Designing Managed Retreat: Coastal Communities in the Green Transition

Community Engagement Report

Benjamin Mehigan, Adrian Lahoud, and Sam Jacoby

March 2024

Royal College of Art

Arts and Humanities Research Council

Acknowledgments

The project ‘Designing Managed Retreat: Coastal Communities in the Green Transition’ is led by Benjamin Mehigan and supervised by Adrian Lahoud and Sam Jacoby from the Royal College of Art. The project was funded by the UK Arts and Humanities Research Council through a Design Exchange Partnership and partnered with the Architecture Foundation. The Design Exchange Partnerships were supported by the Future Observatory at the Design Museum.

Project collaborators: Ed Brookes and Gill Hughes (University of Hull), TimeBank Hull & East Riding, and POoR Collective.

This document was developed in collaboration with residents of Hull and East Riding of Yorkshire: Angi Beckett, Fiona Caley, Julie Corbett, Richard Corbett, Michelle Davy, Petra Codato, Wendy Graves, John Hepwroth, John Kinghorn, Angela Kinghorn, Janet Lightowler, Sarah Mole, Kevin Paulson, Alison Riley, Rosi Robinson, Eithne Spain, Jackie Stringer, Lyz Turner, Nnaemeka Ugochukwu, Steve Wilkinson and Linda Wilson.

The following contributed and participated to the project: Alinah Azadeh; Archaeology South-East, UCL; Coastal and Intertidal Zone Archaeological Network, East Riding of Yorkshire Council, Royal College of Art City Design and Environmental Architecture students: Kristiana Genca, Kegin Zhang, Nova Ma, Jinwon Hong, Bente Anna, Koelink Chin Lam, Wensheng Liu, Yingshan Zhang, Diana Wong, Lan Luo, Yuqing Hann; Scott Whitby Studio; Snug Architects; South Downs National Park Authority and Tanya Venture.

Executive Summary

According to DEFRA and the Environment Agency, the cost of fortifying the existing coastline is approximately £5,000 per metre. By 2050, around a third of England's coastline is expected to become financially unviable due to sea-level rise and coastal erosion accelerated by climate change. Sea-level rise contributes to increased coastal erosion as waves extend further onto beaches and cliffs. Consequently, some existing large-scale protective works, built according to 'hold-the-line' coastal management policies, will need to be replaced by strategies such as controlled erosion and realignment of the shoreline, known as a 'managed retreat'.

This policy shift can offer sustainable long-term solutions to coastal management and facilitate the restoration of coastal ecosystems. However, it may impact up to 160,000 properties in England, necessitating either their abandonment or relocation away from coasts and floodplains. This can particularly affect already deprived coastal communities where land costs and economic activities are low. Presently, 520,000 properties in England are situated in areas vulnerable to damage from sea-level rise and coastal flooding, a figure projected to increase to up to 1.5 million properties by the 2080s (Committee on Climate Change, 2018).

Up to 8,900 properties in England are classified as immediately at risk of being lost to coastal erosion, a number that could rise to over 100,000 properties by the 2080s (Ibid.). Evidence suggests that the lack of action or delay in implementing radical adaptive measures on the coast, such as managed retreat, is directly linked to how the problem of coastal erosion is framed, communicated, and perceived. Locally based action groups often emphasise issues with regional coastal management policies, particularly the insufficient investment in sea defences. In contrast, decision-makers at the national level attribute coastal processes to inevitable natural occurrences and climate change. As a result, divergent motivations determine the preferred solutions to manage coastal erosion.

Managed retreat becomes necessary when rising sea levels require relocating people and assets from land no longer deemed suitable for its current use or occupation. Managed retreat will soon become a necessity for thousands of households across the country. Therefore, a comprehensive strategy that considers the needs of both individuals and the community at large is required. Despite possessing some of the fastest-eroding coastline in Europe, the United Kingdom currently lacks a clear strategy or mechanism to move people and assets out of harm's way.

Our study of coastal change and managed retreat through engagement with local communities along the coast of East Riding in Yorkshire has led the following key findings and insights:

- Notably, nearly 80% of residents in the East Riding and 97% of residents in the city of Hull are vulnerable to at least one or more sources of flood risk, including those caused by coastal erosion.
- There is insufficient UK-focused research into managed retreat planning, which is necessary to support the long-term sustainability of at-risk communities and their cultural ties.
- Managed retreat discourses, including relocation, realignment, and adaptive release, need to frame loss and preservation beyond financial and physical concerns. It is equally important

to focus on non-economic loss and cultural or social values.
- There is little to no UK data on the impacts of past relocations and how relocated groups have fared economically, socially, or psychologically.
- A proactive, community-designed managed retreat strategy should prioritise the values and needs of those affected, placing them at its centre.
- Effective managed retreat depends on the ability to record, communicate, and share relevant information.
- Effective communication about future coastal change, especially the identification of at-risk areas, can support community empowerment and prioritisation of preservation efforts.
- While communities can easily identify and prioritize intangible qualities of a place through positive association, unlike material assets, they may not as easily recognise them as important for preservation.

This report introduces current UK coastal management approaches, recent managed retreat case studies, and our conversations with local coastal communities about the social and cultural impacts of coastal change. It emphasises the importance of community participation, proactive communication, and the representation of individual experiences and community assets in adaptation planning and discussions about coastal futures.

In the UK, managed retreat discourse is primarily characterised by quantitative assessments of at-risk value, such as meterage, acreage, and economic losses. Our approach aims to address this imbalance by highlighting qualitative understandings of community perceptions and values.

Contents

1 Background

- Introduction

Coastal erosion is a permanent and ongoing natural process. By 2100, and according to current emission rates, global average sea levels are projected to rise at least 40 cm above 2000 levels and possibly up to 1 m under a high emissions scenario, exacerbating coastal erosion (Oppenheimer et al., 2019). Currently, up to 267 million people worldwide are living in areas less than 2 m above sea level and are at risk from the adverse effects of sea-level rise and coastal erosion (Hooijer et al., 2021). This is already driving migration and relocation. If temperatures continue to rise at their current rate, the displacement of up to 187 million people is estimated (approximately 2.4% of the global population) for the coming century due to the effects of rising sea levels (Nicholls et al., 2011). Currently, 520,000 properties in England are located in areas at risk of damage from sea-level rise and coastal flooding, a number which could rise to up to 1.5 million properties by the 2080s (Committee on Climate Change, 2018).

The threat of erosion to the shoreline has been mitigated by high-maintenance engineered approaches such as seawalls and groynes in a policy approach known as 'hold the line'. As the cost-benefit ratio of these approaches becomes increasingly unsustainable, more long-term adaptations such as a managed retreat are increasingly being considered as solutions. While the definition of managed retreat varies between policy makers and disciplines, in the following we define it as 'any deliberate strategy to remedy coastal and flood prone land that is deemed unsuitable for its current use or occupation due to the effects of sea level rise'.[1] A managed retreat can be implemented in a number of different ways: from the strategic relocation of structures (a rollback); to banning rebuild; to the abandonment of land or a 'managed realignment' of river, estuary or coastal defences to make space for the rising water level. Managed retreat aims to remove or decrease risks of significant harm to people, assets, and ecosystems, and reduce management liabilities and costs.

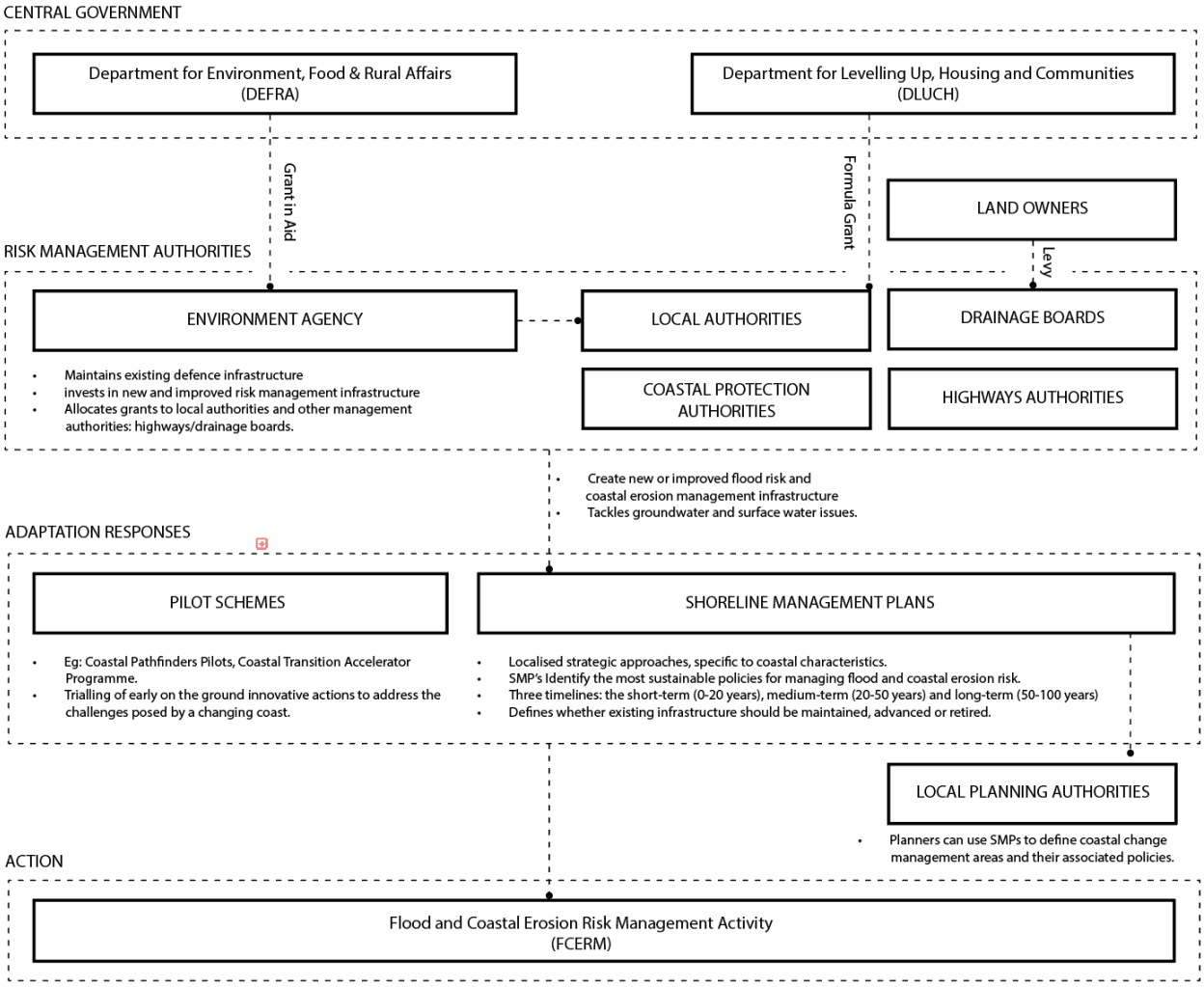
With rising sea levels and increasing rates of erosion in the UK, the question is no longer whether some communities will be forced to move, but rather when and how they will retreat, what they will take with them, and what will be left behind. The UK currently has no strategy or mechanism to move people and assets out of harm's way, despite having some coastlines that are eroding rapidly. No standard guidance exists on how to meaningfully engage with or empower those at risk. As retreat becomes inevitable, important questions about social, cultural, political, and economic impacts need to be asked. For example, how can communities shape and support long-term adaptation and mitigation strategies?

- Managing the UK Coastline

England has some of the fastest-eroding coastlines in Europe, particularly along the North Norfolk

[1] The IPCC refers to relocation in the context of climate change adaptation as 'resettlement, managed retreat or managed realignment', the UK Government uses the terms 'managed realignment' and 'managed retreat' interchangeably.

and East Riding of Yorkshire coasts, which are made from softer sediment. Average rates of erosion are 1-2 m a year, rising up to 4.5 m a year (Environment Agency, 2022). The management of coastal erosion in the UK is the joint responsibility of the Department of the Environment, Food and Rural Affairs (DEFRA) and coastal authorities. Since 2008, UK coastal management has been administered by the Environment Agency (a non-departmental public body). For nearly 30 years, the English and Welsh coastline has been managed through Shoreline Management Plans (SMPs) that are jointly developed by the Environment Agency and local district or borough councils, who are the lead coastal protection authority.



UK Coastal Management Network Diagram

There are currently 22 active Shoreline Management Plans (SMPs) across the UK coastline. SMPs are non-statutory guidance documents that outline natural processes and environmental forces and their consequences (e.g., shoreline movement etc.), their risks to people and the developed, historic, and natural environment, potential retreat or advance of the shoreline, and policy preferences for managing these risks over the next 100 years.

SMPs have interrelationships with other plans such as coastal habitat management plans, biodiversity action plans, and estuary management plans produced by organisations such as the Royal Society for the Protection of Birds, Humber Nature Partnership, North East Coastal Group,

and Historic England. SMPs also provide essential information for the preparation of statutory Local Development Plan policies and assist local planning authorities in determining planning applications in the coastal zone.

Criticisms of Shoreline Management Plans (SMPs)

Despite their longevity, many leading voices in UK coastal management, including the Climate Change Committee (an independent non-departmental public body) believe that SMPs are out of date, unreliable, and no longer a sustainable way to manage the coastline.

The argument in defence of SMPs is that their benefits outweigh their costs, with a reported net benefit of nearly £2 billion over 100 years (Jacobs, 2018). Benefits include avoiding damage to properties from flooding and erosion, however, benefits of intervention are unevenly distributed along the coast (Ibid). The total length of shorelines where intervention is determined as not cost-effective, is estimated to be 2,664km, equal to around 53% of the total coast.

An evaluation of SMPs has revealed a relatively weak scientific underpinning (Ballinger, 2020), although leading scientists suggest that the advancement and increased scope of modern coastal science can provide an adequate framework for coastal decision-making well into the 21st century (Nicholls, 2021).

Our national analysis confirmed that England lacks the comprehensive, quality-controlled, compatible, and collated open-access datasets of coastal hazard, exposure, and defences required to assess spatial patterns of risk and resilience […]. (Lazarus, 2021)

The current use of time-bound epochs in SMPs – 25 year, 50 year, and100 year timelines – is also regularly criticised, as these timeframes can hinder implementation when things do not happen in strict accordance with projected timings (Jacobs, 2018).

Adoption of the SMPs in local development and planning guidance is neither absolute nor consistent. Approximately one third of local development plans do not reference SMPs, leading to a misalignment between coastal management decision-making and other decisions regarding how and where we live by the coast.

Chris Stark, chief executive of the Climate Change Committee offers the following succinct criticism of SMPs (Carbon Brief, 2018):

> Shoreline Management Plans are the core reason why the Climate Change Committee concludes that England's current approach to protecting the coastline 'isn't fit for purpose' [... SMPs] are non-statutory, they're unfunded, and they give this kind of illusory protection.

Supporting Stark's view and referring to the question of the appropriateness and cost-effectiveness of implementing SMPs, Baroness Brown, chair of the Climate Change

Committee's adaptation sub-committee states (Ibid.):

> There genuinely will be homes that it will not be possible to save [...] That's why we need those discussions, that's why people need information, so they can take rational decisions about the level of risk they are prepared to take.

As the criticisms of the SMP framework suggest, alternatives to managing the coast are needed to ensure a sustainable approach to shoreline living for today's and future generations. Although SMPs make references to the number of at-risk properties from coastal erosion within their policy area, they do not mention or offer guidance on how to mitigate that risk.

- Adapting to Change on the UK Coastline

SMPs use four coastal adaptation strategies that differ in terms of human and physical costs and impacts:

1) Hold the line
Maintain or upgrade coastal defences to protect the shoreline in place.

2) No active intervention
No investment in defending against flooding or erosion, whether or not coastal defences have existed previously. The coast is allowed to erode landward and/or flood.

3) Strategic (managed) realignment
Allow the coastline to move naturally (in most cases, to recede) but manage the process and direct it in certain areas. Retreat, in this context, does not refer to the movement of personal assets or property but the deliberate process of realigning river, estuary, and/or coastal defences to make room for rising waters.

4) Advance the line
Build new coastal defences on the seaward side of the existing coastline. This can include an extension of the coastline through land reclamation.

In the UK, current annual damages from coastal flooding are estimated at over £500 million per year (Edwards, 2017), and costs are likely to increase under projections of future sea-level rise.

Because hold the line hard-engineering solutions are increasingly unsustainable from an environmental and ecological perspective, creation and restoration of natural habitats, such as sand dunes, saltmarsh, mangroves, and reefs, are considered to provide coastal protection. These so-called nature-based 'soft solutions' are not applicable in every context, owing to the diversity of the UK's coastline in ecological, social, and economic terms.

The following case studies show strategies employed in the UK to mitigate risk to communities

living on the coast. They vary greatly in their scope, effectiveness, and cost.

Bacton Sandscaping (Hold-the-line)

According to DEFRA and the Environment Agency (2015), the cost of fortifying the coast is around £5,000 per metre. This raises questions about the affordability and long-term sustainability of hard-engineering approaches. Nature-based solutions are increasingly preferred to hard defences for aesthetic and biodiversity reasons, although the use of the term is contentious. Sandscaping, the large-scale deposition of sand on a beach frontage, is a soft-engineering alternative to hard coastal defences that was implemented for the first time in the UK in North Norfolk in 2019, where the shoreline was retreating at a rate of approximately 4 m per year. It raised the beach level by 7m and primarily aimed to protect the Bacton Gas Terminal from coastal erosion, which is responsible for up to a third of the UK's gas supply. The scheme cost £22 million, but will only be effective for 20 years before having to be replenished (Cotton, 2022).

Chris Taylor/ Guardian

Medmerry (Managed Realignment)

The managed realignment of the Medmerry coast in West Sussex was completed in 2013. 7km of inland shingle banks were constructed 2km away from the coast to create an ‘intertidal’ area that allows the sea to breach existing defences. This buffer zone of marsh can absorb storm energy and provides protection to key infrastructures such roads, waste water treatment works, and 348 properties in the village of Selsey (Environment Agency, 2012). It also created a new wetland/salt marsh habitat, attracting new wildlife species and tourism. While the previous Environment Agency annual cost for maintaining coastal defences was £300,000 (Institution of Civil

Engineers, 2015), the managed realignment cost £28 million and is expected to adapt to sea-level rises for at least 100 years. The benefits of the realignment are valued at an estimated £91.3 million (Atkins, 2017), making it a relatively cost-effective solution. However, its applicability to other UK regions is limited, as it requires a large amount of land to be yielded to the sea. Medmerry also involved only a few stakeholders, with the Royal Society for the Protection of Birds owning part of the land already and four farms subject to a voluntary purchase by the Environment Agency at a cost of around £10 million.

UK GOV

Fairbourne (No Active Intervention)

Fairbourne, a town of around 1,000 people in Wales, will become the UK's first 'decommissioned' town by 2054 due to rising sea levels. In 2017, the agency responsible for flood management, Natural Resources Wales, spent £6.8 million on strengthening 1.8 miles of concrete tidal defences protecting Fairbourne. From 2054, the council estimates the costs of maintaining these defences to be £115 million over the next 100 years, which exceeds the economic benefits (namely the value of properties) estimated at £70 million (Gerretsen, 2022). Gwynedd Council therefore decided to withdraw a 'hold the line' policy and changed the Shoreline Management Plan from 2050 to a 'no active intervention' policy in which the shoreline is allowed to encroach inland. Many residents first learnt of the decommissioning of the town through the BBC programme *Week In Week Out,* rather than from the local authority (Bennett-Lloyd, 2017). There are no plans by Gwynedd Council to relocate or rebuild homes, services, and the community elsewhere, and many of Fairbourne's inhabitants have voiced their intention to remain in place.

Getty

- Rollback/Moving Out of Harm's Way

The process of retreat is complex and often contentious, but will become a reality for hundreds of households across the country. There is currently no national relocation policy or relocation funding mechanism. This adds to local social, environmental, and political pressures to defend rather than relocate. A holistic strategy considering the needs of both individuals and the community at large is urgently required.

The relocation of assets away from areas at risk of coastal flood and erosion is only considered in isolated cases in specifically funded pilot projects. For a more proactive approach to relocation, a change in government policy and associated funding mechanism is required to enable authorities to relocate at-risk properties and assets (Jacobs, 2018). This could significantly change coastal flood and erosion risk management approaches, from relocation that is currently only deemed a 'last resort' possibly becoming a more common long-term solution (Ibid.).

Examples of rollback

In the UK, only a small number of private and state-funded pilot projects of rollback (managed retreat) have been realised so far. For example, structures with great heritage value, such as the Belle Tout Lighthouse, Clavell Tower, and Bude Tower. have been relocated at great cost to preserve them. The government-funded Coastal Change Pathfinder Scheme (2009-2011) also supported the managed retreat of 15 private homes.

The Belle Tout Lighthouse

Rob Wassel

Since its completion in 1834, the Belle Tout Lighthouse on Beachy Head, East Sussex, has been an iconic fixture of the South Downs clifftop. With rates of erosion around 60cm per year and the lighthouse located only metres from the edge, the South Downs Lighthouse Trust was established to relocate the three-storey lighthouse.

Having crowdfunded £250,000, the trust used hydraulic jacks to push the 850-tonne building along four lubricated steel capped beams. In front of cameras and media from all over the world, the lighthouse was moved 17m inland within a week. However, rates of erosion mean that the lighthouse will have to be moved again in 25 years, an eventuality designed into the initial rollback by Abbey Pynford. (Institute of Civil Engineers, 2018), with the lighthouse due to be moved by another 25m in the coming year (Southworth, 2021).

This relocation approach to relocation is not broadly applicable and was only used in this example because of the cultural importance of the building, nonetheless it raises useful questions about how cultural value is evaluated and its role in channelling investment. its effectiveness and costs, as coastal erosion is a continuous process. In the majority of cases, relocation is costly is also and financially and practically unviable in the majority of cases, as it is costly, requires suitable land to move to, and can be only used for buildings with a relatively small footprint.

Coastal Pathfinder Scheme (2009-2011) - North Norfolk Coastal Pathfinder

Alamy

In 2010, North Norfolk District Council was awarded £3 million to trial the 'rollback' and 'buy and lease back' of properties under the North Norfolk Coastal Pathfinder Scheme.

As a part of this scheme North Norfolk District Council adopted an innovative rollback planning policy (EN12), giving property owners at imminent risk of coastal erosion the opportunity to rollback onto land not currently designated for development, acknowledging that rapid shoreline erosion 'led to local households being unable to sell their properties, residents and businesses being unable to raise money against them and unwilling to invest in premises […] this had a detrimental impact on the entire community' (DEFRA, 2012).

The local authorities chose eleven properties predicted to be lost by 2025 to coastal erosion as well as a caravan park, lifeboat house, public car park, and site for public toilets. The owners of the eleven properties on Beach Road, Happisburgh, were paid by the council for their homes a value based on estimated potential future rental income, the valuation of the rollback opportunity, and a 'disturbance payment', which came to approximately £700,000 for all properties, equal to around 45% of average prices in Norfolk at the time (OECD, 2019).

The site for the replacement properties was owned by a local farmer, who entered into a joint venture agreement with the council, with the site sold on the open market. However, none of the relocating owners could afford to use their EN12 planning rights to build new homes in the

village and moved to a caravan site, rented accommodation, or public housing (Barkham, 2015). Although one resident, Chris Cutting, did purchase a new home, it was ‘nowhere near any water, definitely not near any sea’ (Ibid.). He exchanged his four-bedroom bungalow by the sea for a mortgaged semi-detached former council house, using the £96,000 received from the Pathfinder programme.

The North Norfolk Pathfinder is widely seen as successful in establishing a methodology for acquisition, demolition, and relocation of homes and offering a ‘fair value’ for the at-risk properties (North Norfolk District Council, 2012). It remains the only significant attempt in the UK to relocate multiple residents inland. Importantly however, barriers in financing and planning frameworks meant the relocation could not be realised in place, resulting in both tangible and intangible negative effects to the community through loss of some of its members and their social and economic input.

Alamy

Drawing evidence from the post project evaluation of the North Norfolk Coastal Pathfinder, several practical considerations and barriers to rollback can be identified in regard to the design and implementation of an effective managed retreat (DEFRA, 2015). These can be summarised as the following questions:

Land acquisition

- Is land available in proximity to the rollback site?
- Is that land available for purchase? Can that land be purchased in an appropriate time period?

- Is that location compatible with homeowner needs and desires?

Planning

- Do local plans and zoning restrictions limit relocation options?
- Can planning consent be acquired in an appropriate time period?
- Can rezoning increase the value of at-risk properties?
- Can uplift in value be used to mitigate relocation risks?
- What wider benefits to the community can be made through the improved environment?

Finance

- What level of relocation expenses should be borne by homeowners?
- Can homeowners afford to relocate to a rollback site?
- Should financial support depend on building classification?
- How are appropriate levels of financial support evaluated and by whom?[2]

- Is Rollback Viable?

With the right policies and mechanisms in place, the Pathfinder project in North Norfolk suggests that rollback can be feasible and desirable from the perspective of the local authority and individuals with homes at imminent risk. In the North Norfolk District Council (2012) assessment, the most prevalent issues were identified as land selection, a lack of community awareness or understanding of erosion, and funding constraints.

Awareness of coastal erosion problems and adaptation options is key to increasing a community's capacity to adapt to change. The North Norfolk Pathfinder case shows that residents' participation in a process of relocation is important to change the mindset of 'holding the line' and accept a changing shoreline.

Each community and individual have specific needs and requirements in a managed retreat. Some residents may prefer low levels of management and the freedom to move independently, others may want a more collective response. Heeding lessons from international case studies such as retreat occurring on island nations, we can assess processes of communal relocation and evaluate the effectiveness of strategies that have supported cultural preservation.

Vundigoala, Fiji

Like most of the Pacific Island Nations, Fiji is particularly susceptible to the impact of rising sea levels, with surface temperatures and ocean heat in parts of the south-west Pacific increasing three times faster than the global average rate. The village of Vunidogoloa on Fiji's northern island of Vanua Levu consisted of 26 houses for 128 residents, located only a few metres from

[2] In the UK there is fundamentally no compensation for loss due to the effects of climate change as legislated by The Coastal Protection Act of 1949.The Department for Environment, Food and Rural Affairs (Defra) provides up to £6,000 in retrospective funding towards the cost of demolishing a property and removal expenses.

the coast. The village was consistently inundated when heavy rains combined with high tides, isolating the community. The decision to move was made as a last-resort to sustain livelihoods and protect the community in the long term. The community made collective decisions on where to relocate to and the new village design, deciding to retain proximity to existing neighbours.

In January 2014, the village relocated to a new site within the customary land boundaries of the community. Thirty new homes were built 2km from the original village site. As a pilot for future national relocation strategies, actions led by the local community itself were deemed largely successful (McNamara, 2015).

The three key factors ensuring the effectiveness and success of the Vunidogoloa relocation were:

1. Timber from their customary lands was used to construct the new houses.
   Local human capital was essential to the relocation and ensuring that community members were very much part of the relocation efforts.
2. New economic activity at the relocation site.
   For example, the Department of Fisheries provided fish ponds, as the community could no longer easily access the ocean and fish for their own needs or trade. The International Labour Organization offered strategic advice, pineapple tops, banana shoots, and a copra dryer as in-kind support to the crop rehabilitation and livelihood programme. By planting the banana and pineapple, the community gained a sense of ownership over the process of developing new livelihood strategies.
3. The community's ability to relocate on their own land within *mataqali* (clan) boundaries. This made it an easier transition without having to negotiate with a neighbouring clan or the government. According to interviewees, this was a key reason for why the relocation was considered successful (Ibid.).

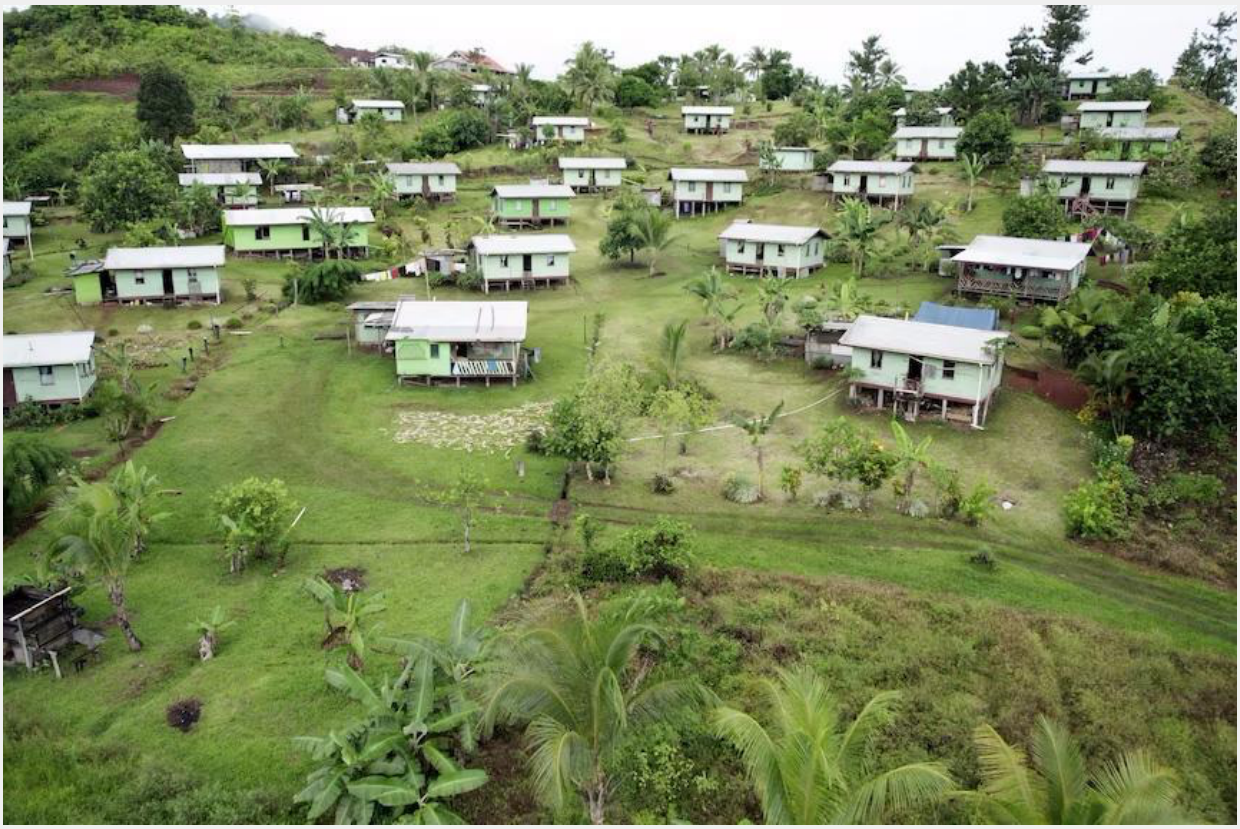
Despite its success, the relocation also created new problems. Due to uneven gender representation in the consultation process, houses in the new site were built without kitchens. Access to shoreline industries and resources were severed, leading to weakened communal connections to the land, ocean, and tidal rhythms. Proximity to urban areas resulted in increased anti-social behaviour (McMicheal, 2021). And burial sites and ancestral connections emerged as one of the biggest challenges: when moving, villagers faced a choice of either leaving the bones of ancestors behind or taking them to the new site. 'The hardest people to move are the dead', said one resident (Lyons, 2022).

However, interviews with residents suggest that the benefits of the relocation outweigh the disadvantages. The new houses have septic tanks, solar panels, and flushing toilets. Village leaders and residents decided that each married couple would have their own home, rather than two or three families sharing a dwelling as previously. It proved much easier to grow food in the new site, away from the boggy, salinated soil (Ibid.).

Several other villages in Fiji are already identified for urgent relocation. The Standard Operating Procedure (SOP) for Managed Relocations will support this, emphasising the need for sensitive

engagement with affected communities and embedding local customs, social values, and cultural ties into the process. The Fiji SOP is also a valuable reference for future UK-based frameworks for engaging with residents at risk:

> Relocation is not seen merely as a move to new houses. Relocation is the movement of people carrying with them their culture, their social structures, their way of life and more importantly, their expectation for a better and secure life [...] The SOP process requires comprehensive assessments and consultations with the community on how the new site may impact on their way of life and their long-term security. This includes discussing any emotional and/or sentimental attachments that the community may have to the old site and measures to address this (like maintaining continued access to the old site) (Office of the Prime Minister, Fiji, 2023).



Craig Hansen, ABC

2 Methodology

- Designing a Sustainable Managed Retreat

There is no single framework able to standardise managed retreat processes, owing to the diversity of coastal ecosystems, inhabitation, and ownership patterns. There is also insufficient UK-focused research into managed retreat planning or strategies to support communities and cultural ties, as the social uncertainty generated by the 'decommissioning' of Fairbourne suggests.

Retreat to date has overwhelmingly focused on the physical removal of people and buildings, with limited discussion of the social, cultural, psychological, or long-term economic consequences. A proactive, community-designed managed retreat strategy therefore should position the values and priorities of those affected at its centre. Sustainable coastal adaptation measures must take into consideration what at-risk-communities will accept in terms of change and loss and therefore necessitates extensive engagement with all stakeholders.

Based on an evaluation of case studies of managed retreat schemes nationally and internationally, the following understandings should be embedded into planning discussions and processes:

Physical dimensions

- An understanding of historical climate change of the area.
- An understanding of the environmental processes and risks in the affected area.
- An understanding of spatial characteristics, community landmarks, and services.

Social dimensions

- An understanding of the demographics of the affected community.
- An understanding of the cultural norms and traditions of the community.
- An understanding of the history of the community, including generational and family ties.
- An understanding of what a community has and will accept in terms of a response to change.
- An understanding of the specific needs and desires by individuals and communities.

Trust and engagement

- An understanding of existing adaptation and mitigation strategies and policy.
- An understanding of the public's knowledge of and access to necessary, reliable information.
- An understanding of relevant timeframes and community expectations in respect to change.
- An understanding of existing public engagement in the area.

- Having Conversations About Change

We explored the impacts of sea-level rise on UK coastal communities through workshops with residents from the Holderness Coast, East Riding of Yorkshire. This coastal area is interesting to study because it has one of the fastest eroding shorelines in Europe and was part of the Coastal Pathfinder Scheme (2009–2011) and is currently benefiting from the new Coastal Transition

Accelerator Programme, which makes East Riding of Yorkshire as a leading authority in addressing the challenges of coastal erosion in the UK. We were interested in collective and individual values and concerns, what communities considered important in the places they live, what they thought should be preserved during managed retreat, and what processes could be used to identify and prioritise these.

Residents in the coastal towns of Hornsea and Withernsea have been subject to consultations by the local authority in recent years, but these were perceived as having resulted in little concrete action. This has added to fears and uncertainty about accelerating coastal processes. With the area changing at an increasing rate, the current Shoreline Management Plan (Flamborough Head to Gibraltar Point SMP3), established in 1991 and last updated in 2010, may no longer be valid.

The invitation to participate in our workshops was addressed to those who were 'curious, concerned or just wanting to talk about climate change, flooding & erosion or the future of [their] community.' The engagement sessions were publicised through local newspaper advertisements and on local social media pages, as well as through some existing partner networks (e.g., TimeBank Hull & East Riding).

The intention of the community walk in addition to a more conventional, seated workshop was meant to attract a more diverse group of participants. The participants in our workshops represented a relatively wide range of gender, age, and occupation.

There is general consensus that decision-making and adaptation strategies must include the views of coastal communities, as bottom-up efforts with strong community support tend to result in more specific solutions that are more appropriate and effective than top-down interventions. Community engagement are effectively in identifying a variety of perspectives and establish a common framework for better outcomes.

Before the workshops, we defined a number of outcomes that we wanted to achieve from the community engagement:

- Ascertain what people value about their community.
- Try to establish why a location is unique.
- Clarify what the tangible and intangible features and customs of the location are.
- Collect individual and shared histories of the place.
- Understand why the coastline and access to water is important.
- Understand experiences of change in this location.
- Understand experiences of climate-change related loss.
- Understand attitudes toward adaptation and change.

- Community Coastal walk

It was important to us that conversations with local communities took place on the coast within their own local space. Situating discussions on site emphasises the importance of locality and local knowledge by participants and encourages direct references to local places and experiences.

We planned the community coastal walks so that places or landmarks could serve as prompts to conversation about individual or community meanings and values connected to living along the coast in order to establish what spaces participants identified as important to their everyday routine and also for the community at large. We stopped at a number of designated points of local interest and asked questions, but also encouraged residents to stop and point out landmarks or features of the area and discuss experiences along the way.

Example of designated points of interest and questions:

The beach

- How do you use the beach in your everyday routine?
- How has the beach changed in your time living here?

Public facility

- What spaces or facilities are important to the community here?
- If things were to change, what would be important for you to keep the same here?

Historic landmark

- Can you tell us a story about this landmark?
- Withernsea Towers: What does this landmark mean to you?

- Community Workshop

The community walk was followed by a seated workshop with participants from the walk but also additional participants who just joined for this part. The workshops enabled more expanded, structured, and direct conversations about the themes of the research with the entire group, whereas during the walk many conversations were one-to-one or in small groups. Individual and community values related to the coast and their place were discussed, specifically hopes or fears of the past and for the future, including their understanding of preservation and their views on environmental processes, risks, historical change of the affected area, and current policy and strategy.

The workshops used different formats, including written responses to particular sets of questions, to tease out interpretations and understand differences or commonalities in experiences and priorities. We used case studies to invite participants to envision how their future might look like; these were not intended to prescribe a course of action or suggest likely future scenarios, but to prompt thoughts about longer-term experiences of living in a specific place. Using case studies from different historical periods reinforced this by positioning their current circumstances and the difficulties of their current decision-making within a wider history of change.

- Recording, Preserving, Transforming

The analysis of the engagement sessions is structured into issues of recording, preserving, and transforming. This aims to develop a framework for community engagement, with a focus on the

social and cultural consequences associated with managed retreat. The findings and recommendations of each section are a first attempt to formulate guidance for engagement work with coastal communities when discussing coastal management and change.

Managed retreat discourse in the UK is currently dominated by quantitative accounting of at-risk value: meterage, acreage, economic loss etc. We tried to redress this imbalance by foregrounding qualitative understandings of community value to offer an important broader context that considers issues of climate justice, loss and damage, and intergenerational rights.

Preservation in adaptation and mitigation discourse is mainly associated with preserving physical assets. However, a holistic managed retreat discourse should understand loss and preservation as encompassing more than financial and physical aspects. We therefore discussed qualitative understandings of loss and preservation with local communities and practitioners working creatively with preservation and challenges of loss through art and design. This examined what opportunities processes of recording and preservation might offer in the context of sea-level rise, as well as the role of creative and design practices within this.

3 Recording

- Background and Aims

According to the Environment Agency (2020), over 5.2 million properties in England are at risk from flooding and coastal erosion and yet, 'only a third of people who live in areas at risk of flooding (including coastal flooding) believe their property is at risk'. To date, coastal policy agendas and the experience of residents subject to coastal change have mostly been segregated (Kelly, 2018). Effective coastal adaptation strategies, including managed retreat, depend on proactive communication with those at risk.

Initiated at the 1992 Earth Summit, the Integrated Coastal Zone Management (ICZM) framework emphasised the value of a well-informed public to the effective management of coasts. The ICZM refers to 'the full cycle of information collection, planning (in its broadest sense) [and] decision making' across all stakeholders (Post, 1996). Highlighting the need to integrate the views of the general public to achieve 'societal goals in a given coastal area[s]', the ICZM guidelines note that 'much of the drive and momentum necessary to initiate and sustain an ICZM process must come from [the general public]' (Ibid.).

The principles of the ICZM still informs how policy-makers in the UK formulate national coastal planning and management strategies (Boyes, 2013). However, public awareness and involvement in adaptation processes is weak. A project on coastal literacy by Chichester District Council in 2009 and 2011 found that a third of participants were not concerned about local impacts of climate change, over half had never seen any educational resources relating to coastal change, and two-thirds of residents did not believe that they could influence coastal decision making (Carless, 2010). In addition, the 'lack of integrated datasets from local to national scales, inconsistent data protocols, and the patchiness of public availability present significant hurdles to any transparent and open-source analysis of UK coastal flood and erosion' (Lazarus et al., 2021). Analysis by DEFRA also highlights lack of funding to facilitate 'skilled community engagement', especially when 'there is a shift from hold-the-line to no-active-intervention policies in the Shoreline Management Plan', that is. when a managed retreat strategy may become a necessity.

As the coastal literacy survey found, there is 'a tangible cynicism around the ability or inclination of the decision-making process to incorporate local people's views' (Carless, 2010). An effective managed retreat framework has to collaborate with all stakeholders, prioritising those with detailed local knowledge in discussions about change. The following record of community engagement in an area at risk tests some possible forms of engagement and their effectiveness.

- A Community Record - East Riding of Yorkshire

In the following, we report on concerns, values, and coastal changes discussed during our interviews, community walks, workshops, and thought exercises with local residents of Hornsea and Withernsea in the East Riding of Yorkshire, as well as with other local residents who visit

these areas for family, work or recreation reasons.

Social connections

Many cited the opportunity to discuss local issues with others and meeting new people with similar interests and concerns as their reason for joining our workshops. There was a strong sense that community mattered to the participants.

- In response to the question ‘describe the character of where you live?’, community was the most repeated answer.
- To the question ‘what do people value in their local area?’, approximately half of the participants made direct reference to the community, and community connections as well as a proximity to those community bonds.
- When asked ‘if things were to change, what would you want to keep?’, about half made direct reference to the community, and in particular, the community groups that run in the area.

This suggests that community level participation in coastal management processes could strengthen community bonds and forge new connections and routes to a consensus about the future.

Hobby and activity groups were seen as the strongest driver of social connections. References were made to reading and sewing groups, photography clubs, knit and natter clubs, pantomime group, cèilidh band, choirs and music bands, tennis clubs, boules, rummy club, and dancing, to name just a few. There was also reference to crossover between clubs, how groups may share members and spaces. Participants voiced their belief that these are important to organically grow community bonds.

Participants were keen to share not only the groups they participated in, but also the groups available to other, unrepresented demographics, referring to after-school football clubs and men-in-sheds clubs for retirees. The health benefits of these groups were frequently mentioned, as was a ‘happy to chat blue bench’ installed by volunteer groups in Hornsea to combat loneliness.

> We go to a cafe after our walk and have a cuppa and natter, there's not lot of a people that come, there's only a handful of us. Some are divorced, some are widowed, and some are quite lonely. Some are isolated and live quite away, one lady gets on the bus, and it takes an hour and a half to get here on this local little bus, and she comes because we're the only thing she sees every week.

Routine was described as important to the rhythm of the community. In nearly all references to community activities or groups, the date of said group was mentioned. Weekly routines such as ‘Hornsea Harriers running group, on every Sunday’ or ‘so at the Methodist Church, Tuesdays it's tap dancing and on Thursdays dancercise’, but also annual routines such as the New Year’s Day swim for the Mermaids Group, a Carnival in July, and a lantern festival every 25th of

November. However, routine also relates to the spatial organisation of the town and are important to people's enjoyment of a place, with various participants referring to using the beach for swimming, walking, exercise, and social activities 'everyday'.

Volunteer groups play an important part in community life, e.g., the Hornsea Urban Gardeners or Plastic Free Hornsea beach cleaners. If participants were not part of volunteer groups themselves, they still had a strong awareness of the groups and their value to the town: 'They're great volunteers, the whole town is run by volunteers. Where are the people who are being paid and why aren't they doing anything?' […] 'we look after the neglected spaces that the council don't look after'.

The promenade was repeatedly referred to as the most important of public spaces, used as a forum, a civic centre, exercise, a place for routine and familiarity but also for chance encounters: 'we just tend to walk down the prom. It's more of a social gathering really.' However, several other shared spaces emerged as being of significant social importance for hosting different activity groups without a dedicated space. For example, the library is available to hire for free to accommodate singing evenings, reading, and sewing groups and a Methodist Hall is used for concerts and Caleigh practice, but also offers a warm space during winter, showing that 'people are taking control of spaces which are outside of mainstream control'.

Particular venues, such as the Floral Hall in Hornsea, hold a significance beyond their utility as a rentable space and cafe, but for their value as a signifier and monument to community cohesion. In 2012, the Floral Hall was under threat of demolition by the local authority. After

significant demonstrations against the move (including 2,400 signatures gathered in support) a Floral Hall Steering committee was formed, which led to the operation of the hall being transferred to the committee and volunteer directors. The retention of Floral Hall is an example of a self-organised community group driving the direction and process of local change.

Access to community information was repeatedly referenced as particularly valuable for residents. Among different formats of information, Facebook groups were often mentioned, and community newspapers were understood to be widely read and important for their distribution of local information. ‘A couple of people that post their photos of the stormy sea or sunrise on Facebook every day, and you can sort of experience it second hand if you're not actually there.’

Community and friendliness were also cited as a driving force for new residents in choosing to move to the communities in the first instance: ‘There's a really great sense of community, and of people looking out for each other.’ But, also a hesitancy to accept change in the community was mentioned. A particular threat was the construction of new housing in the area, raising concerns about the strain on services. ‘We are determined, as our volunteer group, to fight massive changes within Hornsea.’

History

In response to the question ‘how do you use the water near to where you live?’, several participants referred to activities related to local heritage, including beach combing, sea glass hunting, and fossil collecting. Numerous references were made to fossil groups including local exhibitions and displays of particular finds: mammoth teeth, woolly rhino teeth, petrified wood. Likewise, to the question of ‘if things were to change, what would you like to keep the same?’, participants made reference to local history, mentioning the memories and stories of people who lost land as a result of change on the coast. There was generally a great awareness of coastal change. One participant has been running free local history walks since 2000.

There was consensus that coastal processes such as erosion have been ongoing throughout history and that the changes witnessed today are not new. However, participants recognised a recent acceleration of these processes, especially residents who had lived on this coast for a long time (in some cases for over 50 years), but, having acquired a different reference for rates of change, they also felt somewhat more relaxed about this. ‘For us, coastal erosion has always been happening, it'll just happen potentially quicker. So, the issue is still the same, the solutions as they are, are still the same. It's just more of it.’

Frequent reference was made to how interaction with coastal processes encourages a new attention and interest in them, e.g., when unknown or concealed heritage is revealed such as an old Victorian tip. Participants confirmed that there is a great interest in these windows into history, with people visiting the site to collect heritage artefacts: ‘it’s memories. It's that it's not only that, that sort of history, that history is falling out of the cliffs, isn't it? Our history is falling out of the cliffs.’

Particularly relevant in the case studies on the Holderness Coast is the idea of ‘lost villages’. This coastline has been in constant motion, and there are well documented records of lost villages and towns that many participants were aware of.

> So yeah, I feel very aware of it. And every time you go for a walk on the beach, you know, you can pick up old eroded bricks that have come from houses that used to be out where the land used to be.
>
> But obviously, there has been a history of retreating villages, they would come and go, people would move much more in sync with, with erosion and the flow of the natural world and water. And it's sort of only in the last couple of years. Even more recently, the modern kind of movement around that fixity. And that again, that attachment to property rights is again, much more modern.

However, the willingness to accept that adaptation to such change is unsustainable was split amongst participants. Some used the existing hard infrastructure of groynes and rock walls as examples that it is possible and necessary to defend in perpetuity, while others were more sceptical about their sustainability and visual impact. Erosion along the coast has already led to some total loss of built heritage (notably Second World War defence infrastructure) or their displacement and partial ruin.

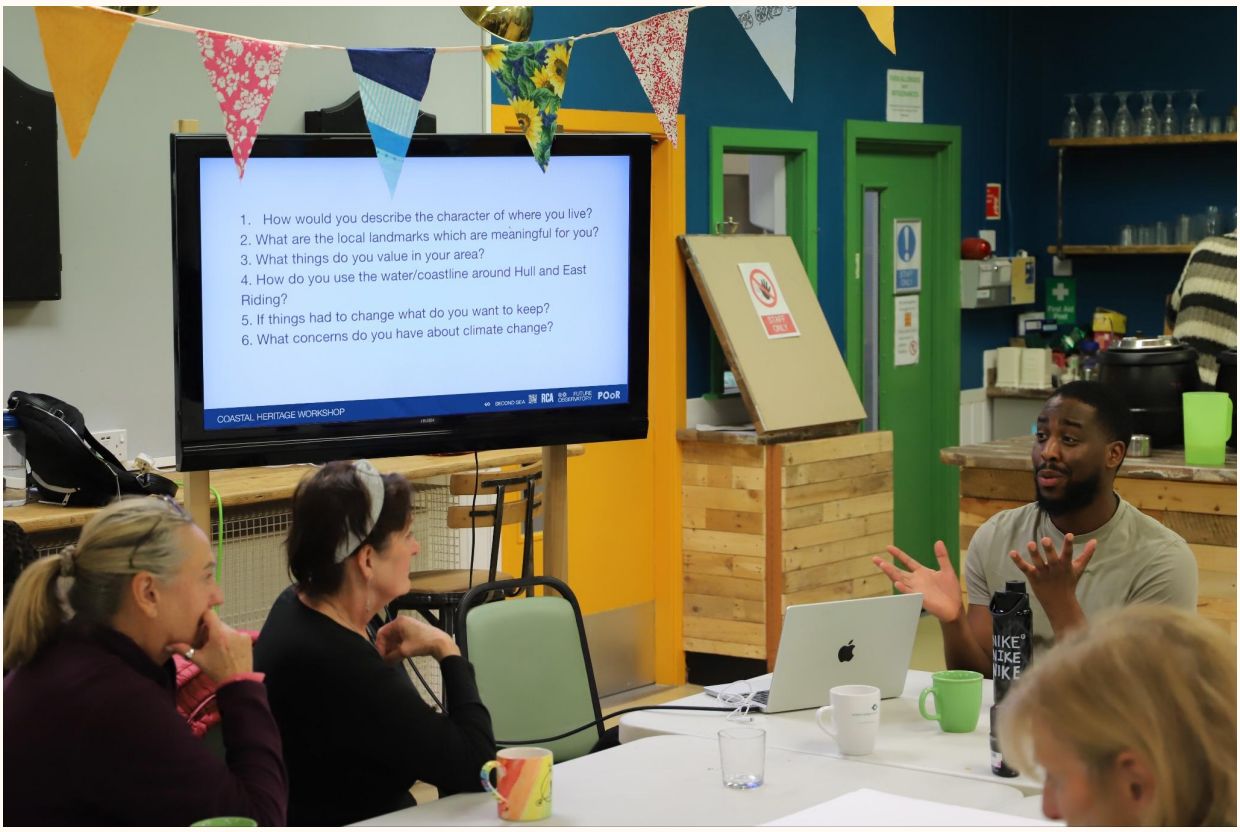
A history of change is repeatedly pointed to by signposts and commemorative plaques to lost pieces of architecture in and around the villages we studied. But participants also shared less obvious links to this history of retreat and loss by referring to how street names were taken from previously located versions of the town. History mattered to many: ‘It's one of the reasons that people like myself move to Hornsea, so you feel like you're stepping back 30 years.’

Both case study sites, despite their size, have dedicated museum spaces for local history. ‘Old town charm’ is a shorthand for a particular feature that residents hold as valuable to their sense of place. Residents referred to and pointed out particular features of the urban environment that refer to specific periods of history, this included Victorian street signs and tiles from a dissolved pottery industry. Particular care and expense focus on maintaining these assets, for example, the upkeep of old street signs by volunteers tries to prevent the local authorities from replacing them with plastic ones.

Historical change can mean loss, such as the loss of particular services. One notable example is the train service that ceased to operate in the 1960s, with participants agreeing that this loss had a transformative impact on the towns: ‘In Withernsea you get a lot of the part of, the reason the town was as popular as it used to be because of the train station.’ This loss has exacerbated a sense of isolation that residents feel due to their geographic location, lack of public transport links, and perceived lack of governance compared to more inland areas. But it has also made property more affordable to those moving in: ‘I think there's only a bus once an hour out to Hull. If there was a station here, the property would be a lot more expensive. Yeah. We couldn't have afforded to come if there was a station’. However, interestingly, the isolation has made

some feel more resilient.

> You could say that we're isolated, you could say just nicely cocooned, maybe that's how we feel. Maybe we don't feel the same type of threat from climate change that we should do, because we don't necessarily feel the same type of threats from other things.'



Place

The responses from participants around the theme of place can be divided into the sub-themes of landmarks and character. Discussions around landmarks helped to draw out responses about the tangible, physical features of the area, which were perceived to be of value to the participants. Character spoke more to the intangible features of a place that exist between these landmarks and through social interactions and activities.

To the question of 'how do you describe the character of where you live?', there were differences in positivity towards each area, with responses in nature of 'dull', 'dour' and 'shabby' as common as those speaking to being 'friendly', 'welcoming', and 'caring'. Uniqueness was an implied response to the question of local character, with participants referring to where they live as being 'different from elsewhere' or misunderstood. 'I also think Withernsea has a really undeserved reputation […] I just think this place does not deserve the reputation it has, it has so much to offer.'

In response to 'what are the landmarks of where you live?', built assets dominated the

discussion as well as features that commemorate particular histories. For example, the lighthouse in one area was the most common response, followed by references to the promenade.

Of note are the responses to the question about what holds values in the local area, as participants did not refer to tangible landmarks but instead to intangible community and community connections. In response to 'if things were to change, what would you want to keep the same', only one person referred to a physical asset or service: the leisure centre, whereas most referred to natural features of the area, the sea, beaches and landscape, and others spoke to the more intangible characteristics of place, such as links to community groups, community spirit, proximities, and memories.

Frequently, participants noted how particular spaces had changed in their use over time, implying that values association with particular assets often has historical connections. Participants pointed out what amenities had been lost or changed in each area. Overall, there was emphasis in the discussions that change had been happening, and loss of particular landmarks and services was not an unfamiliar experience to participants.

> I love it here but I've seen a degree of things closing down. Like you don't have the hospital we used to have, various shops shut down. Yeah, so it's becoming a bit more of a ghost town than it used to be. Even in the eight years I've been here.

At the same time, particular enthusiasm emerged when identifying landmarks that were under some form of community ownership or responsibility. The Floral Hall, the Pantry, or Resource

Store were highlighted as being of particular community and social value that they wanted to maintain.

> The Resource Store, yeah, that's what we want to keep on, we want it to be a youth centre, a room for hire, we want to put the pantry in there. First aid should be in there, it should be in the middle of town, it's no good in Tesco.

A series of services and provisions needed for the community to operate effectively were mentioned: the swimming pool, sports hall, gym, cafes; fish and chips shop, pubs, day-care centres, and cinema. What mattered to the participants were the capacity of these spaces to accommodate social groups and community activities in flexible ways.

Across all of engagement sessions, notions of 'peace and quiet' were discussed, and how there was 'less stress' living by the coast, creating a 'feeling of freedom'. Many participants also implied an exceptionalism in the sense that where they lived was unique but also in the sense that they felt left to their own devices to deal with local change. Prompted by an exchange over the reality of erosion and the prospect of having to relocate brought about the strongest responses from residents around the unique character of each place and what is and isn't worth preserving. While one participant said, 'I suppose, if you were talking about this town, it wouldn't matter if this town didn't exist. If you moved all the people to another new town somewhere, they could still have that same community', another stated, 'I don't know how long this place can be defended. But it's special to me and I'd like it to be here for as long as possible.'

Several participants were particularly receptive to the possibility of having to move away from the shoreline, but felt that the 'character' and 'spirit' of a place could survive: 'There is nothing about the physical town which needs to be kept; it is small and insignificant. The community can be moved elsewhere.' This kind of response points to a sense of resilience and a collective ability to adapt to change that was strongly felt throughout our engagement: 'there's a strong sense here of things having changed and being in a continual, perpetual state of change, and maybe a little more adaptive, we're more aware of change than the average person'.

Our conversations about change with participants emphasised a willingness to think creatively together about the future of the community and critically engage with questions of loss and value prioritisation, which is essentially for any sustainable strategy of retreat. However, there was also dissent in the community, especially between those who had lived in the area for longer and were more resistant to change and newer residents. Also, like everywhere else, there were disagreements between those of a post-retirement age and those still in work. 'There are people who don't like what we do, who wish we weren't here. We weren't born here. They're Hornsean, we're not. It's personal, It's territorial.'

Sea

Asked about local landmarks, things with particular local value, or things to preserve, the most

common answer was the beach and the sea. The range of answers provided underlined a strong individual attachment to nature, with cited activities ranging from rock pooling, history walks, exercise, seeing, visioning, wild swimming, solace, beach combing, and sea glass hunting.

The sea was recognised by all as central to a changing coast and their lived experience. Many participants had a highly personal relationship with the water, built on their daily life.

> Some people say the beach doesn't change but for me it changes every single day, the colour changes from silver through pinks to greys to browns, the beach itself changes height-wise, some days are sandy, some days are pebbly, some days it's a mixture, some days a mixture of both.

Concern was aired by residents that intervening too much with the patterns and characteristics of the water, mainly through hard engineering, would change the ways residents would use and enjoy the water. 'I want to look more to the environment and how much it matters and nature, and I think we've got to be quite careful on how we intervene and affect the planet'. Similarly, another participant said: 'My issue is […] if we put loads of concrete and bricks and stuff or big walls, we're not going to be able to access the sea.'

This understanding of cause and effect and the consequences of intervention is rooted in the strong knowledge that residents have of the individual characteristics of their stretch of coastline. Having lived close to water, many participants could not imagine living elsewhere: 'Basically, I don't seem to be able to move too far away from the sea. I've kind of moved up and down this coast since about 1970.' Others had simply a strong longing to be near the sea: 'Even just watching, bearing witness to it, it's so powerful you get a kick out of it.' Living by the sea was often stated to have an important positive impact on wellbeing:

> If you've got your problems, you just go look at the sea, don't you.
>
> I walk at the beach. It gives a feeling of perspective on life. In the grand scheme all our problems are small and transient.
>
> To walk on the beach, I think it's amazing for mental health.

These responses illustrate a highly personal connection to living by water difficult to capture through other kinds of consultation. Residents appeared to enjoy the opportunity and space to articulate, in their own words, the value of and privilege they feel living in close proximity to water. Vivid sensory descriptions were used as a means of bridging this individual response into a more collective feeling. Sharing what it is like to see, hear, and smell the sea every day: 'I listen to the cracking, sometimes deafening sound of the waves, the light and the reflections on the sea.'

Individual sensory recollections fluently communicated connections to water... Water is the essential characteristic of a shared sense of place in each location. Not only are towns spatially

organised in relation to the water, but it drives the social interactions and is an enabler of community cohesion through patterns of routine and chance encounters.

- Case Studies

East Riding of Yorkshire Coastal Innovation

The average annual rate of coastal erosion along the Holderness coast in the East Riding of Yorkshire is approximately 2m per year (East Riding of Yorkshire Council, 2023). Research suggests that nearly 80% of residents in the East Riding and 97% of residents in the city of Hull are vulnerable to at least one or more sources of flood risk, which include that caused by coastal erosion (Yorkshire and Humber Climate Commission, 2018).

Like North Norfolk Council, East Riding of Yorkshire were a recipient of a Coastal Pathfinder grant in 2009, using the programme to trial relocation through Enhanced Assistance Packages (EAP). Supported by a new 'Coastal Change Fund', each application was assessed against levels of risk. A Relocation Package provided financial support for demolition, relocation logistics and other out of pocket expenses (up to £1,200), and an Adaptation Package support for professional services (e.g., planning application and architect fees) or an assistance grant for adapting properties not at imminent risk (e.g., new access route or septic tanks), up to £2,000 (DEFRA, 2012).

The Coastal Change Fund and Pathfinder project supported 36 households along the East Riding coastline, including 16 relocations, 43 property demolitions, and several adaptation projects. Despite not implementing a material rollback, it was largely considered a successful pilot scheme.

A particular success was establishing a consistent definition of 'imminent risk' of coastal erosion. The standardisation of the risk-based approach to planning decisions has allowed coastal management mechanisms such as the Shoreline Management Plan to be better integrated with the councils' coastal monitoring data and local authority planning. This has led to greater consistency and transparency, as well as greater acceptance of decisions by communities (DEFRA, 2011).

Albrough, East Riding of Yorkshire

In 2020, as part of the Government's £200 million flood and coast innovation programme, East Riding of Yorkshire was granted £36 million to explore approaches of adapting to coastal erosion. Known as the Coastal Transition Accelerator Programme (CTAP) (2023–2027) the funding will help coastal communities that cannot sustainably be defended from coastal erosion (CTAP, 2023) by exploring on the ground actions, such as the repurposing of land in coastal erosion zones for alternative uses, the exploration of innovative finance or funding mechanisms, and the rollback of properties and facilities. The local authority thereby seeks to clarify the responsibilities and relationships between themselves, coastal management partners, land-owners, and communities to confront the challenges of transitioning communities, businesses, and assets away from the coastline.

Community Consultation - Milford-on-Sea Beach Huts, SNUG Architects

Paul Bulkeley/ Snug Architects

Paul Bulkeley of SNUG Architects shared his experience of community consultation for the reconstruction of 119 Beach Huts at Milford-on-Sea with us. Destroyed in a '1-in-200-year storm', the architects undertook the project as a collaboration with the community.

It became apparent that simply replacing the huts like-for-like would be an opportunity missed. Inviting members of the local community into the process, the architects wanted to embed the needs and values of the beach users into the proposed reconstruction of the changing facilities. Doubling-up as an enhanced coastal defence, the community's desire for an enhanced public realm included immaterial improvements such as preserving the iconic views towards the Needles cliffs on the Isle of Wight and the inclusion of graphical panels to educate and encourage residents to explore other historic and ecological sites along the coast.

Reflecting on the processes of community consultation, Bulkeley explained:

> It is easier to record the status quo, possibly even record and uncover the past, than it is to imagine the future. That's the challenge, how we imagine the future in a way, which is consultative and brings people to consensus […]
>
> So, we went through a process of engaging with the community. And we engaged with

> about 600 people […] That's how much interest there was in us changing their seafront […]
>
> And sometimes [people] brought things, so I had people who would bring things that they'd found on the beach, or something that their grandmother had, and they bring these objects as sort of pieces of, I don't even why in some way, you think why would they do that? Why would they come to a consultation event and bring something, and it's obviously because they're deeply engaged, and it matters to them.

- Key Findings

Facilitating conversations around coastal change supports reflection within the community and taking ownership over the direction of change. Especially discussions of extreme adaptation measures, including retreat, can encourage a shift in thinking away from traditional coastal protection. Considering managed retreat clarifies the positive characteristics of an area and highlight the importance of collective engagement in fostering community solidarity. However, a challenge for managed retreat discussions is the need for consensus on what change or loss is accepted by a community.

Residents feel that participation in coastal management is important and may strengthen community bonds. Participation and information are also important to forming consensus about the future. However, information is not always sufficient and residents lack information about coastal change that is easy to access and understand. Despite this, residents had a strong awareness of coastal processes, including specific local knowledge, with local values and relationships to place built on these. Access to local community information, while not substituting government communication, is important and effective to creating awareness of local change.

Local histories can provide an important resource in understanding the acceptance of change in a particular at-risk area. At the same time, community ownership models and volunteer groups illustrate the potential for communities to self-organise and drive the direction and process of adaptation to local change. Therefore, engagement with social or activity groups and their programme of activities can identify collective needs and values of a community, which are to be prioritised in managed retreat decision-making. While tangible heritage and assets are important, equally important are intangible aspects, such as the capacity for spaces and services to flexibly accommodate shared activities and routines. Especially the intangible and tangible relationships, activities, and spaces that social groups use are essential to preserving community.

- Recommendations

- Engagement with communities subject to coastal change should happen in situ, as key local knowledge and values are held in-situ.
- Managed retreat processes should prioritise the identification of the customs, routines, and

rhythms of a community at risk in relation to the designation of physical landmarks and built assets of commercial value.

- Managed retreat research and engagement has to be more effectively shared with all stakeholders to increase awareness of and broaden access to and participation in its processes.
- Documented and anecdotal records of coastal change should be leveraged in managed retreat discussions to contextualise the history of shoreline living and better understand acceptances of change.
- Managed retreat consultation should adopt a range of engagement formats as well as a broader vocabulary for capturing local interests and concerns, this includes anecdotal storytelling, personal histories, and sensory descriptions of a place.
- Managed retreat engagement should prioritise the positive associations of value attached to an at-risk site above the fears of change. This encourages residents to identify and prioritise what is significant in a place and what should be preserved.
- Managed retreat processes have to include under-represented individuals and communities. Engagement methods should include a variety of timings and formats suitable for different demographics. This will aid identifying the range of perspectives and common ground, which is needed to form consensus for managed retreat decision-making.

4 Preserving

- Background and Aims

Accelerating rates of coastal flooding and erosion force coastal management authorities to rethink how they manage assets at risk and allocate their resources (DeSilvey, 2021). As a result, new practices of preservation are considered, with some coastal features maintained in-place and others subject to adaptive reuse, relocation, and managed decline.

Implementing current shoreline management plan policies to manage the risk to coastal communities are estimated to cost between £18 to £30 billion over the rest of the century (Climate Change Committee, 2018), but much of this protection, an estimated 53% of the total length of the coast, is deemed not cost-effective (Jacobs, 2018). The Climate Change Committee (2018) therefore urges local authorities that any future plans to protect and manage shorelines must be more 'realistic and sustainable in economic, social, and environmental terms'.

A political focus on the expense and logistics of coastal adaptation strategies means managed retreat discussions are presently framed as a last resort. The effectiveness of managed retreat discussions depends on a critical and creative engagement with what it means to preserve something. Definitions of preservation and conservation vary across sectors, with the terms sometimes used interchangeably. Colloquially, the word conservation is linked more closely than preservation with the natural environment and the sustainable use of natural resources and also the protection of biodiversity and natural areas. Preservation, more commonly refers to practices of keeping something the same, in order to protect it from being damaged or destroyed (Buys, 2022).

The International Council on Monuments and Sites (ICOMOS), responsible for the protection of cultural heritage sites around the world, defines conservation as 'the supreme preservation principle' (Petzet, 1973), referring broadly to the notion of conservation as sustaining the values attached to a site of special interest. This is supported by English Heritage's (2018) objectives for conservation to 'reveal or reinforce those values for present and future generations', which include the evidential value of a site, its historic value, its aesthetic value, and its communal value. The United Nations Educational, Scientific and Cultural Organization's (UNESCO, 2009) conception of conservation likewise refers to the protection of cultural heritage, 'strengthening transmission of significant heritage messages and value [...] to ensure that value is not diminished and that it will outlive our limited time span'.

Thus, conservation means sustaining tangible environments for future generations but, importantly, also preserving intangible values attached to these environments. As the Convention for the Safeguarding of the Intangible Cultural Heritage identifies, this can include local traditions and national and regional cultural practices (UNESCO, 2003), the collective experience and memories of a place, or the ways in which people draw sensory and intellectual stimulation from a place (English Heritage, 2008). Conservation seeks to capture values held in the past and present and ensure their transition into the future.

Preservation refers more directly to the disciplinary practices that tangibly record, preserve, and disseminate those values, what ICOMOS refers to as ‘any practice [...] understood as a conscious safeguarding of evidence’ (Petzet, 1973). In the UK, National Planning Policy Frameworks protect heritage at-risk assets from neglect, decay or other threats through the identification of sites of special architectural or historic interest and the designation of sites worthy of protection. The National Trust (2020) supports a wide range of projects, initiatives, and programmes to ‘preserve places of natural beauty and historic interest’. Digital tools are increasingly used to preserve sites of particular archaeological interest, with organisations such as CHERISH (2021) using technology to pre-emptively preserve ‘by record’ using ‘cross-disciplinary techniques [...] to establish records of past environments, storminess, and extreme weather events’, in order to raise awareness of threatened heritage in coastal locations. Values worthy of conservation may be culturally specific and held in oral, visual, and sensory forms. Preservation practices from different disciplines and methods can be used to identify, record, and safeguard those values to ensure their conservation for future generations.

In this context, managed retreat can be understood as a proactive practice of preservation, requiring methods of recording, engagement, identification, prioritisation, and designation to identify the tangible and intangible values held within a community and the material and immaterial fabric of a place, in order for customs, routine, opportunities, and community rhythms to be effectively conserved for the future.

Designing an effective managed retreat framework requires an expanded understanding of preservation in the face of coastal change. The following aims to engage creatively with what it means to preserve something and centre what is essential and necessary for community continuity. Recognising that ideas of loss and preservation are coupled, through our engagement with residents in Hornsea and Withernsea we sought to identify and understand what are the associated fears of change.

- Uncertainty, Loss, and Change - East Riding of Yorkshire

Several lines of questioning emerged from this exploration into loss with local residents, which current managed retreat thinking insufficiently acknowledges. These include articulations of fairness, uncertainty, agency, and selfish vs communal interests. However, there is a whole range of responses. Some accept change: ‘You can't fight the sea, can you really, you can do to a degree, but you'll never win, you can buy time.’ With others highlighted that interventions are interrelated:

> They're not interested in saving that, it's because their argument is the sea has got to go somewhere, I get their point. You know, it will, it will just move the problem further down the coast because as we know, the tide comes in in a north-easterly direction.

While nearly all participants agreed or recognised that coastal change was happening, coastal erosion is highly contextual. ‘When we moved here, it, the cliff, was literally, it was about two

metres between that and the barricades and now there's 50 metres or 100 metres between it.' Or, 'I've got five to 10 years. But you know, I've been there for nearly 30-38 years, my parents were there 22 years before I was there.'
There was an incredulity at the speed at which change can occur: 'But seriously, you know, you're looking at three Victorian farmhouses that were never meant to go into the sea.' Due to this, some found it difficult to ascribed to what extent they witness just natural change or whether erosion is a direct result of climate change or accelerated by other man-made interventions.

> In some ways, I don't know how easy it is to tell whether or not it's climate change or not, for me just personally speaking, because if we didn't, I mean, I've mentioned Mappleton before. I mean, if Mappleton hadn't been, the defences hadn't been built there, we wouldn't have had the increased erosion to the south or the north. And it's the same, in a way, with the, you know, the rocks, there's sort of rocks being built out within sea. So if neither of those, it's quite hard to know, actually how much land, you know, whether it would have been less land, whether it's climate change as well or some other causes.

Others also questioned policy decisions, as Shoreline Management Plans are not always clear on how 'hold the line' or 'no active intervention' decisions are made, leading to criticisms about the data used to make them. The economic basis of coastal management is read by those on a 'no active intervention' policy as indifference or abandonment, or a lack of recognised heritage values worth protecting.

> I don't know why they don't just protect the whole coast. So, you know, there are people out there who think it could be doable. To not necessarily concrete, but a bit like at Withernsea, where they brought stones over from Norway and that sort of thing, and I've heard phrases like 'when the Queen was alive', you know, 'why isn't the Queen doing something about it, her country that's been washed into the sea'.

> I would be interested in, if we could increase the value of the area, because there's only two English National Heritage bits in East Riding isn't there, there's no national park this. There must be a national route to increase the value of the area, for because we don't have those things.

The question of what is and isn't defended is seen as an issue of fairness, that it is unfair that some residents are left vulnerable to change and others not. Why are some forced into thinking about strategies of adaptation including managed retreat at their own cost and others not?

> And the issue is not with the sea, not with everything else, because I accept that erosion happens and frost and rain all contribute to this. But if you're going to put a hard point in there, and you're going to make my erosion worse, then my right needs to be respected because you're doing something to me, not the climate, not anything else, you are doing something to me.

In contrast, those living in areas with coastal protection, were more complacent and felt that they would be protected in perpetuity from change, although they did not always know who was responsible for this and what the plans in place were.

While at the national scale, decision-makers refer to the inevitability of coastal processes citing causes such as nature or climate change (Tebboth, 2013), it is often unclear what this specifically means to a coastal community. There were therefore many complaints about a lack of transparent and consistent information about coastal change, plans, or support. Repeatedly, residents referred to a lack of knowledge and information about what their possible options are. 'I've always been part of the solution, but I don't have the knowledge [...] I don't feel like I have the answers. So, what can we call for, what can we ask for? So, what are the possibilities?'

Current thinking of coastal change is dominated by the quantification of loss and damage. SMP's identify the number of properties at risk or the acreage of at-risk agricultural land. Similarly, coastal management plans define changes within standard time-periods, reinforcing that coastal changes are finite. As adaptation strategies are consequently driven by cost-benefit analysis, the terms in which loss is articulated and understood centres on financial and material value rather than social and cultural values. However, community engagement highlights these less tangible and non-economic losses: 'People have no concept of what it is like to live somewhere where you're losing land […] it's very much a personal thing.'

- Case Studies

Adaptive Release - Hurst Castle

Some expect Hurst Castle, an artillery fort established by Henry VIII on the Hurst Spit in Hampshire in 1544, to become the first significant UK heritage site to enter a process of managed decline, known as an adaptive release, which allow sites that cannot be sustainably protected to erode into the sea. Through consultation, documentation, interpretation, and education, the values, knowledge, and significance attached to that asset are meant to be transformed into different forms of cultural value and memory. Adaptive release is a means of preparing people for the inevitable loss of a material asset, while creating a framework to communicate with the site in new ways and accepting that decline is a part of its history and significance.

The arguments for adopting adaptive release as a coastal management strategy include increases in knowledge about the site through research, improved site access (many at-risk sites are unsafe and inaccessible so through improved physical/digital means the site can be explored), ecological gains of a coastal realignment, community gains, consensus to precipitate loss and the potential productive re-use of that site, cultural gains, and expected artistic and creative outputs in anticipation of that loss.

Solent Protection Society

Reflecting on the possible precedent set by Hurst Castle and the prospect of a managed decline, Anooshka Rawden, Strategic Lead for Cultural Heritage at the South Downs National Park Authority explained that this approach is:

> A challenge to ourselves as a sector and a challenge to the public is around this idea that we can preserve everything into perpetuity [...] But we also have to start introducing the idea of managing decline and what that means, and that doesn't just mean you're going to turn your back on something It means you're going to go through a process of letting go. […]
>
> One thing learned about is that idea of taking people on a journey, which is almost like a grief cycle around changes and that people don't often accept change easily. So, you've got to drip feed it. […]
>
> One of the things that all of us came to recognise is we've sort of shot ourselves in the foot slightly as a sector, because for decades, we've insisted that preservation is about changelessness. I [work] in the landscape sector [...] it's interesting, because the public have a perception that, for example, a national park is a protected landscape, and therefore the word protected means changeless. So, some of it's about some of the expectations that have attached to terminology. And we ourselves are going to have to change those expectations. But we've got to be careful, because if you fundamentally erode that principle of conservation completely, we lose the fundamental premise of

leaving heritage that we inherit for the next generation.

Citizen Tools - CiTiZAN

CiTiZAN (Coastal and Intertidal Zone Archaeological Network) is a nationwide citizen science programme to enlist and train thousands of members of the public to recognise, monitor, and record the nation's disappearing coastal heritage treasures from prehistoric trackways to WWII pillboxes.

The programme has provided a standardised survey and monitoring methodology applicable to all English coastline. CiTiZAN volunteers have added nearly 2,500 new archaeological features to the interactive coastal map and created 61 three-dimensional models of foreshore features using photogrammetric processing software. Based on the data collected by volunteers, CiTiZAN has produced reports to mitigate erosion damage for the Council for British Archaeology and Historic England, the National Trust and the Crown Estate. One of the great outcomes of the CiTiZAN programme is the enthusiasm and engagement members of the public have had in interacting with their coastline in a proactive way. Rather than wait until loss is imminent, community members have been engaged in this process of preservation by learning about the stories associated to these features and their communities.

Chris Kolonko of the CiTiZAN North team based in the East Riding and Yorkshire area, provided us with the following reflections on preservation practices in heritage studies today and the CiTiZAN project:

> From my experience, as an archaeologist, we always tend to react to a situation rather than try to pre-empt something in a lot of cases. So, my experience of the Second World War [heritage] was in the short term, yes, we're going to lose a lot of stuff, the pillboxes are falling off the cliffs, but it's an opportunity for learning. We don't necessarily know how they were built and when one example [collapsed] I was able to work with it, asking questions that we haven't been able to answer for 80 years. There is a lot of opportunity there. […]
>
> So, in archaeology, you don't necessarily have to preserve the physical thing to ensure it's preserved. And in much the same way that history is recorded in books and documents. We can record archaeological features and buildings in a paper record or in other forms through digital recording, such as photographs and photogrammetry models. So, the idea here being that a lot of the time, it's not practical or cost effective to ensure physical preservation within the coastal time intervals and of archaeological features. And as a result, there are much cheaper ways of preservation. […]
>
> But we're also keen as well about learning about the stories associated with these communities. And just generally, you know, trying to work out how best to benefit the

communities or how best to approach this in the areas we've chosen across the UK. There was a lot of dialogue for communities and upskilling people in giving people the knowledge and experience they required to be able to essentially do their own archaeological work and continue to use these skills in the future to record archaeological features.

CiTiZAN

Commemoration

In our engagement with community members, physical or commemorative landmarks were identified as important aids for the collective memory of a place's history. Commemorating or marking change on the coastline was a means in the studied area of situating the present rates of change within a long, rolling history of transition and adaptation on the coastline.

Signifiers of this history are woven into the material fabric of the area, from plaques to monuments to current street names. Residents pointed to these features and used them as a mnemonic guide to recall either a personal or collective history of place. The power of

commemoration also sits within its lack of fixity to a particular place, as long as there is a logical organisation between the commemorative post and the history in remembrance (whether this is through a visual link or other forms of interpretation) that history can remain visible and suitably archived.

Digital Records - Seaford Head

Seaford Head is a nationally important area of chalk landscape in East Sussex, featuring archaeology of multiple periods including a Bronze Age bowl barrow, an Iron Age hillfort, and a Second World War reinforced concrete structure. The last few years have seen significant rates of coastal erosion, which are expected to increase in frequency and severity due to climate change.

This threat of loss of tangible heritage prompted a cross-disciplinary team from the UCL's Institute of Archaeology, Historic England, South Downs National Park Authority, and local residents and artists to start a programme of capturing the importance of the site before it is lost to coastal erosion. The work at Seaford Head sought to establish a framework for how to record and manage historic sites under threat that other heritage agencies, landowners, and community groups could follow.

As archaeologist Jon Sygrave explained, 'the purpose of the project was to [record] things rapidly and cost effectively'. Using a combination of non-intrusive documentation techniques, including the analysis of historical maps, contemporary techniques of aerial, topographic, and geophysical survey, and photogrammetry to produce an accurate 3D site model.

The project created a public dialogue about the impact of environmental change on coastal heritage and aided local residents in processing the eventual loss of the site. Seeking to capture 'what the common understanding and knowledge about the site was in one place', an improved awareness and understanding of the site was deemed a necessary first step in the process of

managing potential loss. As part of this, various multimedia and performance projects by local artists were commissioned to holistically preserve the site's 'complex heritage for future generations'.

Reflecting on the value of these more expansive formats of preservation, Sygrave shared the following:

> It was really important, through either the films or other mediums to try and explain in a non-technical way, rapidly. [...] As archaeologists, we're focused on recording things and creating data, we're not necessarily the best people to go out and explain what we're doing to the community, we can have that desire, but that's not necessarily our strongest skill set. So, collaborating with people who understand the creative process in order to get across messages to people is really important to us. […]
>
> I think it comes down to an understanding of processes of change through time. The challenge with this at the moment, is the fact that we could be seeing an accelerating rate of change the likes of which we don't have a cultural memory of. Things could be changing now, so rapidly, that it's going to impact thousands of millions of people worldwide. That hasn't happened for a long period of time.

South Downs National Park Authority/UCL Archaeology

- Key Findings

Modern heritage studies have been forced to recognise loss not only as something inevitable, but also as integral to the process of creating and maintaining meaning. Debates on loss and damage are

still dominated by a focus on tangible, physical assets. Current reportage and policy-discussion tend to quantify loss, for example, in reference to the loss of land and properties. This attitude is also reflected in personal accounts of loss that dominate discussions around coastal change, with participants often describing their experience of loss equally in relation to land, property, and material possessions.

Debates on loss and damage still pay insufficient attention to the intangible memories and collective customs and traditions that are essential for the binding of a community. Preservation practices focused on physical assets often overlook the need to preserve or transition the attached immaterial values into the future, which can be of equal importance to communities and individuals. Our engagement with residents living in areas at risk showed that the intangible qualities of a place are easily identified and prioritised by residents through positive association, however, in the process of loss, these are not as easily spatialised or materialised. This makes preparedness for loss of intangible qualities more difficult, both in terms of how accurately those at-risk qualities can be identified and agreed on but also in terms of what measures can be taken to mitigate against their loss, for example through preservation of socio-spatial relations.

Lacking transparency and communication of decision-making around shoreline management policy, especially in cases of ‘no active intervention’ policies, lead to a feeling of helplessness and deference to coastal change, making loss seem inevitable to many. There is also a tension in how issues of coastal erosion are framed at different scales. Nationally, increasing risk and accelerating coastal change due to climate change is acknowledged, as well as the need to act on this, however, what this means locally for regional coastal management policy is often unclear.

A particular challenge with any coastal adaptation management, particularly managed retreat, is the need for public support of the idea that we cannot preserve all coastlines forever. Residents accept that the prevailing ‘hold the line’ policy is unsustainable in the long term, but with decisions predominantly based on economic considerations, there is a sense that this exacerbates existing inequalities. Considerations of non-economic loss and damage and climate justice have to play a greater role in decision-making processes.

Conversation about loss but also practical actions to deal with loss and preservation is an important part of coastal change and climate actions. This includes thinking about notions of displacement and community rebuilding as well as potential environmental and social benefits of change. Without this more holistic approach to climate change, approaches such as managed retreat are not feasible.

Histories of loss and change on the coastline have led to forms of commemoration through plaques, interpretation boards, signposts and other physical signifiers of remembrance. These provide opportunities for learning, situating the present conditions within an expanded history of change. Similarly, citizen involvement in practices of preservation (such as archaeological recording) are important to understanding and processing coastal change. Both preservation experts and participants agreed that dealing with loss through creative practices is important for the individual to process their loss but also to share their experiences, feelings, and insights with their communities. This strengthens communities, creates conversation and consensus, and shares knowledge, which are all essential to greater community-level climate resilience.

The benefits of a broader definition of preservation beyond that of tangible heritage include support for non-economic loss, community-building, community-level resilience and support for climate actions, and greater socio-cultural focus that can lead to more equitable, long-term solutions with social benefits.

- Recommendations

- The scale and implications of future coastal change needs to be better assessed in consultation with affected communities and adequately communicated to the public.
- Preservation strategies are currently driven by cost-benefit analysis and therefore the terms in which loss is articulated and understood centres on financial and material value rather than less tangible social and cultural values. A shift towards non-economic loss is needed to create more equitable approaches to adaptation and preservation.
- There is a significant disconnect between those affected and those responsible for the mitigation planning and implementation that has to be overcome. Managed retreat strategies need to closely consult with affected communities to ensure that they are tailored to local circumstances rather than national policy, as coastal erosion and flooding are highly episodic, geographic-specific processes.
- In managed retreat, issues of loss and preservation are coupled and their local definition is essential for effective solutions that can have long-term positive impacts. Understanding the benefits and process of adaptive release as means of preparing for loss of a material asset is important, contextualising change in relation to a place's history and significance. It is therefore important to understand coastal loss also in generational terms, in terms of what one has inherited but also wants to pass on and preserve. Therefore, community consultation should capture and prioritise community needs and values.
- Managed retreat needs to be understood as a continuous strategy of engagement and decision making, not a reactive binary of whether to protect or not to protect tangible heritage. Thus, strategies and implementation should be based on extensive consultation, documentation, interpretation, and education to cultivate the transferring of values, knowledge, and significance attached to particular assets at risk so that they can be transformed into different forms of cultural value and memory.

5 Transforming

- Background and Aims

Since ‘planned relocation’ was first identified as a global policy adaptation strategy in the Cancun Agreement at COP16 in 2010, climate change adaptation research has increasingly discussed adaptation in terms of transformation and transition (Aiken, 2022). Despite the concept remaining ill-defined, it is broadly understood as a ‘systemic or paradigm shift, possibly triggered by intolerable losses’, with adaptation processes enquiring what needs changing, how to change it, and what can be learnt throughout the process of doing so (Lonsdale, 2015).

The Intergovernmental Panel on Climate Change (IPCC, 2022) has since adopted these terms, referencing a retreat from the effects of climate change as an increasingly necessary form of ‘transformational adaptation’, defined as ‘actions aiming at adapting to climate change resulting in significant changes in structure or function that go beyond adjusting existing practices’. The current understanding of managed retreat in the UK is framed as a final option and still largely associated with ‘a failure to adapt, or a one-time emergency action’ (Siders, 2019).

In its Sixth Assessment Report, the IPPC (2022) asserts that adaptation strategies present opportunities for long-term societal changes that can improve climate resilience and sustainable development, such as enhancing social cohesion, improved equity and justice, prioritising the needs of the most vulnerable, considering the full range of climate risks, and integrating adaptation into decision-making processes at all levels. However, criticism remain that transformational adaptation is insufficiently defined and may lead to new barriers in adaptation finance (Chandrasekhar et al., 2023).

Articulations of ‘transformational adaptation’ identify local communities as key stakeholders with knowledge of the unique environment and risks they face, thus, best positioned to develop solutions tailored to their specific needs (Gul, 2023). Co-designing solutions is therefore essential to ensuring that coastal change leads to socio-spatial transformations that benefit local communities.

This section deals with the transformation of coastal processes into positive effects: the improvement of community unity and solidarity, the positive continuation of heritage and intergenerational bonds, and an increased production and consumption of the creative arts as practice of dealing with change. Through a workshop with professionals across the disciplines of architecture and design, adaptation strategies were discussed that can help translate community needs into practical response to coastal change. The decision-making around new, or a change in, coastal management strategies can have positive effects on community behaviour and cohesion. For example, the spatial re-organisation of a coastal front to introduce more public space, access to new areas of beachfront through coastal realignment, the repair or reintroduction of previous lost community amenities such as a tidal pool. Decision making in response to change can be balanced by the opportunities for the introduction of new positive effects on residents and visitors and not just the drawbacks.

In thinking through coastal changes, responses from residents referred to a number of opportunities that were presented by this. The following, based on our engagement with local residents and specialist preservation practitioners, speak to three themes of transformation brought about by coastal change that are positively rooted and optimistically sited for their ability to aid in coming to terms with change.

- Transformative Opportunities - East Riding of Yorkshire

Community transformation

Conversations about coastal management speak to the wider needs and desires of the community beyond the binary of defended or undefended. Coastal management and adaptation decisions are interconnected with other issues around social needs and community wellbeing. Participants aired concerns about the general lack of public investment in amenities and facilities in the area, for example, waste collection, social services, beautification of the urban environment, and the need for improved infrastructure.

There was an appetite by participants to think about alternative strategies of adapting to coastal change beyond ‘hold the line’ defences. Repeatedly, residents referred to a lack of knowledge and information about what their options are, but expressed a desire to learn from each other. ‘We're not kind of learning from each other’s communities that are already going through all of this. And maybe they got some help and suggestions we can learn from them.’

From our workshops, self-mobilisation and self-organisation of community action groups focused on positive interventions in their environment were important to and highly visible within the community. Groups such as the Hornsea Urban Gardeners or the Floral Hall Steering Committee care for the community and its spaces, and are an important example of how collective ownership enables different ways of maintaining and managing community assets, thereby creating greater ability to adjust to change.

> Would community ownership come into that, imagine if a community has the power to sort of regulate, like, instead of buying a house you paid into like a pot and you were entitled to live there for a set amount of time.

Creating opportunities for an open, inclusive, and public dialogue between community members themselves on local issues is important in transforming change into a resource for solidarity. In our engagement workshops, participants explained the reasons for joining as: ‘to sort of just find out more about what's going on and meet some people’ and ‘I just want to learn more’.

Intergenerational transformation

Conversations about change on the coast with residents repeatedly spoke to the value of a place shared between generations. This was articulated through particular tangible landmarks that have remained in place for extended time frames, but also the activities enabled by those

landmarks and shared across different generations: walks along the promenade, making sand castles on the beach, walks along the railway line, for example.

The frequency of reference to parents, children, and grandchildren by residents is of particular note. There was a repeated notion of a desire to pass on this experience, to preserve the chance to do these activities for future generations. This expressed clearly that social values are not just linked to tangible buildings but also an environment to play host to shared experiences, to family needs, behaviours, and traditions.

> We've lived here for about 17 years [...] I fell in love with it and stayed, and I raised my child here in the same way and he's been able to have a slightly free-range feral childhood, they could play on the beach, walk on the beach.
>
> That's what I said I liked, you're in nature within minutes, most often people say [there is] nothing to do [...] but I brought my kids up on the beach, doing the nature walks.

Particularly generational frames of reference for coastal change are important to understand attitudes and perception of them. Residents who lived in the place for longer had a different understanding of coastal processes in the area compared to new residents.

> I've been there nearly 38 years; my parents were there 22 years before I was there. Erosion was never a thing until they put the hard point. I never heard the word erosion cross my father's lips.
>
> So, in a way, if you're used to that space, and it never hasn't changed that lifespan. You sort of feel like you would be complacent.

Coastal management and rates of erosion give a false sense of consistency, with coastal loss measured in terms of 25, 50 or 100 years, which broadly align with generational periods. This codes a misunderstanding of coastal changes as finite and counting down rather than an ongoing rolling process of change and loss, which has been occurring for hundreds of years. Intergenerational transformations, however, require vision casting through timelines more suited to individual and family needs. In our workshops, a more dynamic conversation around value and preservation emerged when discussing the capacity for change through lenses of intergenerational transformation. In thinking about notions of inheritance, in terms of what the next generation will be left with, gave a more positive understanding of what values linked to a place could be: ‘Are you thinking of selling? Or do you love it, treasure it, and take comfort in the fact that one day your children will live there with their families?’

Creative transformation

In conversations about the coast, artistic and creative expression was seen as an essential means to record and communicate senses of value as well as those of change and loss. Participants shared with us examples of moving image, photography, audio work, collecting, poetry, and

writing, which referenced a deep connection to the landscape and communicated the strong emotions of uncertainty they were experiencing.

> I've now started to make things with what won't be there. So, I've made 27 Bramble baskets this year. I do cyanotype prints of all the things that grow: weeds, flowers, anything where I am. So, I'm trying to document what is there. […] I'm trying to hang on to something that I can't.

Participants spoke about how they used creative practices to transform the negative attachments to change into a more positive, generative outlook. Fears and anxieties are confronted through messages of inspiration and hope. Where loss was referred to as the motivation behind the works, creative outputs were seen to partially fill that void. This speaks to the remedial effects of creative expression in this context, with participants referring to a deeply personal motivation to produce works as a process of healing.

> I think the value in [art] for me is personal, it's almost like a therapy. So, the studies I've done about the coasts are because, you know, I've been affected by it. So, I feel like I need to express something about it, because it's part of my identity, who I am.

> Communication about the future or the climate is always about loss. We're losing something, we're losing the sharks, we're losing our coastline. It's always about loss. I think the artistic expression is perhaps the only way you can interpret it in a positive way, we're going to do something.

> So, you say you're doing art, you're doing photography, for instance. You know, storytelling, it takes us away from being lost. We are creating something new.

> It's like a grieving, isn't it? That is repairing.

Highlighting these motivations in creative practice is to affirm that value in the community and community cohesion is as much related to the immaterial fabric of a place than it is to the physical fabric. Participants who shared their creative work, repeatedly referenced the sensorial, intangible qualities of the coastal zone as being the subject of their creative interest. Attempting to 'capture' a feeling of being by the coast such as the sensorial effects of coastal living: the sight, the sounds and the forces felt when living in proximity to water. These intangibles are part of the fabric of a place that cannot be captured in other forms of documentation. There was a desire by participants to share their creative works, often unprompted, to share how they feel about the place they live and what is important to them.

> I wanted to show you a poem I wrote about Hornsea beach, the speech that goes from here, it's for a book, *Friends of the Coast*, in which people were asked to write a poem about somewhere that you're interested in or have lived.

> I'm not an artist, but I'm documenting in artistic format, if you know what I mean, just so

> that everything that say is made from or by or with what's going to go.

Participants referred to the representation of a deeply individual experience but also an indirect connection to others with similar experiences. Artistic practices were seen as a means of communicating concepts to others that may not nor never will experience these themselves, highlighting the capacity for art to simultaneously speak to different audiences in different capacities.

> But I couldn't share that with anybody else [as they] wouldn't understand. But I think that, if someone has had the same experience, it's a nice way of obviously sharing.
>
> And also, people who have no concept of what it is like to live somewhere where you're losing land or you have to be careful when you walk on the clay. You've seen people having to leave properties because they have to, not through choice. So, it's very much a personal thing and it feels authentic. And I think from that standpoint, for me it's a good basis to say creative artistic responses are really key and valuable.
>
> So, the creative responses because that's kind of what I'm doing at the moment. When people look at the images or experience the installations and things like that, they can do it from a position of safety. So, in a gallery, or online it means that even if they're in that situation, you've put them in a place of safety and then you can think about things in a different way.

Coastal processes are broadly understood in reference to distinct policy periods of short-, medium-, and long-term risks. The production of creative works in response to change but also continuity can be seen to offer a challenge to the timelines in which change is currently communicated, with creative expressions enabling coming to terms with change and taking ownership of processes of transition.

> And also, you're going to use what has come from the past to look into the future. It's not something that’s separate.
>
> Because I was thinking of a story set in the future, a similar community to what it is now but living on a small island. And imagining that and the different traditions that had arisen because the community had changed.
>
> It feels proactive rather than reactive. It’s a positive association to value and place rather than a direct commemoration. It’s for acquiring agency and feeling like you’re a participant in a process and not just a passenger.

- Case Studies

Creatively Processing Change - East Riding of Yorkshire

The following works of art produced by workshop participants in the East Riding of Yorkshire in response to their circumstances of coastal living illustrates the desire for those at risk to process their relationship to change through creative outputs. Each work represents a highly individual account of how to manage and process coastal change, a reading of these works collectively allows for a better understanding of how a community defines and understands itself.

Julie Corbett *Onlookings*

Corbett's moving image and narrative piece jumps between two distinct perspectives. Commencing with a highly knowledgeable voice-over account of the local coastal dynamics, an artificial, generated voice situates the processes of coastal change against quantitative records of global temperature and sea-level rise. Against fixed long takes of fields, wind farms and the sea, an encyclopaedic record of the East Riding coast's is told, through this voice, the East Riding coast is just another metric to be counted. Switching to handheld footage, Corbett's regional accent speaks to a more individualised account of a place, in referencing the names of nearby villages and geographic features the production of the imagery is fighting the conditions of its creation as 'the wind is rocking [...] and the leaves are dancing' as Corbett 'struggles to stand still'. This lyrical account of a place challenges the prosaic first half of the piece, challenging the differing ways in which places in change are spoken about and by whom.

Julie Corbett, Onlookings

Lyz Turner *Changing Tides*

Turner's moving image work, composed of a montage of still images and a voice-over narration, articulates the fears of change and loss brought about by living in close proximity to a rapidly eroding shoreline. Turner's family had occupied a plot of land on the Holderness Coast for over fifty years, the production of *Changing Tides*, was inspired by the rapid increase of coastal erosion visible out of the kitchen accelerated by the erection of a hard-point groyne north of the property. Turner's voice-over, accompanied by photographs of her home in various states of ruin, poetically speaks to themes of parity and fairness of living on the coastline and the feelings of powerlessness to affect the inevitable. Referring to the loss of both essential and sentimental possessions in the home, reference is additionally made to the changes in habits, the concern for what will be left for her children to inherit as well as creating linkages between her situation and those throughout history who have suffered the same fate.

> [It's] like looking at someone you love in chronic pain. And knowing that you can do nothing to help. I feel a bit like the captain of a sinking ship, but there'll be no glory here.

Lyz Turner, Changing Tides

Intergenerational Transformation - Jubilee Pool, Penzance, Cornwall

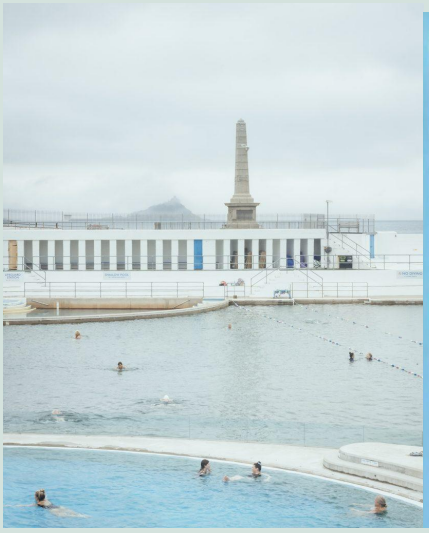
Opened in 1935 to commemorate the silver jubilee of King George, the Jubilee Pool in Penzance, Cornwall, had fallen into serious disrepair after years of damage from Atlantic storms. Threatened with closure by the local authority, the charity Friends of Jubilee Pool lobbied for the pool to be maintained and in 2017, the operation of the pool was handed over to the community. Working with Scott Whitby Studio, the restoration additionally included a new flexible community space for a range of activities, from art exhibitions to fitness classes as well as a retail space. The pool was converted into the UK's first geothermally heated through a system of extracting warm water from a 410m deep geothermal well, allowing for its use all year round.

Since the pool reopened in 2020, visitor figures have increased significantly and 46 employment opportunities across lifeguarding, hospitality, retail, planning and marketing have been created as a result. An events programme that includes an open-air cinema and music has transformed the beloved landmark into a hub of new social activity.

Significantly, adjacent to the material transformation of the Jubilee Pool, *Jubilee Pool Stories* was a three-year, community-focused, creative heritage project that collected, digitised, interpreted, and shared the pool's rich cultural history. Developed from the input of community members and volunteers, the archive includes hundreds of photos, artefacts, oral histories, films, and animations of the pool to record its significance to many generations of families from Penzance. This capturing of the immaterial value of the pool in parallel to its physical preservation has not only revitalised a community's cherished memory but has enabled a new legacy.

Scott Whitby, whose family itself had three generations of connection to the pool, provides the following description:

> And for me, heritage is so much more about [than] just the tangible assets. It's about the unspoken, that social heritage and the little girl who swims to her mother, who then turns to her grandmother, in a place that creates heritage for generations to come. And, you know, I feel that kind of layer to it. This idea of giving people opportunities to experience heritage is one of the great joys of this project and the great joys of all of the work that we're talking about.



Jim Stephenson

Unknown, Courtesy of Scott Whitby Studios/Jubilee Pool Stories

Performing Change – MELT, National Youth Theatre

On the Edge, National Youth Theatre/Risky Cities MELT (2020–2023) was a three-year environmental performance project produced by the National Youth Theatre in collaboration with the University of Hull's Risky Cities Initiative. The programme foregrounded the experiences of climate change that the 200 strong cast had experienced. Through digital and physical dramatisations across coastal sites in the East of England, the creative responses aimed to build flood resilience and knowledge for young people in communities at risk.

On the Edge was a performance by 15 young performers aged 18-26 at COP26 in Glasgow. The performance explored scientific understandings of and creative responses to climate change, particularly the relationship with water and flooding. The themes of the performance platformed young peoples' eco-anxiety in the face of climate uncertainty through the power of spoken word, poetry, music, and short film (National Youth Theatre, 2023).

On the Edge explored the effectiveness of using arts and humanities to build climate awareness, highlighting the intersectional challenges faced by young people, who, post-pandemic are dealing with not just the uncertainty of a climate crisis, but also rising social and economic inequalities. The play empowered young people to transform their experience and knowledge of fear into novel approaches to climate resilience.

Creative Transformation – Seaford Head, South Downs National Park Interpretation

Adriana Lord

Widely publicised instances of cliff erosion had drawn local attention to the prospect of losing not only the heritage assets at Seaford Head but also access to and views of the cliff. The South

Downs National Park Authority decided to use this opportunity of public interest to begin a programme of recording and communicating senses of loss through storytelling.

The South Downs National Park Authority invited 35 writers and storytellers to submit works that reflect on the significance of the area, mentoring them through an immersive, creative writing programme. The contributors were all locally based and included minority voices of older women, voices of colour, migrant voices, queer and non-binary voices, working class voices, and disabled voices, which had been recognised as being missing from records of this landscape.

Led by artist and writer Alinah Azadeh, the stories submitted were curated into a series of outdoor walks, public workshops, and writing groups as well as live performances, workshops, talks, broadcast, and digital publication that sought to 'not just think about history of sites and what has been, but what could be, what might be, what might happen if things carry on as they are'.

13 audio points have been installed on the landscape, which visitors can 'tune' into via their mobile to hear these stories, which are works of speculative fiction, historical tales, and personal accounts and recollections. Stories included:

- A biologist examining Cuckmere's history and speculative future under the shadow of climate change.
- A bus and life journey with an English working class and African heritage poet, along the coast.
- Belle Tout Lighthouse tells of its many lives as it contemplates its last days on land.
- A new myth on the origins of the Cuckmere Valley in Urdu, Hindi and English.

Azadeh provided us with the following reflections on the project:

> The lighthouse and many of the buildings on the Birling Gap site will disappear or need to be relocated over the next few years due to climate change […] We need to think about the process of change, loss, and adaptation here and in your own life. Those communities have been connected over the last year or so about edges, about rigidity, about going beyond our comfort zones and about making life anew and finding new horizons, dreams or paths forward. […]
>
> What for me was important was that actually quite a number of those stories sit relatively close to the edge of the landscape, and they reference what will be lost. And they preserve it to some extent. And they also ask important questions about, they provoke people to think about, how they feel about that. And because I think there's a kind of trauma response in the kind of culture of denial around some of the coastal loss from what I've understood. And I wanted to very gently invite people just to feel into what that's going to look like, feel like, what has been there and what might come in its place.

The interpretation at Seaford Head does not just create a record of what is known and what can

be seen, but also leverages the potentials of creative production to contribute to knowledge of the site. The works supplied by the artists are generative, with writers using the safe space of fiction to invent new tales and mythologies for this landscape, which will aid in transitioning the site into the future and broadening the understanding of the site to a wider, more diverse space. Indications suggest that the process of producing these works engaged residents with the process of letting go, mitigating feelings of loss by positioning change as an opportunity for coming to terms with and inventing new meaning.

- Key Findings

The intangible fabric of an at-risk site is rarely captured in current forms of coastal management consultation and therefore remains absent from coastal management adaptation strategies. These values can be, however, found in the community bonds, intergenerational connections, and creative outputs of a place.

The characteristics and values of a site are intangibly bound together with the experience of a place shared between generations. There is a clear desire for those facing change to impart or inherit the customs and traditions that are attached to a particular place. This provides a more social timeframe to coastal management as well a different rationality of decision making based on issues of non-economic. For example, creative practices can disrupt the dominant understanding of coastal management time frames, enabling those facing change to be proactive in their coming to terms with change and defining transitions in their own terms.

Acts of community-led designation and prioritisation presented by the processes of change, work against the grain of different forms of prioritisation that are often imparted upon a community without consultation. It allows for the contextual defining of what communities want in their terms.

Discussions of managed retreat bring to the surface novel opportunities to transform community values, bringing forward unaired or dormant motivations and priorities that can help a community establish a consensus on its future. Conversations about coastal management speak to the wider needs and desires of the community beyond binary policy decisions of whether an area is to be defended or not. It can, for example, consider new economic activity in support of the long-term sustainability of managed retreat.

Artistic production is widely pursued in at-risk areas for its capacity to allow, in its making, the coming to terms with change. Despite being often based on subjective lived experiences and a form of personal processing of loss, artistic practices are an important part of sharing and forming collective knowledge and consensus. A reading of artistic and creative outputs from a community allows therefore for a better understanding of how a culture defines and understands itself. The opportunity for the creation of new knowledge and meaning also aids in the improved understanding of broader interests including: climate justice, loss and damage, and intergenerational rights.

- Recommendations

- Managed retreat discussions should foster an open, inclusive public dialogue between community members to allow the process to become a resource for solidarity. They should consider the holistic needs of the community, drawing on local issues beyond coastal adaptation and mitigation requirements. Strategies of retreat should capitalise on the opportunity to mitigate broader local issues as a part of its process.
- Managed retreat discussions should challenge existing consultation and valuation methods (such as economic assessments and prioritisation), to ensure intangible heritage and community values are preserved and incorporated into coastal management adaptation strategies. Managed retreat processes therefore should include creative practices to document and capture the intangible fabric of a place that requires preserving, as it can capture individual and under-represented voices.
- Managed retreat processes should not just be designed in reference to fixed timelines. A flexibility for those affected to define periods of change in their own terms (individual, community, intergenerational) can support acceptance of change. Adaptation and coastal change are not finite but a part of an ongoing, rolling-process of transformative change of meaning and values.

References

Adriaan Buys, ‘What are the differences between conservation and preservation?’ in *Conservation Mag* (2022)

A.R. Siders et al., ‘The case for strategic and managed climate retreat’ Article in Science, August, 2019 (2019)

ATKINS, ‘An ecosystem services valuation of Medmerry Managed Realignment Scheme’ (2017)

Ben McAlinden, ‘Managed realignment at Medmerry, Sussex’ for *Institute of Civil Engineering* (2015)

Bob Ward, ‘How is climate change affecting coastal flooding in the UK?’ In *Explainer, Impacts of Climate Change LSE Grantham Research Institute on Climate Change and the Environment* (2021)

Caitlin DeSilvey, Curated Decay - Heritage beyond Saving (2017)

Caitlin DeSilvey et al., 'When Loss is More: From Managed Decline to Adaptive Release’ in *The Historic Environment: Policy & Practice, Vol 12* (2021)

Carbon Brief, *CCC: England’s coastal defences need ‘urgent’ rethink to cope with climate change* (2018)

Celia McMichael, ‘Planned Relocation and Health: A Case Study from Fiji’, in *Int J Environ Res Public Health, 18(8)* (2021)

Christina Hanna et al., ‘The Uncertainty Contagion: Revealing the Interrelated, Cascading Uncertainties of Managed Retreat’, in *Sustainability 12, 736* (2020)

Colette Mortreux et al., ‘Political economy of planned relocation: A model of action and inaction in government responses’, in *Global Environmental Change 50* (2018)

Committee on Climate Change Adaptation, ‘Managing the Coast in a Changing Climate’ (October 2018)

Department for Environment, Food and Rural Affairs (DEFRA), ‘Adaptation to Coastal Change Quick Scoping Review’, WT1562 (2018)

Department for Environment, Food and Rural Affairs (DEFRA), ‘Adapting to Coastal Erosion, Evaluation of rollback and leaseback schemes in Coastal Change Pathfinder projects’ (2015)

Department for Environment, Food and Rural Affairs (DEFRA), ‘Coastal Change Pathfinder Review Final Report’ (2012)

Department for Environment, Food and Rural Affairs (DEFRA) ‘Cost estimation for coastal protection – summary of evidence’ (2015)

East Riding of Yorkshire Council, Coastal Explorer, *online* (n.d)

East Riding of Yorkshire Council, ‘Coastal change in the East Riding’, *online* (n.d)

East Riding of Yorkshire Council, ‘Defending the East Riding Coastline, Coastal Explorer (n.d)

Eli Lazarus et al., ‘The UK needs an open data portal dedicated to coastal flood and erosion hazard risk and resilience’ in *Anthropocene Coasts, volume, 4* (2021)

English Heritage, ‘Conservation Principles, Policies and Guidance for the sustainable management of the Historic Environment’ (2008)

Environment Agency, ‘Cost estimation for coastal protection – summary of evidence’, Report – SC080039/R7 (2015)

Environment Agency, Medmerry coastal flood defence scheme Policy paper (2012)

Environment Agency, National Flood and Coastal Erosion Risk Management Strategy for England (2022)

Environment Agency Flood and Coastal Research Team, ‘Working together to adapt to a changing climate: flood and coast - Summary of research and tools’, Research project FRS17192/2 (2021)

Gerd Masselink et al., ‘Impacts of climate change on coastal geomorphology and coastal erosion relevant to the coastal and marine environment around the UK’ in *MCCIP Science Review 2020* (2020)

Institute of Civil Engineers, ‘Moving the Belle Tout Lighthouse, Eastbourne, United Kingdom’ (n.d)

Isabel Cotton et al., ‘Understanding perceived effectiveness of a novel coastal management project: The case of the Bacton-Walcott sandscaping scheme, UK’ in *Front. Mar. Sci.* (2022)

Isabelle Gerretsen, ‘The UK 'climate refugees' who won't leave’ for *BBC Future Planet* (2022)

IPCC, ‘Climate Change 2022: Impacts, Adaptation, and Vulnerability’, Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2022)

Jacobs, ‘Research to Assess the Economics of Coastal Change Management in England and to Determine Potential Pathways for a Sample of Exposed Communities’ (2018)

James Cox, ‘Rolling Out the Rollback’ for *Lichfields* (2019)

Jan C. Post and Carl G. Lundin ‘Guidelines for Integrated Coastal Zone Management’ in *Environmentally Sustainable Development Studies and Monographs Series No. 9* (1996)

Jocelyn Timperley, ‘CCC: England’s coastal defences need ‘urgent’ rethink to cope with climate change’ for *CarbonBrief* (2018)

Joe Duggan, MELT - major three-year environmental project announced on Earth Day, *National Youth Theatre News Article Online* (2023

Jubilee Pool Stories, About the Jubilee Pool Stories project, *online* (n.d)

Karen McNamara et al., ‘Planning for Community Relocations Due to Climate Change in Fiji’ in *Int J Disaster Risk Sci 6* (2015)

Kate Lonsdale et al. ‘Transformative adaptation: what it is, why it matters & what is needed’, *UK Climate Impacts Programme, University of Oxford* (2015)

Kate Lyons, ‘How to Move a Country’, The Guardian (2022)

Lisa Schipper et al., ‘Transformational Adaptation Including Operationalisation & Assessment’, *15th SBSTA Research Dialogue – SB58* (2023)

Mark Rowe, ‘The Rising Threat of Coastal Erosion’ in *Geographical Magazine* (2022)

Mark Tebboth, ‘Adapting to coastal change: understanding different points of view in coastal erosion management’ for *Royal Geographical Society (with IBG)* (2013)

Michael Buser, ‘Coastal Adaptation Planning in Fairbourne, Wales: lessons for Climate Change Adaptation’ in *Planning Practice & Research 35 (2)* (2020)

Michael Oppenheimer et al., ‘Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities’ in *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (2019)

Michael Petzet, ‘Principles of Preservation, An Introduction to the International Charters for Conservation and Restoration 40 Years after the Venice Charter’ in *International Charters for Conservation and Restoration. Monuments and Sites, 1 . ICOMOS* (2024)

National Trust, ‘Case study: Medmerry Nature Reserve’ (n.d)

North Norfolk District Council, ‘Case Study - Coastal Adaptation at Happisburgh’ (n.d)

North Norfolk District Council, Case Study - Happisburgh ‘roll back’ of nine residential properties (2012)

North Norfolk District Council, ‘North Norfolk Coastal Change Pathfinder Project Post Project Evaluation’ (2012)

OECD, ‘Responding to Rising Seas: OECD Country Approaches to Tackling Coastal Risks’, *OECD Publishing* (2019)

Office of the Prime Minister, Republic of Fiji, ‘ Standard Operating Procedures for Planned Relocation in the Republic of Fiji’ (2023)

Patrick Barkham, ‘This sinking isle: the homeowners battling coastal erosion’ in *The Guardian* (2015)

Philip Bennett-Lloyd et al., ‘Fairbourne Coastal Risk Management Learning Project’ *Welsh Government* (2019)

Phoebe Southworth, ‘Beachy Head lighthouse to be moved further inland ... just 20 years after first relocation’ in *The Telegraph* (2021)

Rachel Carless, Public Perceptions and Knowledge of Coastal Management on the Manhood Peninsula, West Sussex Research report (2010)

Rhoda C. Ballinger, Wendy Dodds, ‘Shoreline management plans in England and Wales: A scientific and transparent process?’ in *Marine Policy, Volume 111* (2020)

Robert Harvey, ‘Medmerry Managed Realignment’ in DEFRA, Working with Natural Flood Management: Evidence Directory (2013)

Robert J. Nicholls et al., ‘Integrating new sea-level scenarios into coastal risk and adaptation assessments: An ongoing process’ in *WIREs Clim Change, Volume 12, Issue 3* (2021)

Robert J. Nicholls, et al., ‘Sea-level rise and its possible impacts given a 'beyond 4°C world' in the twenty-first century’ in *Philosophical Transactions: Mathematical, Physical and Engineering Sciences Vol. 369, No. 1934* (2011)

Robin Bronen, ‘Climate-induced community relocations: using integrated social-ecological assessments to foster adaptation and resilience’, in *Ecology and Society 20(3)* (2015)

Rodney Harrison et al., Heritage Futures Comparative Approaches to Natural and Cultural Heritage Practices (2020)

Sefryn Penrose and Nadia Bartolini, ‘Adaptive Release: guidance framework for sites affected by coastal erosion and flood management’ for *Historic England Research Report Series no. 85/2022* (2022)

Sue Boyes et al., The East Riding Coastline: Past, Present and Future (2016)

Tamsin Edwards, ‘Future of the Sea: Current and Future Impacts of Sea Level Rise on the UK’, *Government Office of Science* (2017)

Tanya Venture et al., ‘Articulating Loss: A Thematic Framework for Understanding Coastal Heritage Transformations’ in *The Historic Environment: Policy & Practice, Vol 12* (2021)

UCL, ‘Using drones to capture coastal heritage before it’s lost’, *UCL News Online* (2021)

Yorkshire and Humber Climate Commission, ‘Community Resilience to Flooding’ (n.d)