), which use to occur every 100 years, could now become annual events by 2070

Facing this level of threats means some coastal communities will become unsustainable. Sir James Bevan (previous CEO of the Environment Agency until 2023), speaking in 2022 stated that,

"While we can come back safely and build back better after most river flooding, there is no coming back for land that coastal erosion has taken away.'

Currently, there is no legal obligation for local or national government to protect or compensate people for the loss of their homes due to climate change or its impacts such as coastal erosion.

However, in recognition of the growing problem and threats of coastal erosion on local communities in England, The Environment Agency has announced that government has allocated £30 million to those coastal communities which are battling eroding shores.

Under the Environment Agency's new Coastal Adaptation Pilots, £18 million will be shared between coastal projects across the East Riding of Yorkshire, Norfolk and Suffolk to continue advanced coastal adaptation work. These areas have been at the forefront of developing innovative approaches to coastal transition and will help fund new long-term adaptation approaches.

This will include selective property purchases or long-term financing solutions in areas where homes face imminent risk from erosion, in the hope that this funding could provide a sustainable model for managing coastal transition.

The new pilots build upon the £36 million Coastal Transition Accelerator Programme, which continues to support coastal authorities to trial new methods for managing erosion. This has helped residents and businesses move away from high-risk areas while sharing insights with other vulnerable communities.

The Environment Agency will manage the pilots, which are due to start in April 2026. They will provide technical support to participating areas over the coming months and will ensure that learning is shared with other coastal communities facing similar pressures.

Environment Agency (2026). £30 million boost for coastal communities adapting to eroding shores. [online] GOV.UK. Available at: https://www.gov.uk/government/news/30-million-boost-for-coastal-communities-adapting-to-eroding-shores

Landslips

As well as the gradual wearing away of our coastlines by wind and wave action, there is another natural phenomenon which causes significant damage to our coasts and the communities and infrastructure lying close by – landslips or alternatively, landslides.

Landslips are a major mechanism of coastal erosion in the UK, often causing rapid and dramatic cliff collapses, particularly in soft rock areas like the East Yorkshire, Norfolk, Kent, and Dorset. Triggered by winter storms, heavy rain, and wave action undermining cliff bases, these mass movements result in significant property loss, infrastructure damage, and danger to the public.

Landslips, or landslides, driven by coastal erosion are a critical threat across the UK, affecting over 1.3 million people in 98 coastal areas. Over 50% of the England and Wales coastline features unstable cliffs subject to erosion and rotational slumping, which is when saturated material such as weak rock or unconsolidated material (like clay) becomes heavy as a result of excessive rainfall, reducing friction and causing a mass to move downward and rotate backward

Areas such as The Isle of Wight have complex, long-term landslip systems, particularly in areas like Ventnor and the Undercliff. Due to a combination of weak, complex geology (clays, sands, and chalk), intense coastal erosion at the cliff base, and recent high, concentrated winter rainfall, landslides have become a more common occurrence. The 2023-24 winter, among the wettest on record, triggered massive landslides, one landslide in December 2023 removed over 2.5 million cubic metres of material alone.

Isle of Wight Council (2025). DEVELOPMENT OF LANDSLIDE AND COASTAL CHANGE ADAPTION PLAN. [online] Isle of Wight: Isle of Wight Council, pp.1–26. Available at: https://iow.moderngov.co.uk/documents/s19203/Report.pdf.

Because of climate change causing rising sea levels and extreme weather patterns, increased coastal erosion is continuously removing material from the "toe" of the cliffs, removing support for the slopes above.

These factors combine to make the area a continuously evolving landscape, forcing ongoing, large-scale engineering, monitoring, and, in some cases, the abandonment of homes and roads

Recent updates to the Shoreline Management Plan (SMP) and the Draft Island Planning Strategy (DIPS) have reflected a growing recognition that traditional coastal defences alone are insufficient. Instead, a shift toward adaptive, long-term planning is required. This includes the identification and implementation of Coastal Change Management Areas (CCMAs), which will guide future development away from high-risk zones and support the relocation of vulnerable infrastructure and communities. The strategy will also promote the use of nature-based solutions, such as dune restoration and managed retreat, to enhance resilience while preserving the Island's unique coastal ecosystems.

To support this approach, the Isle of Wight Council is proposing a **Dynamic Adaptive Pathway Approach (DAPA)**, which is a way of planning for coastal change that helps communities and decision-makers deal with uncertainty—especially around climate change, sea level rise, and erosion.

Instead of choosing one fixed solution, this approach lays out a range of possible actions that can be taken over time. It helps:

• Plan ahead for different future scenarios (e.g. faster or slower sea level rise)

• Stay flexible, so different actions can be taken if conditions change

• Avoid costly mistakes, by only committing to major changes when they're really needed

The council has described this approach as a type of roadmap with multiple routes. Where the council start on one path, but if the situation changes—like flooding becomes more frequent—they can move to a different route that's better suited to the new conditions.

In short, DAPA helps the council make flexible decisions about how to manage their coast over time, while keeping options open and preparing for change.

Dealing with coastal erosion - case studies

Hard Engineering - Blackpool

Recent large-scale investment in Blackpool's coastal defences totals over **£118 million** in secured funding for major projects designed to combat rising sea levels, protect thousands of homes, and preserve beaches. While various projects have been announced at different price points, the primary focus currently is on a **£57m** Beach Management Scheme and a £61m upgrade to Bispham defences.

Blackpool Beach Management Scheme (£57m): Funded by the Environment Agency, this project involves constructing 17 rock headlands (groynes) on the beach between South Pier and Cocker Square. Its main aim is to trap sand, slow down beach erosion, and protect existing, aging seawalls.

Bispham Sea Defences (£61m): This project focuses on refurbishing 2.8 km of coastal defences between Princes Way (Little Bispham) and Cocker Square. This project is looking to replace 1980s-era defences and to protect 3,631 households and the tramway.

Anchorsholme Coastal Protection: Separate, ongoing works to address falling beach levels, including rock revetments and groynes to stabilise the beach and protect the existing seawall, thus protecting over 5,000 properties against coastal flooding at a cost of £11 million.

North West England North Wales Coastal Group (2023). Shoreline Management Plan Guide - Wyre . [online] Wyre: North West England North Wales Coastal Group , pp.1–14. Available at: https://www.mycoastline.org.uk/wp-content/uploads/2023/04/Wyre-leaflet-Feb-23.pdf.

In addition to these new multi-million-pound projects, over £150 million has already been invested in Blackpool's coastal infrastructure over the past 30 years.

Collectively, the schemes aim to protect over 10,000 households from coastal flooding and are part of the "Hold the Line" Policy outlined in Shoreline Management Plans. The work is part of a long-term strategy to maintain the coastline against increased risks from climate change and rising sea levels.

The work undertaken by Blackpool is part of a wider coastal approach as outlined in the Northwest England North Wales Coastal Group Shoreline Management Plan.

Soft Engineering - Sefton Merseyside

The Sefton sand dunes form the largest dune system in England along the Sefton coast (Formby to Southport), and act as a critical, natural, and dynamic barrier against coastal erosion and flooding. The dunes are managed by the National Trust and Sefton Council, and help dissipate wave energy during storm events and, despite being vulnerable to severe erosion themselves, adapt to protect inland areas. The dunes provide a flexible, self-repairing barrier that protects against storm surges and high tides.

Whilst the dunes system is constantly shifting; in that some areas experiencing erosion (e.g., Formby), whilst others experience accretion, this dynamism allows the dunes to rebuild. By storing vast amounts of sand, dunes can release this sand to nourish the beach during erosion events like storms, acting as a self-repairing system.

However, in order to maintain their protective function, they have to be carefully managed. This involves restricting public access to sensitive areas through the use of boardwalks to prevent them being disturbed as well as allowing natural processes to dominate, in particular, the establishment of vegetation which hold the dunes together.

As well as having a protective value against coastal erosion by protecting low-lying land, infrastructure, and communities from flooding, the dunes are vital habitats for wildlife and are designated as a Site of Special Scientific Interest. Although highly effective, these soft defences can still be overtopped or damaged during extreme, severe storms.

Community and Wildlife impacts of coastal erosion

The information so far has very much concentrated on the causes and the physical impacts of coastal erosion, but there are other areas where coastal erosion is having a negative impact, such as community sustainability and the destruction of wildlife habitats.

Coastal erosion threatens communities by causing loss of land, infrastructure (roads, sewage systems), and homes. It causes significant economic damage to property and businesses, damages tourism, and negatively impacts mental health where residents face fear of flooding and, in severe cases, forced migration, which can lead to anxiety, depression, and PTSD. Many residents simply do not want to leave their homes and argue that more could be done to save them, but the brutal reality is often that the measures needed to protect such threatened properties are too costly, and even if implemented, cannot guarantee permanent protection due to the uncertainty of future climate change impacts.

In addition to the loss of homes, coastal erosion can lead to the loss of amenities and heritage such as beaches, recreational spots, and historical sites being threatened and even destroyed, thereby reducing local quality of life and cultural heritage.

Regarding coastal wildlife habitats, coastal erosion has had some severe impacts on these environments as well, in areas such as nesting beaches, saltmarshes, and sand dunes, forcing species to abandon traditional breeding sites. Biodiversity levels are therefore being significantly reduced as the loss of such habitats is altering animal life cycles. Furthermore, where species are hanging on to their traditional breeding sites, the impacts of rising sea levels and landward human defence structures are causing a situation known as "coastal squeeze", where the area of breeding sites is being reduced as well as causing the loss of the wider coastal ecosystems.

More recently, it has been recognised that the extreme weather and storms caused by climate change are having a significant impact on those UK and European birds that winter out at sea. The rougher seas are causing significant damage to the birds leaving them too weak to feed. Known as a seabird 'wreck', winter storms have resulted in hundreds of puffins, guillemots and razorbills washing up on UK beaches during erosion events like storms, acting as a self-repairing system.

Rowlatt, J. (2026). This year's winter storms could prove a disaster for UK puffins. BBC News. [online] 21 Feb. Available at: https://www.bbc.co.uk/news/articles/c043edkn942o.

APSE Member Coastal Erosion Survey 2026

APSE has seen the number of network queries around coastal erosion increase over the last few years and therefore thought it would be worthwhile to gather information from its member coastal authorities as to how coastal erosion is affecting them and how they are they are dealing with this problem.

From the responses received, it was quite clear that large areas of the UK coastline fall under the responsibility of local authorities and all have some sort of plan which allows them to monitor levels of coastal erosion either Shoreline Management Plans or similar.

One Scottish local authority who responded stated that they are developing a **Coastal Change Adaptation Plan (CCAP),** which is a strategic framework developed by local authorities to manage risks from sea-level rise, erosion, and increased storminess. These plans aim to protect specific at-risk coastal communities and assets by identifying long-term, nature-based, and structural adaptation solutions to unavoidable changes by identifying specific triggers, actions, and projects to help communities adapt (e.g., relocating assets and using natural defences). Whereas an SMP determines what to do with the coast, a CCAP in Scotland defines how a community will adapt to those changes over time.

The CCAPs have been developed under Scottish Government 2023 guidance to address climate change and support local authorities.

Most respondents were able to identify how much of their coastline they had defensive features on and how much was 'undefended,' although some did indicate that there was some uncertainty as to who was responsible for all the sea defences in their area due to a lack of historical records and changes in administrational boundaries over the years. What was clear was that the main defensive structures were in those areas where there were primary coastal communities and major infrastructures.

Regarding the types of defensive features used, nearly all used seawalls of varying lengths, together with the widespread use of breakwaters and groynes. Natural defences, such as dune stabilisation and creation, although represented in 20% of responses, were still seen as being less effective than hard engineering solutions.

www.north-norfolk.gov.uk. (n.d.). Home | Coastwise. [online] Available at: https://www.north-norfolk.gov.uk/projects/coastwise/.

Although most respondents felt hard engineering solutions were effective, there was a recognition that these suffered from being costly to maintain and surprisingly, many commented that a number of their sea walls were old and were being 'overlapped' more often due to higher sea levels and greater storminess. Several respondents also raised concern about the greater loss of sand than occurred previously on some of their beaches due to increased and strengthened wave activity.

As mentioned previously, maintaining hard engineering features did seem to cause financial concerns, particularly around the relatively small budgets available to carry out necessary works and the fact monies were not ring-fenced but rather part of the local authority funding allocation. This had a knock-on effect regarding the differences in inspection frequencies. Some reported that they carried out annual inspections, on high-risk and storm-prone features and post-storm inspections to help prioritise works, whilst some had had to reduce frequency of inspections due to staffing shortages but were prioritising high-risk areas, albeit on a three-year frequency.

Clearly, if damage did occur, this would need rectifying depending on the urgency. But what was clear was that the costs to create hard engineering features were extremely high and that for many, the budgets were so minimal that creating, monitoring and repairing these features was a real challenge.

A recent funding source announced by Government is The Coastal Transition Accelerator Programme (CTAP), which is a £36 million Environment Agency initiative launched in 2022. However, this is a targeted funding stream supporting English communities at high risk from coastal erosion to adapt to climate change. It funds long-term planning, such as managed realignment and community relocation, rather than just building defence. Similar to the Scottish CCAP, it aims to help communities prepare for, and adapt to, the inevitable impacts of climate change on the coastline where defending is no longer sustainable.

Initially focused on North Norfolk and East Riding of Yorkshire, which have high numbers of properties at risk, the £36 million programme has been allocated to explore innovative approaches to coastal transition by 2026/27.

The project in North Norfolk focuses on supporting residents and businesses, managing risks to homes and infrastructure, and exploring how to live with erosion. The East Riding project is looking at preparing communities for coastal change.

Department for Environment, Food and Rural Affairs, Flood and coastal erosion risk management funding policy. [online] GOV.UK. Available at: https://www.gov.uk/government/consultations/flood-and-coastal-erosion-funding-reform/outcome/flood-and-coastal-erosion-risk-management-funding-policy.

Due to the complexities and costs of some of the engineering solutions to reduce coastal erosion, many authorities responding to the survey are adopting a managed realignment approach to stretches of their coastline, where there are fewer communities or infrastructure. However, from comments received, it was made clear this approach, which is often seen as an abandonment of these areas and allowing nature to take its course, is not strictly true. Although no physical defences may be being erected, these areas are still monitored, with supporting adaptation and future realignment plans being drawn up for any future actions which may need to be taken.

Therefore, although limited in scope, the survey was able to show how local authorities were currently addressing coastal erosion in light of rising sea levels and extreme weather events through the use of shoreline management plans and similar documents. However, it was abundantly clear that funding is the critical factor, and priority was having to be given to those areas where the greatest threat was perceived either social, economic or environmental.

Funding Sources

Funding for controlling coastal erosion primarily comes from a combination of central government grants, local authority budgets, and partnership funding from stakeholders who benefit from such works. In England, the Department for Environment, Food and Rural Affairs (Defra) provides the majority of funding (around 90% in 2022) to the Environment Agency (EA) as Grant-in-Aid, which is then allocated to risk management authorities for projects. Known as the **Flood Defence Grant-in-Aid (FDGiA)**, this is the main source for capital projects to build new, or improve existing, coastal erosion defences.

There is also funding raised by the **Local Levy,** which is raised by Regional Flood and Coastal Committees (RFCCs) from local authorities. This fund supports projects that do not qualify for full national funding but are of local importance.

Partnership Funding is also another funding source which encourages local communities and beneficiaries (such as private sector businesses) to contribute to the cost of a scheme, allowing central government to support a wider range of projects beyond just the top-priority ones.

Clearly **Local Authorities** use their own budgets for shoreline management, often supported by the formula grant from the Ministry of Housing, Communities and Local Government (MHCLG). While much funding for maintenance is not ringfenced, local authorities use a portion of their core council tax and business rates revenue for maintenance.

As previously mentioned, the **Coastal Transition Accelerator Programme (CTAP)** is a £36 million programme designed to support communities in adapting to a changing coastline, assisting in moving homes or businesses away from high-risk areas.

Where homes are under threat from being destroyed by the effects of coastal erosion, there is funding through the **Coastal Erosion Assistance Grant (CEAG),** which allocates a grant of £6,000 per property available to help with the safe demolition of homes at the greatest risk of loss.

Other sources of government funding include: the Levelling Up Fund, UK Shared Prosperity Fund, and Rural England Prosperity Fund.

Green Finance and Private Investment is a more recent source of funding, where contributions can be secured through biodiversity net gain units or carbon credits resulting from nature-based solutions (e.g., saltmarsh restoration).

Specific Funding Initiatives

- **£5.2 Billion Capital Programme (2021-2027):** A record investment for flood and coastal erosion projects in England to better protect communities.
- **Coastal Adaptation Pilots:** A £30 million, 2026 announcement to support innovative, long-term adaptation approaches in areas with high erosion risk.
- **Natural Flood Management Funding:** Specific funding for using natural features (e.g., shingle banks, saltmarshes) to reduce coastal risks.

In recent years, large numbers of applications for EA funding have led to an increase in the priority for eligibility, so that only high-priority investments were likely to be successful. However, recent changes in the allocation of Defra funds mean that any worthwhile project is eligible for at least some funding based on the benefits being delivered in each case.

Funding is generally based on an economic assessment of costs and benefits, such as the number of homes protected and damage prevented. Projects often require a business case demonstrating value for money.

Defra has announced that there will be a new approach as to how new and existing Flood and Coastal erosion risk management schemes are funded. Details are expected in Spring 2026, but early indications show that funding eligibility will be along the following lines:

Flood and Coast Erosion Risk Management (FCERM) projects that are prioritised will be eligible for FCERM funding to the following levels, depending on project size and whether the funding is for refurbishing existing projects or for building new projects:

- For existing projects and assets - eligible for 100% of costs for refurbishing existing assets

- For new or improved projects and assets - eligible for 100% for the first £3 million, and 90% for costs above £3 million

The government is acutely aware of the threat from coastal erosion and has put in place a £5.2 billion program for 2021-2027 to improve resilience against flooding and coastal erosion nationwide as previously highlighted.

Funding is often allocated based on the economic value of assets protected, which can lead to disparities between heavily populated areas and rural, eroding coastlines beyond just building sea walls, funding is increasingly aimed at "coastal adaptation" to help communities manage the inevitable, long-term impacts of erosion. But as a cautionary note, whilst major funding is committed, "significant funding pressures" on other national priorities have led to reviews of future plans

Conclusions

Erosion is constantly reshaping coastlines as land is swept into the sea, sometimes along with buildings and infrastructure, and as previously highlighted, the UK has some of the fastest eroding coastlines in Europe with around 17% of its coastlines affected by erosion.

Coastal erosion in the UK cannot be entirely stopped as it is a natural process, which now appears to be accelerated by climate change (sea-level rise and storms). While structures like sea walls and groynes can slow erosion, they are expensive, need maintenance, and can exacerbate erosion elsewhere, and even with such defences in place, there can still be a risk of erosion during large storms. Consequently, defences may only slow coastal erosion rather than stop it entirely. Added to this is the growing risks from landslides often caused by increased rainfall, causing ground water levels to rise and make cliff tops and edges unstable resulting in significant amounts of cliff edge collapsing, such as at Knipe Point near Scarborough in North Yorkshire and Ventnor on the Isle of Wight.

Some evidence indicates that it is not possible or prudent to stop or delay coastal erosion forever as in some places. In fact, it may even be advantageous to allow it to happen. For example, when soft cliffs retreat, they release large amounts of sand which is deposited on nearby beaches, making them higher and wider. High and wide beaches absorb the energy of waves, giving some protection to cliffs, dunes and sea walls from further coastal erosion and flooding.

Realistically, it is almost impossible to defend our entire coastline. Indeed, some would argue that the hard engineering features we use to protect our most at risk sites can in fact visually detract from everything we love about our coastlines and therefore should only be used where absolutely necessary.

Seemingly, rather than trying to hold back the sea, perhaps we need to look at how we can manage or learn to live with the effects of coastal erosion by understanding how to adapt with the constantly changing coastline. This view is now widely accepted with the adoption of coastline strategies, such as SMP's, which consider managed realignment as a key approach.

However, the issue for many coastal authorities is whether they have the resources to achieve the necessary levels of protection they need to protect key sites and infrastructure, and frustratingly, whether such a significant national problem as coastal erosion is seen as such.

If we consider the backbone of our proposed actions to manage coastal erosion – shoreline management plans (SMPs), these plans aim to clearly give confidence that we are able to meet the threats of coastal erosion and its increasing severity caused by rising sea levels and the wider impacts of climate change. However, **SMPs are not statutory documents** so hold no sway over issues such as planning applications for new property developments which may be proposed along the coast. Strong pressure on local authorities in the form of central government housing targets to deliver new developments in their areas too often conflict directly with policies established in shoreline management plans. It has been argued that local politics can sometimes trump long-term strategic policies and create a legacy of unsustainable development. So, to avoid this potential conflict, there must be greater integration and reflection of plans in the areas affected by coastal erosion.

SMPs equally are not documents which have funding to achieve the aims contained in the plans. Therefore, designations such as 'Hold the Line.' may well change in the future if the required funding (Government or partnership), is not obtained, which is a real concern due to the noted increase in applications across the UK for funding. This concern is despite the fact that the Environment Agency is investing £5.2 billion (2021-2027) in coastal projects, as it will still be a challenge to ensure this funding can go anywhere close to matching the ambitions of the SMPs.

A further concern is that a 2024 independent review noted that while many SMPs are effective, some need better integration with local planning, improved, clearer links to infrastructure providers, and stronger long-term environmental planning. Also, some SMPs have also been criticised for needing better community engagement and support to be fully implemented. Indeed, a report by The Climate Change Adaptation Committee echoed this view stating that 'The public are not clearly informed about the coastal erosion risk to which they are exposed or how this risk will change in future' (October 2018). Therefore, in an attempt to address these issues, the Environment Agency has recently launched tools like the **Shoreline Management Plan (SMP) Explorer** and updated **National Coastal Erosion Risk Maps (NCERM)** to provide better digital access to risk data highlighted earlier in the report.

However, despite knowing that your home may be at risk, there is currently no compensation for residents who lose their homes to coastal erosion, apart from a grant of £6,000 for home demolition. This suggests there is an urgent need for enhanced, long-term support for affected residents and local authorities through better communication, relocation packages and close working with those communities most at risk.

This need for greater public protection was also raised by the January 2026 APPG Coastal Communities meeting, which voiced the need for more support and funding mechanisms to be put in place for those impacted by coastal erosion.

This meeting also called for **SMPs to be made a statutory document.** This would mean that statutory Shoreline Management Plans (SMPs) would compel local authorities and agencies to implement long-term coastal erosion and flood risk strategies, moving them from advisory to mandatory, enforceable policies. This should provide legal certainty for investments, enhance climate change adaptation, and ensure cohesive management across different coastlines. A statutory plan would also offer better certainty for developers, businesses, and residents, clearly outlining which areas will be defended and which will not, allowing for informed, long-term decision-making. Giving SMPs statutory status would help ensure a coordinated, large-scale assessment of flood and erosion risks across the entire coast, rather than fragmented, local approaches.

The APPG Coastal Communities meeting also called for a Minister for Coasts to be created. It was felt that a dedicated Minister for Coasts and Rivers is essential because these areas face unique, complex, and rapidly increasing threats that require centralised, strategic management. A focused ministerial portfolio would help ensure that coastal communities, river systems, and the marine environment receive specialised attention rather than being fragmented across different departments.

Looking at some of the comments received in the APSE survey, local authority representations, external committees and recognised experts, it does appear that there is still a great deal of work to be done in raising the issue of coastal erosion to allow a more co-ordinated, realistic and evenly spread funding regime and importantly, a better community focused approach.

The status and legislative value of SMPs also needs to be addressed if they are to be of real worth in ensuring coastal erosion is to be addressed with equal vigour across the UK. Indeed, the proposals regarding a coastal erosion 'tsar' in the form of a Minister for Coasts and Rivers could be one way in which a more co-ordinated and national legislative approach could be achieved and would be popular with many, especially communities who would feel they had someone to look after them.

It is accepted however, that great strides have been made in trying to combat coastal erosion, particularly in those areas most at risk, through hard and soft engineering approaches.

Sadly, the reality is that coastal erosion is not going away. It is a natural process which has always been part of the Earth's geological and weather cycle. The widely accepted human-induced climate change effects which are causing rising sea levels and extreme weather events are now causing the cycle of coastal erosion to speed up. Added to this is the desire of many to live near coasts and develop communities there, which are now increasingly under threat.

To a large extent, the increased levels of coastal erosion we are now beginning to experience is very much of our own making, but by using human ingenuity, we can perhaps slow the speed of coastal erosion in many places, although not everywhere. We will have to accept the fact that 'Holding the Line' is not an option for the whole of the UK coastlines, and in some cases, communities and associated infrastructure may have to be moved both now and, in the future, to avoid falling into the sea.

Helping coastal communities to adapt is the first step but the real goal is to continue to tackle the root cause of the problem, that of achieving net zero and over time reducing the amount of carbon dioxide in the Earth's atmosphere. This may take decades even centuries, but if it is not our main priority, then we may face the same dilemma as King Cnut in failing to hold back the waves.

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