Climate change risks to coastal communities and their health and wellbeing

CONSULTATION REPORT

December 2024

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1. Introduction

The Marine Climate Change Impacts Partnership (MCCIP) was founded in 2005 as an independent source of marine climate change impacts evidence and adaptation advice for the UK, guided by core principles of scientific integrity and stakeholder engagement. MCCIP works with scientists to produce authoritative, state of the science, evidence reviews and summaries, directly supporting evidence requirements of the UK Government and devolved administrations.

Climate change risks to coastal communities, and particularly health and wellbeing, have been identified as a major knowledge gap by MCCIP in our reviews of physical, ecosystem and societal impacts of climate change, largely due to the scarcity of published evidence. The literature on climate change and coastal communities in the UK is generally outdated, and during a rapid validation exercise undertaken by MCCIP, research and policy experts confirmed that critical, and wide ranging, gaps in our understanding persist, particularly relating to people's health and wellbeing.

MCCIP recently initiated a new project called Climate change risks to COastal COmmunities and their health and wellbeing (COCO) to explore these issues in more detail. The aim of COCO is to build a UK stakeholder network around climate change risks to coastal communities and their health and wellbeing, to help advance the knowledge base, and to promote action.

A stakeholder consultation was launched to gain a deep insight into perceived barriers, attitudes, and options for taking positive action regarding climate risks to the wellbeing of coastal communities in the UK.

2. The approach

2.1 Aims and objectives

General Aim: To advance the evidence base on climate change risks to UK coastal communities and promote action.

To achieve that overall aim, and in line with the strengths and expertise of the MCCIP partnership, the COCO project set out with the following specific objectives in mind:

1. **Build a UK interest group**: To build a UK-wide interest group – the Working Group – involving experts and practitioners from different organisations.

2. **Barrier analysis**: To explore and rationalise issues getting in the way of addressing the vulnerability of coastal communities and their health and wellbeing.

3. **Options for positive action**: To develop options for action, focusing on specific place-based case studies where appropriate.

4. **Community engagement**: Identifying opportunities for progressing options for positive action, working with coastal community groups.

5. **Wider promotion and dissemination**: Through publication of outputs and promotion at relevant fora and events.

2.2 The MCCIP COCO Working Group

The primary aim of the COCO Working Group (WG) is to oversee the operational delivery of the “Climate change risks to coastal communities, and their health and wellbeing” project, engaging with scientists and end user communities to better understand risks and help build resilience.

The COCO WG includes practitioners working across the UK, with representatives drawn from the following bodies and organisations:

- Agri-Food and Biosciences Institute, Northern Ireland (AFBINI)
- Environment Agency
- Defra
- Vale of Glamorgan and Swansea and Carmarthen Bay Coastal Engineering Group
- Cardiff University and the Severn Estuary Partnership
- Severn Estuary Coastal Group and Welsh Coastal Group Forum
- Welsh Government; Natural Resources Wales
- Marine Management Organisation
- Adaptation Scotland, Sniffer
- The Scottish Government
- MCCIP Secretariat

Through the WG members, the COCO project has established an extensive network of stakeholders, practitioners and expert focus groups.

2.3 The Collective Intelligence Protocol

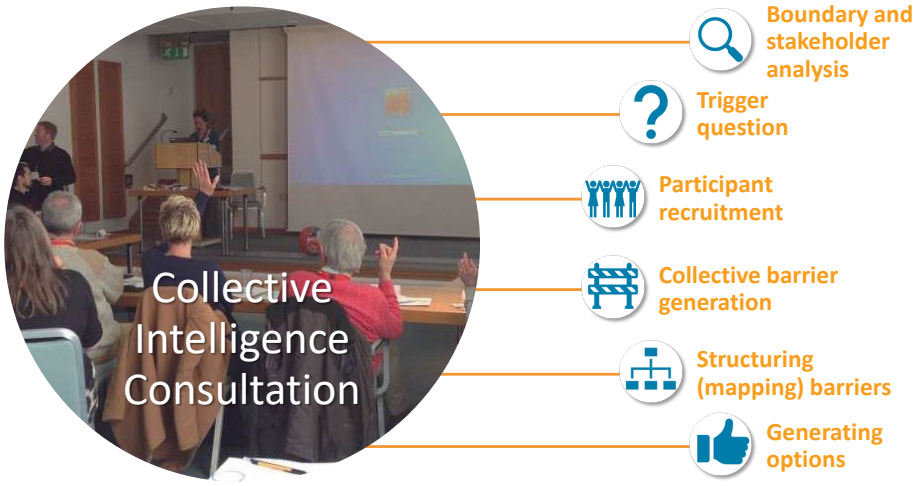
The consultation follows the Collective Intelligence principles and protocols utilised by the SeaChange Project, an EU Horizon 2020 ocean literacy project that involved partners from 9 European countries, with the goal of bringing about a fundamental change in the way European citizens view their relationship with the sea, by empowering them to act towards healthy seas and healthy communities.

SeaChange produced specific training resources, protocols and manuals based on collective intelligence, participation and co-creation methods. These were used and adapted for the purposes of the MCCIP COCO project, and can be found here: http://whitakerinstitute.ie/project/sea-change/

The consultation consisted of two parts:

- An online survey of a wide group of stakeholders, to generate a long list of barriers.
- A workshop involving a select subgroup of stakeholders, to categorise, rank and structure the long list of barriers and generate options for action to overcome those barriers.

The 'options' for action that resulted from the consultation/workshop will be used to refine the work plan for the MCCIP COCO project.



2.4 The stakeholders

The COCO WG identified a set of key stakeholders at a national, community and individual level, who deliver or can influence action on climate adaptation in coastal communities, with the aim of improving their health and wellbeing. To ensure that there was an overall balance of views and perspectives on the issue of climate risks to coastal communities across the list of potential stakeholders, they were assigned to one of the following groups:

- *Incumbents* = visibly control the system, are happy with how things are.
- *Challengers* = less influencing, often conform but wait for chances to challenge.

- *Regulators* = facilitate smooth running of things, so tend to defend *status quo.*

A total of 182 contacts from across a wide range of organisations, associations and committees were identified. They included, but were not limited to, national and local government; industry; coastal partnerships and community fora; climate change research; social research; statutory agencies; services and utilities; maritime and coastal infrastructure and transport links; health services; nature conservation and management; arts and culture; marine recreation; climate and weather forecasting; lifesaving at sea; tourism, culture and heritage; and food standards.

2.5 The consultation

The **purpose** of the MCCIP COCO consultation was *to gain deep insights into stakeholder's views on barriers, attitudes and solutions for taking action regarding climate risks to the wellbeing of coastal communities*. *The resulting options for action were used to refine the COCO workplan, with the input from the MCCIP COCO Working Group.*

The consultation was carried out in two parts:

1. An **online survey** was sent out by email to all the stakeholders identified, and used to generate a wide range of barriers,
2. Followed by an **online stakeholder workshop** to review and categorise the barriers and generate options for action.

Online survey and barrier generation

The online survey was introduced to stakeholders using a trigger question, to help initiate **thinking**, **reflection,** and **discussion**, and to help stakeholders focus on the issue at hand to formulate the necessary barrier statements.

A selection of five alternative phrases for the trigger question were discussed and put to vote with the Working Group ahead of the survey:

A. What are the barriers to addressing climate change risks to the wellbeing of coastal communities?
B. What are the barriers to building resilience to climate change in coastal communities?
C. What are the barriers to addressing the vulnerability of coastal communities to climate change?
D. What are the barriers to supporting climate adaptation in coastal communities?
E. What are the barriers to taking positive action to support the wellbeing of coastal communities in a changing climate?

The WG chose option C below, as the best phrase to use as trigger question, namely:

(In the UK) What are the barriers to addressing the vulnerability of coastal communities to climate change?

Participants were required to formulate five short barrier statements, with the option of including a longer clarification for each. They were also asked to express their interest in taking part in the later workshop.The survey ran for 4 weeks, with a total of 150 barrier statements collected

Initial barrier categorisation

All the 150 barriers were anonymized and numbered sequentially. During the survey respondents were offered the opportunity to provide an extended clarification alongside the

barrier statement, although this was not compulsory and therefore some barriers were submitted without clarification.

Barriers were checked for exact duplicates where the wording of two or more barriers, and their clarifications, might be identical, but no duplicated barriers were found. In a few instances, barriers were submitted with the same wording, such as “money”, however their clarification text (where available) clearly indicated a slightly different context or meaning, and therefore they were kept in the list in their original form.

Where barrier statements clearly expressed more than one idea, those were split into single barrier statements. The final list of barriers were then initially structured into nine broad category groups by the project team according to their topic content:

C1 - VESTED INTERESTS
C2 - SCIENTIFIC EVIDENCE
C3 - STAKEHOLDER FORA
C4 - FINANCIAL CONSTRAINTS
C5 - MINDSET
C6 - GOVERNANCE
C7 - LITERACY
C8 - HEALTH & WELLBEING
C9 - DISADVANTAGE

The purpose of this initial categorisation was to rationalise the list and facilitate the review and voting exercise during the workshop that followed.

2.6 The workshop

A total of 14 participants took part in the online workshop, across 2, 3-hr sessions on 8-9th May 2024.

Final barrier categorisation and structuring

Participants were reminded of the trigger question used during the online survey: ‘*What are the barriers to addressing the vulnerability of coastal communities to climate change?*’, and the 150 barriers generated during the survey. The initial categorisation of these barriers was rigorously reviewed and amended to the following list by workshop participants. Some of the categories were renamed, and some of the barriers under them were relocated to different categories. As a result, a new category (“C10 – Governance Procedure”) was created, and one of the initial categories (“C8 - Health & Wellbeing”) was merged because it was felt it was a component of a number of other categories, particularly C9 (“Physical, Social and Economic Constraints”). The list below summarises the final categories and the general context of the barrier statements grouped under each of them:

C1 - COMPETING PRIORITIES: corporate, political and or economic interests as blockers of action.
C2 - SCIENTIFIC EVIDENCE: availability or accessibility of data and information.
C3 - ENGAGEMENT: engagement and communication between key stakeholders.
C4 - FINANCIAL CONSTRAINTS: lack of top-down funding.
C5 - MINDSET: aspects related to people’s attitudes, beliefs and behaviours.
C6 - GOVERNANCE POLICY: barriers at the legislative, planning, management, or governance levels.

C7 - KNOWLEDGE & SKILLS: people lacking basic understanding to interpret technical information.
C8 - HEALTH & WELLBEING (void)
C9 - PHYSICAL, SOCIAL AND ECONOMIC CONSTRAINTS: place-specific disadvantages.
C10 - GOVERNANCE PROCEDURE: specific barriers related to governance processes themselves.

The full list of barrier statements per category can be found in the Appendices.

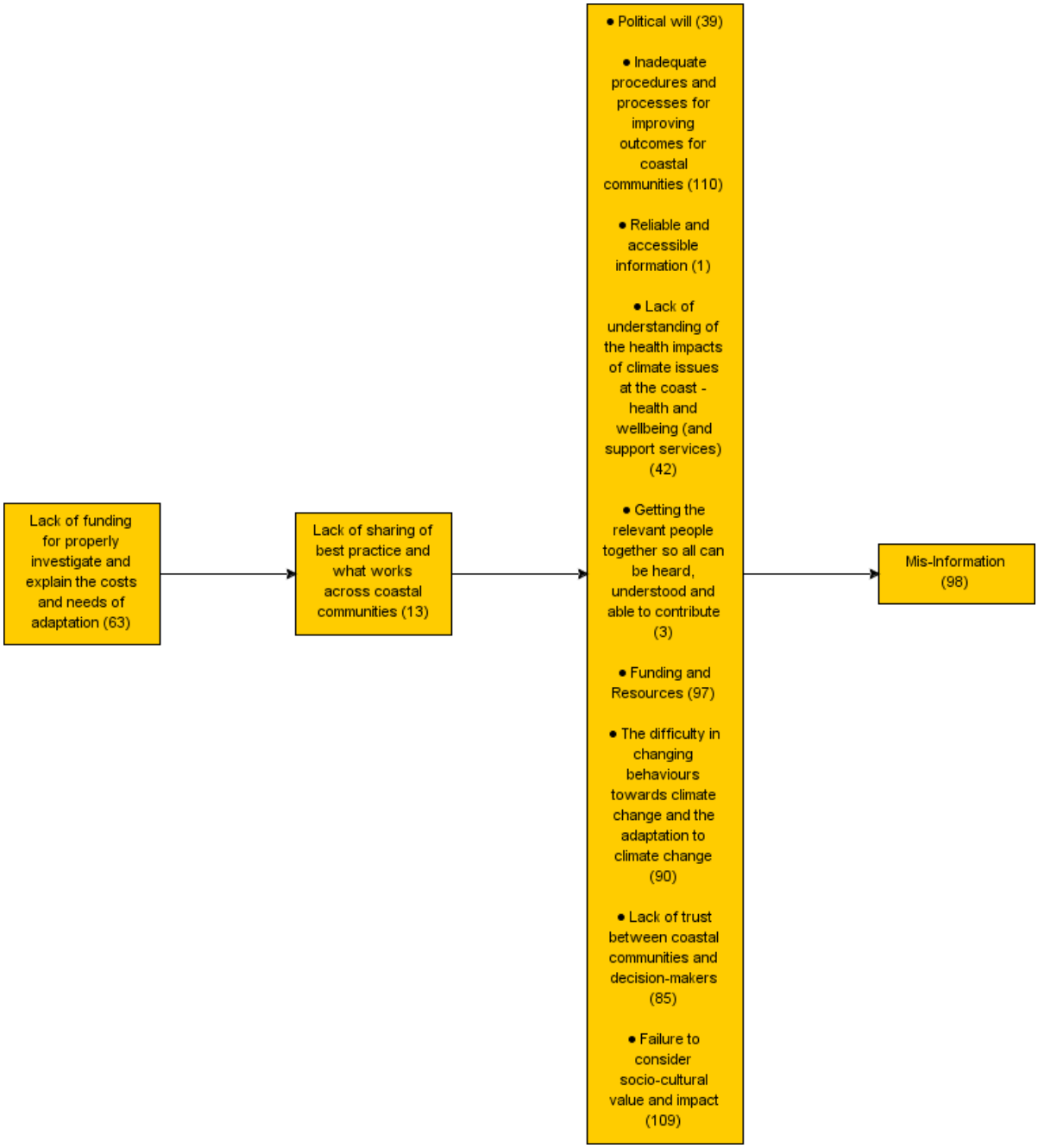
Participants were then asked to vote for the barrier they thought was most significant in each category. The table below shows the 12 most voted barriers:

BARRIER No.	**CATEGORY No.**	**BARRIER STATEMENT**	**VOTES**
B41	C1	Political will	12
B109	C10	Inadequate procedures and processes for improving outcomes for coastal communities	9
B1.1	C2	Reliable and accessible information	6
B44.1	C2	Lack of understanding of the health impacts of climate issues at the coast - health and wellbeing (and support services)	6
B2	C3	Getting the relevant people together so all can be heard, understood and able to contribute	6
B96	C4	Funding and Resources	6
B89	C5	The difficulty in changing behaviours towards climate change and the adaptation to climate change	6
B14	C7	Lack of sharing of best practice and what works across coastal communities	6
B83	C3	Lack of trust between coastal communities and decision-makers.	5
B63	C4	Lack of funding for properly investigate and explain the costs and needs of adaptation.	5
B108	C6	Failure to consider socio-cultural value and impact	5
B97	C7	Misinformation	5

Next, the top 12 voted barriers were entered into the Interpretive Structural Modelling (ISM) software, to explore the links between those most important barriers and how they may or may not aggravate each other. Participants were shown the 12 most voted barriers, before being guided through a series of relational questions generated by the ISM software ("*Does barrier A significantly aggravate barrier B?*") to ascertain which barriers could be making other barriers worse. The answer to each question ("*Yes*" or "*No*") was reached by consensus by the group.

Once all the relational questions were completed, the ISM software generated a structural barriers map. The participants discussed the map and were given the opportunity to re-run some of the relational questions if they felt the links between barriers were not correctly reflected on the map.

The diagram below represents the structural barrier map generated by the ISM software.



The way to interpret this map is reading from left to right, with barriers on the left having the most aggravation. Any arrows represent paths of aggravation, and there can be multiple depending on how complex the structure is. In this case, there was only one single path of aggravation. Any barriers within the same box represent a cycle of aggravation, meaning that those barriers are inherently inter-related.

While some participants were not necessarily in agreement with the map, or found it overly helpful, they were happy to accept it as a basis for discussion and to generate options. They also agreed that the barriers represented within the same boxes reflected the complex nature of the issues involved in climate change adaptation in coastal communities, where issues 'aggravate' one another and are cyclical in nature. In many ways the map output matched their experience: that the links between these barriers are not straightforward (i.e. resolving one

barrier does not neatly lead to the next barrier) and therefore issues need to be addressed collectively to move forward.

Generations of options for positive action

Next, the workshop moved to the positive thinking session and participants were given some general guidance and allowed time to write down any number of options that in their opinion could help overcome any of the barriers on the structural map. Participants were then allowed to ask questions about each other's options for further context.

The full list of 57 options generated can be found in the Appendices.

Next, the participants were asked to vote on their preferred options according to the following criteria: feasibility, high impact, timeframe, and whether it could be championed by someone.

The list below shows the 12 most voted options.

OPTION No.	OPTION DESCRIPTION	VOTES
O20	Engage with media outlets to ensure good news and practice on coastal management is promoted, rather than only being mentioned in a doom and gloom context. This also includes promoting benefits of Managed Realignment etc	5
O16	Database with accessible information for decision-makers and stakeholders to be able to see a wide range of projects and successes/failures	3
O5	Capturing stories of what is possible - working with early movers e.g. National Trust, RSPB, ? others to demonstrate what is possible and the co-benefits for biodiversity, health including mental health and wellbeing	3
O7	Better 'marketing' - like line 12 [Change procedural governance in coastal decision-making to require the earliest community participation and ensure meaningful participation throughout] - good practices promoted across all media (social, traditional etc.) so benefits shown as they happen	3
O17	Develop national frameworks and funding mechanisms for rolling back communities and/or assets to ensure uniform approach as much as possible, to remove the feeling of "unfairness" (being treated differently), especially across nations (Wales, England, Scotland, NI)	3
O22	Expand the CoastSnap initiative as a way to passively educate the public on the impacts of climate change and coastal processes and expand data collection and understanding of coastal processes in areas with an installation	2
O32	Interdisciplinary teams established for adaptation projects to support holistic and place-relevant project design and delivery - to break down silos	2
O39	More research into the benefits of engagement, to enable funding of this on an ongoing (rather than ad-hoc, project by project) basis	2
O41	Promote the acceptance of failures and learning from them. This is a new challenge and there needs to be the acceptance that we might not get the right answer first time	2
O43	Provide funding for engagement with communities to better understand the intent of the SMP (non-statutory!!) allowing development from the SMP in terms of broader (not just risk management) approaches	2

OPTION No.	OPTION DESCRIPTION	VOTES
O54	Use existing Coastal Group channels to share comms & eng material, support in challenging conversations and to produce reliable and accessible engagement material on national topics of interest	2
O8	Change in mindset in Government organisations to reflect the fact that coastal adaptation is not just an issue for Defra but for a number of other Government departments	2

This completed the session, and the workshop was concluded after a brief explanation by facilitators about how the options would be used and next steps in the MCCIP COCO project.

The full range of barriers, categories and options are being used to inform the COCO workplan.

3. Acknowledgements

We want to thank our MCCIP COCO Working Group for their invaluable contribution to this work, as well as the participants in the workshop and all the stakeholders who took part in the online survey. This work is supported through the UK Marine Climate Change Impacts Partnership (MCCIP).

4. Resources and references

4.1 Additional resources

A list of further useful information, resources, and related projects collated with the help of the COCO WG can be found in the Appendices.

4.2 Bibliographic references

Collective Intelligence Methodology further reading:

Fauville G., MgHugh P., Domegan C., Mäkitalo Å., Møller L.F., Papathanassiou M., Alvarez Chicote C., Lincoln S., Batista V., Copejans E., Crouch F. & Gotensparre, S. 2018, Using collective intelligence to identify barriers to teaching 12-19 year olds about the ocean in Europe. *Marine Policy*, vol 91, pp 85-96.

Domegan, C. and Devaney, M. (2013) *Sea for Society Citizen/Youth and Stakeholder Consultation Methodologies*, Whitaker Institute, NUI Galway, Ireland.

Domegan, C., Devaney, M., McHugh, P., Hogan, M. And Broome, B. (2014) Waves of Change: Collective Design for a Sustainable Marine Ecosystem, Whitaker Institute, NUI Galway, Ireland.

Broome, B. J. (2006). Applications of Interactive Design Methodologies in Protracted Conflict Situations, in Lawrence Frey (Ed.), *Facilitating group communication in context: Innovations and applications with natural groups,* pp. 125-154, Hampton Press.

Hogan, M.J. & Broome, B. (2014). Wellbeing in Galway City: Overcoming Barriers to Well-Being in Galway, Collective Intelligence Conference Report, NUI, Galway

Appendices

A. Glossary of abbreviations

Below there is a list with the definitions of some of the abbreviations included in the barriers and options collected during the consultation, for convenience.

ADEPT	Association of Directors of Environment, Economy, Planning & Transport
ARP	Anglia Revenues Partnership Enforcement Agency
CaSP Cymru	Wales Coasts and Seas Partnership
CBA	Cost-Benefit Analysis
CCRA4	Forth UK Climate Change Risk Assessment
EIA	Environmental Impact Assessment
FCERM	Flood and Coastal Erosion Risk Management
FDGiA	Flood Defence Grant-in-Aid
IEMA	The Institute of Environmental Management and Assessment
NAI	No-active Intervention
RFCCs	Regional Flood and Coastal Committees
RMAs	Risk Management Authorities
SAB	Scheme Advisory Board
SMP	Shoreline Management Plans
WCGF	Wales Coastal Group Forum
Welsh FCEC	Welsh Flood and Coastal Erosion Committee

B. Final list of categories, barrier statements and barrier clarifications

Final list of barriers as they were grouped into final categories. During the survey respondents were offered the opportunity to provide an extended clarification alongside the barrier statement. Where this clarification was not provided it is indicated as '-'.

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
C1 - COMPETING PRIORITIES		
B102	Landownership	-
B121	Political implications and risks	The impact on reputation of Government and their delegated bodies in respect to accepting (or not!) the responsibility of negative impacts from unsustainable flood risk management or other impacts from climate change. Assessing the vulnerability of coastal communities' lays-bare the need for Government policy and commitment to mitigate the risks or provide compensation for impacts on communities, infrastructure, and environment where perhaps there is no DIRECT legal duties of care? E.g. loss of equity from climate change related sea level rise or loss of agricultural land {note this is similar to the second point but relates specifically to policy gaps or political "hot potatoes"!
B122	Reputational Risks leading to FOIs and high-profile challenges.	Government priorities may not satisfy everyone's expectations! – Another difficult issue is explaining the problem of climate change related impacts and relating that to the priorities of government as defined in National Flood Risk Management strategies and climate change related adaptation guidance or policy. For example, the loss of agricultural land to sea level rise! These policies and positions may not meet everyone's expectations or likely leading to lobby or high-profile negative publicity. I.e. Government emphasis on protecting communities at risk (but only when economically viable in respect to cost benefit) rather than primarily infrastructure, distribution networks and agricultural land. This may be a difficult message for many within vulnerable coastal areas, particularly where there are only low numbers of community at risk which effect the cost benefit ratio!
B124	Managing the reputational risks.	Many of the messages and engagement narratives are extremely difficult and negative in nature when dealing with the climate change emergency. They involve a change in the status quo, disturbing peoples feeling of security and sometimes involves existential risks. For example, evidence associated with existential threat from tidal flooding in coastal communities and unsustainable flood risk management potential. The messages disturb the status quo and security of the public and stakeholders and lays bare some unpalatable realities of future short-, medium- and long-term change expectations. Messaging is therefore complex and needs to ensure that accountability is not assumed.
B131	Coastal assets in private ownership	In Cornwall in particular, many coastal assets are in private hands (for complex historical reasons linked to the Duchy of Cornwall). The whole of Cornwall has about 30m of costal defences are owned by the Crown Estate.
B41	Political will	National and local government may not understand or prioritise the needs of coastal communities, particularly small ones. Their attention and associated funding decisions can be focused elsewhere, e.g. town centres, industrial development, urban areas with larger voting cohorts. Rural coastal communities may particularly be vulnerable to being overlooked or deliberately not prioritised.
B42	Economic pressure to develop in inappropriate areas on the coast	There used to be national planning guidance that protected coastal areas for industry that needed to be located at the coast. This no longer exists. Although the government has coastal change management areas this leads to a piecemeal approach to what is appropriate to site where and can lead to problems for coastal communities regarding non-CCMA areas which can have any kind of development built there, potentially impacting on the ability of communities to relocate as the need arises and skewing the spending on coastal defences.
B54	Greenwashing	The ability of companies and businesses to Greenwash is meaning that people are badly informed of the issues and don't understand what is actually being actioned
B55	Corporate greed	There is still too much focus on making profit and this is often from pollution. Water companies, plastic producers and oil giants are not seeing environment issues as their main driver and instead investing in unsustainable solutions.
B74	Inadequate focus	Often politics or campaigns are driving the focus on what might not be a pressing problem but constitute a stronger headline.
C2 - SCIENTIFIC EVIDENCE		

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
B1.1	Reliable and accessible information	Lots of data and information, some is not accessible, some not easy to understand or use and it can be hard to know what to trust to help at different stages (i.e. when scoping an approach, when prioritising actions and when implementing an action or evaluating progress). Each need different type of info/data and levels of detail.
B100	How do you define "coastal areas"?	Off the back of research being conducted by Plymouth University - if you are looking at communities on the coast, it matters whether the community even defines themselves as being "on the coast". For example, the town of Carmarthen in Carmarthenshire is influenced by the tide and subject to tidal flooding because it sits on a large river leading to a large, complex estuary. Therefore, if you go by a simple definition of "coastal area" then Carmarthen would fit this description. However, the people of Carmarthen would not consider themselves to be living in a coastal town.
B105	Climate change uncertainty of timings	-
B148	Lack of granular data metrics	Data on the impact of climate change on the health and wellbeing of people in coastal communities is either missing or collected at a higher level that ward metrics meaning that those in the most deprived communities are often overshadowed by their wealthier neighbours.
B17	Monitoring and Metrics	The vulnerability of coastal communities extends beyond physical coastal changes, but these factors are often harder to monitor, and appropriate metrics may not exist to allow the identification of trigger points to taking action.
B25	Data	Understanding what is changing and how fast. I'm particularly thinking about changes in the geographical range of fishery species. Fisheries are often data poor making it harder to predict the impacts of climate change.
B27	Nearshore modelling	Ability to translate and communicate how offshore conditions impact coastal environments, e.g. sea level rise, changes in wave height/direction. There is a need to nearshore 'transformation' models, which are typically run by consultancies, but many 'users' are unaware of this.
B28	Wave/surge projections	Projections of sea level rise is good, while projections of waves/surges have had less focus on to date.
B29	Compound impacts	How do projections on land interact with projections in the sea - do we understand the compound impacts.
B44.1	Lack of understanding of the health impacts of climate issues at the coast - health and wellbeing (and support services)	Mental and physical health can be impacted by any kind of change, particularly that that can't be easily controlled by the person suffering. Vulnerability to or perceived vulnerability to flooding, losing property due to erosion, high temperatures, compounded by lack of access to services e.g. GPs and hospitals due to the 180 degree nature of coastal communities (inland communities have a wider 360 degree search area for such things) and issues such as disease vectors like mosquitoes which may be more common e.g. in areas with salt marsh all contribute to poor mental and physical health in coastal communities.
B48	Level of Coastal Vulnerability is not well known	There are many different metrics to determine a coastal community's vulnerability from socioeconomic, environmental and cultural. Climate change can impact these all in different ways, especially regarding socioeconomic and environmental factors.
B73	Lack of clear/strong signs	Despite the fact that some effects of climate change are already somehow visible (i.e. increase in storminess), the change in U.K. is happening in a very subtle way. It is much more difficult to assess and register the direct consequences of climate change this way and there might be a lack of drivers to act to address vulnerability if an imminent threat is not perceived.
B75	Lack of proper assessment	Related to the previous point on science [B72 clarification: Often, investment for science (i.e. data collection) are limited either in amount or duration. We see it for example in the science supposed to underpin the management of inshore fisheries in Scotland, where the lack of a structural and consistent framework for data collection has led to uncertainties in the status of certain stocks which in turn has the potential to impact the economy. This lack of monitoring translates also in the lack of capability to assess if there are already climate related effects at play in the areas. In a fast-changing world, we can only rely on science to pick up changes and allow the community to become more resilient to change]
B86	Lack of clear adaptation measures to adopt under specific climate change scenarios	-

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
B87	Awareness of the full range of climate change impacts which could impact a coastal community	This may be the scale (e.g., what does >1m of sea level rise mean?) of known impacts or the lack of visibility around other impacts (e.g., how will pathogens change?).
B94	Limitations in sea level rise modelling / failure to consider beyond 2100	One area where there has long been considerable uncertainty in the scientific literature is sea level rise. It is acknowledged that the projections for sea level rise in UKCP18 are incomplete and were not able to include robust projections for contributions to sea level from changes to the Greenland and Antarctic icesheets. In the intervening period considerable work has been undertaken on quantifying the complex relationship between the cryosphere and the ocean, and better understanding of the contribution of these areas to sea level rise is emerging. The UK Met Office has recently produced new modelling incorporating these dynamics: High Level Storylines for Sea Level Rise which attempts to assimilate the latest evidence regarding ice sheet dynamics in Greenland and Antarctica and allows consideration of sea level rise over a longer time frame. It is important that sea level rise beyond 2100 is considered in land use, settlement and infrastructure planning today given the uncertainties regarding the difficulties in modelling future changes to storminess (a major driver of change at the coast), knowledge gaps regarding positive feedbacks within the climate system (and modelling gaps linked to this) the pace of change being seen in the cryosphere and, as a result, at our coasts. We have to consider the long-term direction of travel rather than assessing coastal risks as though sea level rise will just stop neatly at 2100.
C3 - ENGAGEMENT		
B83	Lack of trust between coastal communities and decision-makers	Many communities feel there is still a barrier between local people and those decision-makers within their area. Some feel unable to get their voice heard in terms of proposals or development. Deprived communities are likely to feel most estranged from decisions in their area. Role of communication and clarity is important for accessing these groups.
B90	Lack of clear communication between policy makers, scientists, local authorities, and communities	There needs to be two-way information exchange throughout the process to ensure socially acceptable adaptation or mitigation strategies are adopted. Climate information may not be accurately conveyed, community voices may not be heard equally, and there may be lack of clarity about who is ultimately responsible for what part of the process are just some of these problems.
B112	No consolidated effort to drive action	-
B125	Managing the necessary engagement within a fixed period	The engagement will follow a process that has defined period and closure (although there may be opportunity for future engagement). Therefore, the scope of engagement to be delivered within a prescribed period of time needs to be very carefully managed to raise the issues from cold call – through to increasingly more complex engagement with ample opportunity for recording and assimilation of views of the public and stakeholders etc. Careful planning, recording of engagement outcomes, and the utilisation of a variety of engagement platforms/approaches to reaching all the parties is therefore critical. The period and process/stages of engagement needs to explicit.
B128	How to manage public communication of difficult and / or contended forecasts	-
B98	Biased sampling	By hosting online consultations etc., we are tending to exclude the elderly or digitally illiterate. By hosting events in person, usually only a select sub-group of the population with a particular interest or personal agenda on the consultation topic will attend. In my experience, very rarely are you able to get a good sample from the entire breadth of a population, which is really what you need when addressing health and well-being. A lower-income single mother, for example, will likely not have the ability or time to respond to a consultation regardless of format, but could be more severely impacted.
B15	Lack of stakeholder engagement about	Lack of consultation around shoreline management plans.

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
	how climate change should be managed	
B65.1	Change in people involved	Adaptation can take time. Agreement can be reached initially. People making decisions can change, requiring a new set of discussions starting afresh. Much of the focus is on "what do people want", often getting contrary issues being raised. Frequently, this conflict is not actually resolved in part because the engagement is around aspiration rather than framing discussion around reality of change.
B2	Getting the relevant people together so all can be heard, understood and able to contribute	Mechanisms to support coastal communities to coordinate and join forces. We need a public debate on how we address climate adaptation. Coastal communities, given they will be impacted sooner than other parts of society need to have a clear voice in this. Requires some kind of agreed mechanisms to get people to come together and good convening power, process design skills and facilitation to ensure people understand what is happening, whey they are involved, the scope of the initiative, and ways to participate that suit at different points.
B70.1	Community engagement	People expect the government to solve the problem. It would be useful if the EA had materials that would explain how the FCERM (Flood and Coastal Erosion Risk Management) funding calculations work. Communities cannot afford to find circa £11m for schemes.
B46	Partner preparedness and readiness	The perceived preparedness and readiness of authorities, organisations and stakeholders to engage with communities. Especially true where there has been previous conflict and in sensitive areas. This results in communication occurring at too late a stage of a project / scheme cycles and communities feeling as if they are left out of the conversation.
B50	Community access	Simply, not knowing who to go within a community. There are many of community groups that may be suitable.
C4 - FINANCIAL CONSTRAINTS		
B45	Resources	Cuts to funding at all levels of national and local government and the associate arms-length bodies mean less attention on non-statutory work.
B56	Money	The various options to assist coastal communities against the impacts of climate change are not cheap. Local councils will need to find space in their budgets. National government(s) will need to allocate resources. When it's not a "right now" demand - flooding or coastal erosion haven't cost any houses or lives recently - it is harder to find the budget space given the demands on overstretched finances.
B53	Money	This isn't sufficient funding in order to tackle to issues, we need to look at concentrating community funding on coastal projects and linking up land and sea
B63	Lack of funding for properly investigate and explain the costs and needs of adaptation	If the decision is to continue defence, one has the funding to explore the options for defence. If the decision is for adaptation, very largely it becomes someone else's problem. There is a lack of joined up thinking and a lack of consideration of how to adapt.
B64	Understanding that adaptation can often be taking a step back in order to move forward in a sustainable manner	At present much of funding is related to continuation of the current situation based heavily on economic growth and development. It then becomes increasingly difficult to gain funding for the situation where there is a need to accept a decline in economic growth, in order to progress forward in a different and more sustainable way forward.
B47	Resource constraints	There are sever resource constraints within delivery organisations from staff shortages, money and time. This prevents the necessary resources and mechanisms for community to be developed, with communication left to the side and not a priority, which it should be! can conduct action before communicating what is going to be undertaken.
B43	Coastal defence funding models	Coastal defence funding is generally given on the basis of number of households protected. This does not allow for protection of vital infrastructure such as roads and rail access which are vital for the for the functioning of coastal communities and also discriminates against smaller, often rural coastal communities. The effects of erosion and flooding on mental health and wellbeing and the knock-on effects on economy are also overlooked.
B9	It could be an expensive problem at a time when	-

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
	everyone is competing for funding	
B61	Acceptance of the need to adapt on economic grounds	Frequently, the response to any suggestion of change is "why can we not protect". The need for adaptation may be as a result of a range of factors - environmental impact, unsustainable defence over time (see barrier 2) or basic lack of economic (FCERM - Flood and Coastal Erosion Risk Management risk). On the last of these, often there is only very high-level consideration of alternatives (one only goes beyond that if one is trying to evaluate an intervention scheme, not as a means of explaining why one cannot realistically continue to defend). unless there is a scheme for defence, there is infrequently funding to properly evaluate works one is not planning on doing. This raises suspicion that alternatives are not properly being investigated. Linked to this is that scheme justification is generally taken from a siloed risk management perspective not taking account of broader scale (non-FCERM) damages.
B36	Resources	Some solutions to addressing climate change involve expensive works - it can be difficult to access funds.
B21	Cost	New infrastructure required to protect low lying coastal communities from sea level rise.
B62	Acceptance of decisions around longer-term unsustainable issue	The current appraisal process tends favour short term decision making. The economic argument, based on discounted values (even viewed over a longer assessment period) tends to conceal increasing investment in the future compared to the overall assessment of shorter-term damages. This issue relates in part to sunk costs - e.g. we can be based on present damages justify continued defence, longer term costs being discounted. It is only when one takes a time incremental approach i.e. how much additional cost is required in year "x" compared to the discounted value of avoidance of damages does the problem become evident. This leads to the barrier expressed as "we can afford to defend now, therefore we will, and we will worry about the future when it happens.
B70.2	Unaffordable partnership contributions	People expect the government to solve the problem. It would be useful if the EA had materials that would explain how the FCERM (Flood and Coastal Erosion Risk Management) funding calculations work. Communities cannot afford to find circa £11m for schemes.
B72	Lack investments	Often, investment for science (i.e. data collection) are limited either in amount or duration. We see it for example in the science supposed to underpin the management of inshore fisheries in Scotland, where the lack of a structural and consistent framework for data collection has led to uncertainties in the status of certain stocks which in turn has the potential to impact the economy. This lack of monitoring translates also in the lack of capability to assess if there are already climate related effects at play in the areas. In a fast-changing world, we can only rely on science to pick up changes and allow the community to become more resilient to change.
B93	Lack of clear messaging and financial support for those for whom relocation is the most sustainable option	There is little help available for those who lose their homes to the sea. There is no national compensation scheme. The UK has the 'Coastal Change Pathfinder' projects, 15 two-year projects funded in 2010 by DEFRA which: cover the cost of property demolition and site restoration, provide up to £1000 in relocation expenses (removal vans, storage etc.) and provide up to £200 in hardship expenses. This is inadequate. There is a need for compensation to cushion the blow of losing homes to the sea as the government attempts to move from a policy of holding the line to one of managed retreat along many parts of the coast. Furthermore, there is a need for clear messaging on the issue, with sea level rise it will simply not be possible to protect every community from coastal change, but politicians are not keen to be associated with this unpalatable message and where they do engage with the issue it is often to call for measures to keep communities in situ, but which are not viable in the long term. Communities at risk from coastal erosion and sea level rise need support to be able to relocate and plan for the future of their communities rather than the current situation which promotes denial of the problem, and reaction to extreme events only once they occur / are imminent. Some communities know they need to relocate, some of those are willing to, having been flooded repeatedly (and potentially increasingly), but they need to support to do so. To them, the inertia by government is frustrating as they are stuck and will just keep flooding.
B96	Funding and Resources	A lack of funding and resources, the timelines of funding, and the ebbs and flows of political opinion make it difficult to facilitate community-based, evidence collection, or public consultation activities, particularly in preparation for long-term changes that local authorities and communities are preparing to resist rather than adapt to.
B101	Money	-
B104	Property devaluation	-
B130	Grant in Aid not fit for purpose for small coastal communities	The current mechanism for Grant in Aid is not fit for purpose for small coastal communities where the cost/benefit analysis based on OM2 outcomes doesn't account for the social and economic importance of protecting communities.

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
B135	Lack of funding for local authorities to employ people with knowledge to advise	-
B138	No grant funding in place to help communities adapt, no compensation	Areas with a SMP policy of no active intervention or adaptation, with no mechanisms in place to deal with impending property or agricultural farmland loss in this area, putting stress/worry on home and landowners.
B139	No insurance available for properties for coastal erosion	No insurance available for properties for coastal erosion, like there often is for flooding or landslide. With climate change more properties will be affected with total loss having a negative effect of wellbeing of those affected.
B140	No local studies or grant to do studies to look at opportunities to embrace changes	Changes in sea temperature resulting in loss of current species or habitats. No local studies or grant to do studies to look at opportunities to embrace changes in species or habitats to help communities adapt to new or future nature-based tourism opportunities.
B141	Lack of funding or grants (re. loss of amenities / access)	Sea level rise resulting in future loss of amenity beaches or loss of access for longer periods. Lack of forward planning and investment in communities to create improved amenity space next to beaches to help compensate for loss of access to a beach. This also affects tourism and local business. Sea level rise and increased storminess effecting rocky shore habitats or geological SSSI's resulting in loss or access, poor condition or smothering by sediments. Loss of enjoyment, amenity.
B143	Grant funding not enough to pay for upgrades or improvements to a lot of coastal defences	Grant funding is based on the protection of property, rather than say the protection of small community and its wellbeing. For example, at Robin Hoods Bay in North Yorkshire £15million would be needed to build a replacement seawall of a standard to deal with climate change, but there are not enough properties (most of which are historic listed) to achieve anywhere near the £15m in benefits to unlock the grant. Welling being needs a higher rating that just properties.
B136	Lack of staff resources to support identification of climate change issues on the community	-
B150	Government has not yet committed funding to support	~1200 coastal landfill sites are at risk of inundation by coastal flooding or via coastal erosion thereby releasing pollutants (inert & more serious) into the environment. Sites are already impacting health & wellbeing of local communities, and they are an immediate threat unless funding to deal with them, and in the case of those already protected to maintain them, before there is a serious environmental or public health impact.
B32	Lack of public funding	Restoration projects are also very costly, and there are only low levels of public funding to support this. Scaling up funding for coastal restoration would create jobs, support local livelihoods and increase ecological resilience in the face of the threats linked to climate change.
B118	Lack of funding to those losing their homes	There is a lack of incentives for people to proactively relocate away from erosion risk, meaning they stay in their homes longer, increasing anxiety and physical health issues.
C5 - MINDSET		
B103	Communities resistant to change	-
B146	Expectation of funding	-

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
B147	Resistance to change	-
B19	Resistance to change	Communities often do not like change / trying something different. Coastal communities often have an expectation of protection, and so proposals which require a more adaptive approach can face resistance, especially when combined with uncertainty on impacts or outcomes.
B24	Global cooperation	To slow down carbon emissions and limit climate change affects, in worst case scenario predictions if may not be possible for efforts made by local communities to mitigate impacts of climate change.
B38	Unwillingness to lose land	People don't want to have to move, there doesn't appear to be compensation for loss of property
B40	Time	Unrealistic expectations can be a problem. The fact that we are running out of time for some communities, but they don't want to address it.
B49	Communities' willingness to engage	Engaging with communities is very challenging. Many, if not previously impacted by flooding or coastal erosion, do not want to listen to yet another 'bad news story'. Further, those previously impacted by flood and coastal erosion may have lost confidence in authorities and organisations abilities to prevent these. With respect to coastal adaptation, many find this word very worrying, and it can lead to a lot of anxiety, especially for previously impacted communities as they may have feeling of 'abandonment'.
B52	Daunting	Problems can almost feel too daunting, and solutions are not achievable.
B77	Powerlessness	Coastal communities may believe that their local actions, both individual and collective as part of community coordination, will have no impact on reducing their vulnerabilities as climate change drivers are global.
B82	Resistance to change social behaviours	Vulnerability also includes a lack of resilience from communities not changing mindsets and continuing traditional behaviours. Within the access policy, we can influence how people access the marine area however if this is no longer safe given coastal change, sticking to the same behaviours can lead to an increased vulnerability and risk to coastal residents. Potential resistance in changing how a community access and interacts with the coastal area, especially when considering.
B84	Climate change is an abstract term for many	Many think that as they have not experienced the impacts of climate change yet, that it is a problem that is further down the list. Therefore, it isn't addressed straight away.
B89	The difficulty in changing behaviours towards climate change and the adaptation to climate change	This includes awareness of climate change. But the bigger issue is that many of the adaptation measures may be very drastic, involve people's entire livelihoods, and will require huge changes about how coastal settlements are planned and development.
B95	Resistance to change / cognitive dissonance / denial of the new paradigm when it comes to our changing coasts	Because there is no compensation, alternative accommodation or insurance payout for most people who lose their homes due to coastal erosion, many communities who are facing this issue are experiencing significant cognitive dissonance when it comes to engaging proactively with the threat. The situation has serious repercussions for health and wellbeing – particularly mental health. Human psychology struggles to cope with threats when there is no reasonable course of action to avert the threat or support to negotiate it, and as a result it is not uncommon for those facing sea level rise / coastal erosion to become entrenched in denial. Communities in this situation are frustrated by the slow pace of action from Government when it comes to providing support for adapting to sea level rise and coastal change. Working with communities impacted by these issues we hear from people who are anxious at every high tide, every storm and their enjoyment of their homes is prohibited by this uncertainty. While there is a tendency toward denial, deep down many people want a supported course of action that they can take to navigate the current impasse of being 'trapped' in properties that they fear are unsellable / or cannot afford to sell without significant financial loss. Communities facing this threat go through a process from denial to acceptance similar to the 5 stages of bereavement (The five stages are denial, anger, bargaining, depression and acceptance), but while there is no support to allow people to relocate then acceptance and moving on with their lives / embracing the future is something that is prohibited from happening.
C6 - GOVERNANCE POLICY		
B10	Perceived climate change risks could make other	-

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
	investment in the communities seem too risky	
B106	Lack of holistic decision making due to siloed administration and policymaking	Issues are largely approached from distinct policy areas (e.g., health, education, environment, conservation, economic growth, jobs etc) and there is limited integration of multiple issues that underpin vulnerability both in policy-thinking and in administrative application.
B107	Lack of integration of land and sea in policy, decision-making, and intervention	The place-based context of coastal communities means that their vulnerability (and general experience) is influenced by marine and terrestrial natural and social processes. But our administrative boundaries diverge at the low water mark meaning coastal communities are often not seen as relevant to marine activity, and that marine systems are viewed as being distinct from coastal social systems. E.g., the sea is seen as a threat to be defended from, or it is seen as a conservation space that people shouldn't occupy, or it seen in terms of marine industry and economics, etc.
B108	Failure to consider socio-cultural value and impact	Due to the gap between land and sea in decision-making etc, people aren't often considered at all in how they will be impacted by decisions and projects, including how this might directly or indirectly interact with existing vulnerability. When people are considered it is often as adversaries to a given plan, taking away coastal land for restoration and excluding people, or as sources of spatial conflict or opposition to a plan. Positive impacts tend only to be considered in socio-economic terms, such as predictions of job creation or industrial growth, without due consideration of wider implications to the local socio-cultural aspects of a place.
B111	Policy hurdles	-
B12	Lack of government funding and intervention	In some cases, the government have decided not to intervene and to let nature take its course.
B126	Lack of coordinated long term local strategic planning between public and regulatory bodies	-
B127	Lack of strategic capacity to create a long-term strategic plan	-
B129	Lack of assembled strategic projects ready for funding	-
B132	Conflicting role/management for certain coastal assets that also act as defences	It can be difficult to define if a coastal asset is also a 'costal defence'. For example, a harbour breakwater may simply be classified as a port asset because within the haven it creates it is used to moor and load/unload boats. Whereas it performs a dual role, it is almost certainly in the ownership of a port authority not the Crown Estate.
B142	Lack of creation or extension of new SSSI's	Sea level rise resulting in future loss of amenity beaches or loss of access for longer periods. Lack of forward planning and investment in communities to create improved amenity space next to beaches to help compensate for loss of access to a beach. This also affects tourism and local business. Sea level rise and increased storminess effecting rocky shore habitats or geological SSSI's resulting in loss or access, poor condition or smothering by sediments. Loss of enjoyment, amenity.
B144	Lack of forward planning	Acceptance that changes will happen in the future and planning for adaptive changes. 5-year political cycles mean that often there is not the will to plan necessary adaptive changes for the long term 20-25 years ahead. This includes maintaining strips of foreshore areas as

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		communities inevitably need long term planning. Communities often rely on access to water for their wellbeing. Coastal paths/infrastructure can be cut off and often not reinstated or need to be re-routed away from the coast.
B149	Shoreline Management Plans are not statutory	SMPs provide clear guidance to inform planning to ensure that development is appropriate, however some councils ignore the SMPs and allow development within inappropriate areas which in time impacts the health and wellbeing of those within these communities through flooding or coastal erosion. SMPs should be statutory.
B16	Legislation	Existing legislation does not easy allow for more innovative approaches to coastal resilience, in particular with regards securing funding.
B20	Reactive Management	When events impact coastal communities, this can result in reactive emergency management which often defaults to traditional protection measures in contrast to longer-term plans. This can have the effect of raising expectations of protection into the future.
B23	Policy	More policies needed, or addition of climate change impacts to current policies.
B26	Governance	Organisations that are responsible for certain climate change risks and how others are able to support.
B3	Government leadership	NAP3 has a very loose/vague vision and then a focus on risks rather than outcomes of what we want to achieve. Although people recognise that coastal communities are at risk without clear leadership, guidance, regulation or incentives, it will not be easy for cash-strapped local authorities (or other actors) to prioritise.
B31	Policy protection for coastal ecosystems	Coastal habitats like seagrass and saltmarsh offer valuable protection against storms, coastal erosion and flooding which are all linked to climate change. We have lost the vast majority of these habitats due to anthropogenic pressures like development, land conversion, poor water quality and physical damage. A lack of meaningful protection at policy level means that we continue to lose valuable habitats but also the likelihood of success in restoration efforts is low. On the flipside, appropriate policy measures could help to improve ecological conditions and success rates of these projects.
B35	Lack of robust marine spatial planning	Marine spatial planning needs to accurately prioritise the value of marine natural capital in our marine areas, so that it can continue to provide valuable services to society. Instead, ecosystems are prioritised below industrial activities, the benefits of which do not necessarily fall within local coastal communities.
B4	Lack of systemic understanding	It is a complex topic with many interdependencies and unknowns. Climate change impacts all systems we depend on and is going to impact poorer communities (including coastal communities) more than others. Cascading risks, interdependencies and uncertainty (in social, demographic, technological, political and economic futures as well as climate ones) in the future is often poorly considered in planning.
B66	Funding	The GiA calculator does not work for rural areas.
B67	Planning	Planning authorities do not seem to be allowing or making space for adaptation.
B69	Lack of roll back land	Local authority planning teams are not looking for land for displaced people. Everything is reactive not proactive.
B78	Government discourse assumes that resilience is possible.	There may be an incorrect assumption that coastal communities can bounce back or return to normal. This may not be possible and will have an adverse knock-on effect to coastal community health and wellbeing [B85 clarification - duplicate: The assumption that coastal communities are resilience, may lead to them being forgotten and unable to bounce back to a normal or stable state, leading to social inequity]
B88	Competing issues in coastal communities	Climate change is just one of a number of issues to coastal communities. Social deprivation, loss of skills and declining services are among a number of other factors which urgently need addressing.
B91	Failure by Government (central and local planning authorities) to proactively plan for coastal change and property loss and set clear direction	Successive administrations are perceived to have kicked unpopular decisions / public messaging about coastal change (including loss of settlements and infrastructure) into the long term for a number of reasons: fear of litigation from causing 'mortgage blight' to affected properties, fear of raising emotive issues which could impact future electability, and being wary of messaging which disrupts the status quo / could draw negative media coverage / 'scaring the horses'. At the same time many people living in communities which could be and already are being negatively impacted by sea level rise and coastal erosion assume that because these issues haven't been flagged to them overtly by Government, that this is not an issue for their property / community. Our work with communities highlights that the Government displays ongoing ambiguity over coastal change issues arising from climate change. There is a desire from communities and public bodies for honest conversations on this and a clear steer on this and for planning and placemaking for sea level rise to be proactive and 'ahead of the curve' so that it can be managed in a considered way centred on local priorities. Failing to proactively plan because of the fear of delivering or uncertainty around how to deliver an unpopular message is putting health and wellbeing at risk today and in the future.
C7 - KNOWLEDGE & SKILLS		

BARRIER No.	BARRIER STATEMENT	BARRIER CLARIFICATION
B1.2	Decision support	Lots of data and information, some is not accessible, some not easy to understand or use and it can be hard to know what to trust to help at different stages (i.e. when scoping an approach, when prioritising actions and when implementing an action or evaluating progress). Each need different type of info/data and levels of detail.
B11	Lack of awareness and knowledge	Many local communities are completely unaware just how vulnerable they are to climate change albeit sea level rise or exacerbation of coastal erosion.
B123	Clear understandable explanations and engagement	Explaining the problem and risks in an understandable format – the concept of explaining uncertainty and percentiles and likelihoods (Flood AEPs for example) is difficult to communicate. The use of acronyms for example is another problem, and for Wales the requirement for bi-lingual communication and engagement. Careful consideration needed on appropriate levels of information, with risks associated with lack of assimilation or misinformation.
B134	Lack of expert knowledge by Local authority officers	-
B137	Lack of legal advice regarding homes that are at risk from flooding, cliff erosions	What liabilities are there to rehouse impact families and compensation.
B14	Lack of sharing of best practice and what works across coastal communities	No central repository for sharing best practice and what works and what doesn't work across coastal communities.
B18	Messaging uncertainty	There is often large uncertainty related to predictions of coastal change and vulnerability, and this can be difficult to effectively communicate to non-specialists without either underplaying or overplaying the risks.
B30	Preparedness	How well to users understand the different projections and have the ability to adapt on them.
B33	Ocean literacy	The ocean plays a valuable role in regulating our climate, and coastal ecosystems also play a vital role in mitigation. Poor ocean literacy means that society is not fully appreciating the importance of ocean health in adaptation and mitigation to climate change. This means that the important role that coastal communities can play in this adaptation and mitigation is being overlooked.
B39	Lack of Understanding	There are lots of experts giving advice / opinions, but communities sometimes have mixed messages.
B51	Lack of knowledge	Other issues take priority as they can seem more tangible and there is a lack of knowledge about the risks to coastal communities. We need more education like taking people to the beach.
B68	Awareness of the need to adapt	People are not thinking about moving away from risk because there is no vehicle or example for it. We should have been thinking about this 10 years ago.
B76	Lack of information on potential to address climate change	Those in coastal communities who understand the impacts of climate change may not be aware of steps to reduce or mitigate their communities' vulnerabilities.
B79	Lack of information on impacts	Coastal communities have a lack of information, likely leading to a lack of understanding, of the current and future impacts of climate change on them and their health and wellbeing.
B81	Inadequate community education on how to adapt to and mitigate some effects from climate change.	Many are aware and are experiencing first-hand the issues climate change brings but are unaware of how to practically manage these on a ground level with minimal resources. Vulnerable communities especially those in rural and deprived coastal areas lack the financial support, targeted messaging, and ways to facilitate education (i.e. partnerships).
B92	Lack of technical expertise within	Local authorities and public bodies are experiencing significant human resource gaps regarding technical skills relating to coastal hydrology in house. Reliance on commercial expertise means that knowledge sharing is limited. Consultancies learn a lot from working on coastal

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	public bodies (including mediators / intermediators with appropriate technical skills), meaning that external commercial expertise is relied on	change in one location that could be transferred to other locations and / or would benefit all communities affected by coastal change. The commercial model does not encourage knowledge sharing as it risks losing competitive advantage. However, as we are all 'learning by doing' at pace in reaction to the rapidly changing coastal environment, failure to openly share in the public interest what works, and what doesn't (for commercial reasons) is stymying the rapid, effective coastal adaptation that we need. The reliance on the diverse ecosystem of private sector consultancies means that there is a relative lack of data in the public domain and difficulties in synthesising this data meaningfully. For communities where commercial contractors are undertaking coastal change assessment and adaptation work, it is difficult for local views to be considered - this situation is compounded by the lack of mediators/intermediators with appropriate technical expertise for communities to draw on.
B97	Misinformation	Misinformation about the realities, or indeed existence, of climate change has led to a lack of engagement, or even opposition to such activities. Local authorities and the government are seen as the "bad guys" without the public interests at heart, which does not help. I believe this is also related to the lengthy timelines of government funding etc. It is not helpful that most news relating to FCERM (Flood and Coastal Erosion Risk Management), or climate change adaptation is from a negative viewpoint.
B99	Difficult language	Some language around the topic is technical and difficult to understand. This can make it difficult to have meaningful conversations with informed participants.
C9 - PHYSICAL, SOCIAL AND ECONOMIC CONSTRAINTS		
B114	Fiscal impoverishment	-
B115	Brain-drain of skilled and professional individuals to inland urban centres	-
B116	Poor standard of housing	Decline in value of properties at risk from erosion, leads to lack of investment in them, resulting in them becoming unhealthy places to live.
B117	Physical isolation	Physical isolation and lack of services/amenities mean it is difficult to recruit professionals such as health workers into deprived coastal areas.
B120	General lack of access to mental and physical health support	An issue for the whole country, but especially so in coastal towns, where medical facilities are closing.
B13	Deprivation	Many areas that are likely to be affected by climate change are the most vulnerable and deprived and so are powerless to do anything about this.
B133	Tide locking effects on upper catchment areas	Recognition of the relationship between the upper catchment and the coastal community whereby 'tide locking' becomes an issue when Spring tides & storm surges meet a watercourse in spate. The 'catchment-based approach' applies equally to many coastal communities as well as bolstering costal defences.
B145	Lack of education	-
B34	Poor ecological conditions	The state of coastal waters around the UK is poor. This is contributing to the loss of habitats that protect us against threats linked to the climate change but is also a hindrance in adapting to take advantage of new opportunities. For example, lucrative sectors like leisure, recreation and tourism could offer employment and local economic growth if water quality was improved (along with other economic and policy measures).
B44.2	Lack of understanding of the health impacts of climate issues at the coast - socio economic factors	Factors like poor housing stock, poorly maintained infrastructure, lack of affordable housing, high rates of transiency in the work force, low paid jobs e.g. in tourism and hospitality sectors.

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B44.3	Lack of understanding of the health impacts of climate issues at the coast - demographics	Demographics is also an issue in many areas with more elderly populations. Coastal areas (especially deprived ones) attract older people or more deprived people (as housing is cheap in at-risk area), who generally have higher rates of physical and mental health issues.
B57	Rural locations	(Barriers B57-B60 are all linked) Rural locations can be harder to access, and often are less populated. It can take longer to get from A to B, as there might not be direct roads, or roads may not be of sufficient quality to take large lorries down (depending on what infrastructure is needed for communities). There might also be wider resource accessibility concerns; water, electricity, gas, internet. The focus may not be on coastal regions as they are less 'known' to the wider populace - whether due to population centres or money centres.
B58	Accessibility of resources	(Barriers B57-B60 are all linked) Rural locations can be harder to access, and often are less populated. It can take longer to get from A to B, as there might not be direct roads, or roads may not be of sufficient quality to take large lorries down (depending on what infrastructure is needed for communities). There might also be wider resource accessibility concerns; water, electricity, gas, internet. The focus may not be on coastal regions as they are less 'known' to the wider populace - whether due to population centres or money centres.
B59	Time	(Barriers B57-B60 are all linked) Rural locations can be harder to access, and often are less populated. It can take longer to get from A to B, as there might not be direct roads, or roads may not be of sufficient quality to take large lorries down (depending on what infrastructure is needed for communities). There might also be wider resource accessibility concerns; water, electricity, gas, internet. The focus may not be on coastal regions as they are less 'known' to the wider populace - whether due to population centres or money centres.
B60	Focus on other regions (e.g. non-coastal)	(Barriers B57-B60 are all linked) Rural locations can be harder to access, and often are less populated. It can take longer to get from A to B, as there might not be direct roads, or roads may not be of sufficient quality to take large lorries down (depending on what infrastructure is needed for communities). There might also be wider resource accessibility concerns; water, electricity, gas, internet. The focus may not be on coastal regions as they are less 'known' to the wider populace - whether due to population centres or money centres.
B7	The remoteness of many communities resulting in 'someone else's problem' attitude	-
B71	Existence of a disconnect	Scale of problems assessment is usually at higher level than what is needed to address extremely localised problems. Something that might accrue for a little value of loss on a national scale, for example, might be of vital importance for smaller and often remote communities.
B8	The remote locations may make it difficult and expensive for access for surveys/monitoring etc	-
B80	Misinformation	Come coastal communities, especially those in socially deprived areas, may predominantly have access to low quality (especially social) media. Such channels are more likely to promulgate misinformation and climate change denial.
C10 - GOVERNANCE PROCEDURE		
B109	Inadequate procedures and processes for improving outcomes	Due to the siloed approaches and narrow understandings of social impact, formal procedures, such as EIA and planning, have inadequate requirement and indicators for forecasting, measuring, and mitigating social impacts upon coastal communities. With those that do exist in standard procedures often being scoped out entirely for offshore activity. Although supply chain impacts are often considered, the social chain or network spanning land and sea is considered only piecemeal according to economic and impact assessment norms. Coastal

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	for coastal communities	communities therefore face change and impacts from a wide range of contexts and settings which are not integrated for compounding and indirect effects.
B110	Lack of empowerment of coastal communities	Poor procedures and siloed thinking and practice are disempowering to people. This is compounded when there is a lack of understanding of the issue, and of civic literacy to enable participation in decision-making. At the coast, this is compounded if there is a lack of ocean literacy and climate literacy. Low ocean, climate, and civic literacy prevent people from understanding the full context of a given issue, from taking their own action to support their resilience and choosing effective strategies, and from knowing how to be heard and create change in top-down plans.
B22	Speed of change	Current management is not quick or flexible enough to adapt to impacts of climate change, such as sea defences, changes in species distributions (fishing).
B65.2	Failing to get actual decisions in consultation	Adaptation can take time. Agreement can be reached initially. People making decisions can change, requiring a new set of discussions starting afresh. Much of the focus is on "what do people want", often getting contrary issues being raised. Frequently, this conflict is not actually resolved in part because the engagement is around aspiration rather than framing discussion around reality of change.

C. Final list of options generated

The list below shows all the options generated, grouped into broad topics.

OPTION No.	OPTION DESCRIPTION
KNOWLEDGE & SKILLS	
O15	Data and information platform signposting 'trusted' evidence
O16	Data and information platform signposting projects (and their successes and failures)
O21	Engage with research bodies on making information accessible (e.g. resilient coastal communities / maximising adaptation)
O38	Learn from successes across the world and from different disciplines
O18	Education initiatives focused on behaviours and their impacts
O6	Central (government?) repository of best practice to cascade to local authorities / planners
O26	Lunchtime learning' on adaptation for targeted audiences
O22	Expand CoastSnap to educate public and expand data collection
O27	Coastal champions for priority communities with knowledge, inc. social context to bring people together
O31	Develop scientists and practitioners understanding of social factors to develop trusted 'holistic' solutions
O19	Development of FCERM courses (e.g. in Welsh Universities)
O28	Accreditation for capability in adaptation (e.g. IEMA)
INTEGRATED APPROACHES	
O8	Coastal adaptation looked at across depts, not just Defra
O32	Interdisciplinary adaptation projects to support holistic, place-relevant project design and delivery
O14	Co-develop adaptation focussed on what is important / acceptable to a community
O53	The move to a systemic CCRA4 [should] help links health and CC and other agendas (e.g. green space, biodiversity, energy, infrastructure)
O55	Use system-wide decision support and planning processes to bring different perspectives and challenge assumptions (e.g. EA/ADEPT Adaptation Pathways pilot)
O2	Embed social evidence in decision making and practice (e.g. ACCESS)
O7	Move from economic domination of CBA to take account of complex social factors
O10	Value social impacts as high as economic ones in FCERM
O12	Overlay of climate change onto vulnerability / poverty pathways to reduce inequalities
O44	Recommend how policy mechanisms could incorporate evidence on socio-cultural values / impacts on health and wellbeing
O9	Integrate coastal communities into policy, practice and research, e.g. NE oral history with coastal people
O4	Better integration across national and local EA and local authorities
PUBLIC DISCOURSE	
O5	Stories of what is possible, inc. co-benefits for biodiversity, health etc…
O34	Storytelling that engages and motivates (vs despair and apathy)
O50	Shout about successes in all scenarios (managed realignment, no active intervention etc) to build trust and confidence in communities
O45	Public dialogues on the implications of CC for the UK (not just coastal)
O25	Gov departments to state ambitions on coastal change to provide policy direction
O3	Better marketing of good practice across all media to show benefits as they happen
O11	Early, sustained engagement with communities in coastal decision making
O20	Engage with media outlets to give voice to good news stories / benefits (e.g. of managed realignment)
O35	Legal challenges could give profile to, and force rethink of, national approaches to climate change adaptation

O52	Stronger statements from government and agencies on the need to adapt as we can't defend everywhere
O57	Advocate support for FCERM objectives through elected members, especially on adaptation and managed realignment options
O46	Improve how stakeholders / communities can engage in formal processes [e.g. EIA, planning] for better trust and outcomes
FUNDING OPPORTUNITIES	
O39	Research benefits of funding engagement on an ongoing (vs ad-hoc, project by project) basis
O40	Promote funding for adaptation / engagement where SMP policy is NAI (only available for hard engineering capital works)
O43	Fund community engagement on intent of SMPs to support broader (not just risk management) approaches
O42	Guidance on funding adaptation projects after the current Flood and Coastal Innovation Programme ends in March 2027
O47	Review FCERM funding guidance, processes and templates to acknowledge benefits of adaptation projects
O33	Research funding for the social impacts of climate change and adaptation interventions
O24	Gov funding for social evidence collection for integrated decision making
POLICY, LEGISLATION & GUIDANCE	
O37	Local authority ARP pilot scheme is rolled out across all local authorities
O48	Review legislation supporting RMAs to manage coastal change (e.g. Coast Protection Act only about defences...not how to manage not defending)
O49	Review Outcome Measures within FDGiA Guidance to better reflect benefits of adaptation projects
O51	Split coastal change management from flood risk management in national funding and policy (different impacts, costs and solutions)
O17	National frameworks / funding for rolling back communities and assets (fairness)
O41	This is a new challenge so promote acceptance of failures and learning from them
STAKEHOLDER FORA	
O23	Engagement between partnerships to ensure consistent messaging (and involve communities)
O56	Strengthen ties between coastal groups / practitioners / targeted coastal communities (e.g. Draft Wales Coastal Group comms and engagement objective)
O54	Coastal Groups to produce and share comms & engagement material to support hard conversations
O1	Fora to share good practice (e.g. Wales coastal group fora)
O30	Fora for interdisciplinary knowledge sharing to increase buy-in
O13	Coastal groups (Eng / Wales) work with RFCCs / FCECs on funding, engagement and adaptation
O29	Fora to educate those on periphery of coastal management (e.g. FCERM - building regs - practitioners)

D. Further information

The table below includes a list of weblinks to other useful information, free online resources, and related projects, collated with the help of the COCO WG. Please note that the links were accessible at the time of writing this report.

Met Office annual average heat maps (maps enable to view maps of monthly, seasonal and annual averages for the UK, based on the 1km resolution HadUK-Grid dataset derived from station data) https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/u134xcy4j
UK Climate Resilience Programme tools: UK Climate Risk Indicators; Coastal Resilience Model, Coastal Decider tool, UK Adaptation Inventory, Heat Packs, Bristol Cool Mapping Tool, etc https://www.ukclimateresilience.org/resources/decision-support-tools/
UK Climate Resilience Programme tools: Coastal Defender https://www.ukclimateresilience.org/news-events/coastal-defender/#:~:text=This%20project%20aims%20to%20co-develop%20with%20potential%20users,patterns%20affecting%20different%20stretches%20of%20the%20UK%20coastline.
UK Third National Adaptation Plan NAP3 https://www.gov.uk/government/publications/third-national-adaptation-programme-nap3
UK Third Climate Change Risk Assessment 2022 https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022
SOPHIE project https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fpubmed.ncbi.nlm.nih.gov%2F33242730%2F&data=04%7C01%7CL.E.Fleming%40exeter.ac.uk%7C1903da3fdc364d2d429708d9f8755611%7C912a5d77fb984eeeaf321334d8f04a53%7C0%7C0%7C637814005107756317%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0&sdata=SLU64yxxK4ynhFqJnYxm0Do%2FkaajvuBsvvTxr%2BTe04U%3D&reserved=0
UK public perception surveys - i.e. DESNZ Public Attitudes Tracker: Net Zero and Climate Change Summer 2023 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1186165/DESNZ_PAT_Summer_23_Net_Zero_and_Climate_change.pdf
Restoring nature to enable communities and coastlines to counter the threat of climate change. The Stronger Shores initiative will explore the most effective ways to use the power of nature to restore the ocean's health - University of Plymouth Project. Funded by Defra as part of the Flood and Coastal Resilience Innovation Programme, managed by the Environment Agency. Restoring nature to enable communities and coastlines to counter the threat of climate change - University of Plymouth
Defra/EA flood and coastal erosion risk management R&D Programme: Understanding the Processes for Community Adaptation Planning and Engagement (CAPE) on the Coast https://assets.publishing.service.gov.uk/media/602fec58d3bf7f72182e99b9/_FD2624_Final_Technical_Report.pdf

Paul Sayers, Charlotte Moss, Sam Carr, Andres Payo, Responding to climate change around England's coast - The scale of the transformational challenge, Ocean & Coastal Management, Volume 225, 2022, 106187 https://www.sciencedirect.com/science/article/pii/S0964569122001624
EA Report: A method for monetising the mental health costs of flooding https://assets.publishing.service.gov.uk/media/6038c2f28fa8f5048c84c37f/A_method_for_monetising_the_mental_health_costs_of_flooding_-_report.pdf
EA guidance on mental health costs of flooding and erosion https://www.gov.uk/government/publications/mental-health-costs-of-flooding-and-erosion/mental-health-costs-of-flooding-and-erosion
Defra revision to economic appraisal of human related intangible impacts of flooding https://webarchive.nationalarchives.gov.uk/ukgwa/20130903160012/http:/archive.defra.gov.uk/environment/flooding/documents/policy/guidance/fcdpag/fcd3update0704.pdf
CCC - Interacting risks in Infrastructure and the built and natural environments. Research in support of the UKCCRA3 evidence report. WSP Interacting-Risks_WSP.pdf (ukclimaterisk.org)
Coastal Resilience https://www.ukclimateresilience.org/projects/coastal-resilience-in-the-face-of-sea-level-rise-making-the-most-of-natural-systems/
Coastal Resilience website https://coastalmonitoring.org/ccoresources/coastalres/
Risky cities, Prof Briony McDonagh – an Arts and Humanities project looking at flooding in Hull and East Yorkshire https://www.ukclimateresilience.org/projects/risky-cities-living-with-water-in-an-uncertain-future-climate/
Risky cities website https://riskycities.hull.ac.uk/
Time and Tide Bell, Prof Corinna Wagner, Exeter University https://www.ukclimateresilience.org/projects/time-and-tide-resilience-adaptation-art/
SEARCH – Sensitivity of Estuaries to Climate Hazards https://www.ukclimateresilience.org/projects/search-sensitivity-of-estuaries-to-climate-hazards/
Shared Socio-economic pathways https://www.ukclimateresilience.org/projects/uk-socioeconomic-scenarios-for-climate-research-and-policy/

Climate Risk Indicators https://uk-cri.org/
Yorkshire Climate Action Plan, Prof Stephen Scott-Bottoms, Manchester University https://www.ukclimateresilience.org/projects/whose-role-is-it-to-act-on-climate-resilience-implementing-yorkshires-climate-action-plan-with-leeds-city-council/
Working with the National Trust on Tourism and Climate Change, Prof Tim Coles, Exeter University https://www.ukclimateresilience.org/projects/climate-change-and-the-tourism-sector-impacts-and-adaptations-at-visitor-attractions/
Shifting Shores, National Trust https://www.nationaltrust.org.uk/features/living-with-change-our-shifting-shores
Prof Caitlin De Silvey, Exeter University – heritage and loss at the coast https://www.exeter.ac.uk/research/esi/research/projects/landscape-futures/
National Trust Climate Hazard Mapping tool https://national-trust.maps.arcgis.com/apps/webappviewer/index.html?id=a44672bb34c4491a909034d0eed76583
Joseph Rowntree Foundation – Climate Change and Social Justice: Coastal communities and Disadvantage (2011) https://www.jrf.org.uk/report/impacts-climate-change-disadvantaged-uk-coastal-communities
Climate Just Tool https://www.climatejust.org.uk/
Resilience of Coastal Communities SMMR Programme ROCC
Co-benefits solutions to resilient coasts https://www.smmr.org.uk/funded-projects/co-benefit-solutions-for-resilient-coasts-co-opt/
Chief medical officer (CMO report 2021) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005216/cmo-annual_report-2021-health-in-coastal-communities-accessible.pdf
HABs https://www.sciencedirect.com/science/article/pii/S1568988320301803

Chemical pollution https://www.ncbi.nlm.nih.gov/pmc/articles/pmc7731724/
OA https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7344635/
EU BlueHealth Project https://bluehealth2020.eu
Plymouth Case Studies https://bluehealth2020.eu/?s=plymouth https://doi.org/10.1016/j.ufug.2019.05.005 https://pubmed.ncbi.nlm.nih.gov/32971082/ https://www.sciencedirect.com/science/article/pii/S0048969717301754
Royal Society CC health co-benefits report (A. Haines et al.) https://royalsociety.org/topics-policy/projects/climate-change-mitigation-human-health/
Urban Blue Spaces https://www.routledge.com/Urban-Blue-Spaces-Planning-and-Design-for-Water-Health-and-Well-Being/Bell-Fleming-Grellier-Kuhlmann-Nieuwenhuijsen-White/p/book/9780367173180
Weather and recreation https://www.sciencedirect.com/science/article/pii/S1618866718306447
Pollution and the ocean https://www.annalsofglobalhealth.org/articles/10.5334/aogh.2831/
RIAS - The Royal Incorporation of Architects in Scotland, raising awareness across Scotland about the climate emergency and the built environment RIAS Inspiring Futures - RIAS Inspiring Futures
Natural England Report on Natural Spaces and People's Wellbeing Adults' Year 3 Annual Report (April 2022 - March 2023) (Official Statistics) - GOV.UK (www.gov.uk)
European Marine Board EMB Coastal Resilience Europe Report Building Coastal Resilience in Europe | European Marine Board

Flood and Coastal Erosion Risk Management Research and Development Programme. Environment Agency. Working together to adapt to a changing climate - flood and coast Working together to adapt to a changing climate - flood and coast - GOV.UK (www.gov.uk)
FCERM Research & Development Programme. Environment Agency: Working together to adapt to a changing climate: flood and coast. Review of project learning FRS17192/1 Review of project learning (publishing.service.gov.uk)
FCERM Research & Development Programme. Environment Agency: Working together to adapt to a changing climate: flood and coast. Summary of research and tools FRS17192/2 Summary of research and tools (publishing.service.gov.uk)
Health Protection Agency: Health Effects of CC in the UK, 2012 Report Climate change: health effects in the UK - GOV.UK (www.gov.uk)
Partnerships for East Coast Communities. Involves the County Councils of Essex, Norfolk and Suffolk and the Universities of Suffolk, Essex and East Anglia. The initiative is focused on employment, cultural heritage, natural environment and health in the East Anglia's coastal communities. Contact Kevin Daniels (kevin.daniels@uea.ac.uk) Partnerships for East Coast Communities - PECC's — University of East Anglia (uea.ac.uk)
Paul Sayers, Charlotte Moss, Sam Carr, Andres Payo, Responding to climate change around England's coast - The scale of the transformational challenge, Ocean & Coastal Management, Volume 225, 2022, 106187 Responding to climate change around England's coast - The scale of the transformational challenge - ScienceDirect
CoOpt Research Project. NERC-ESRC Sustainable Management of Marine Resources Programme. Using Soft Systems Modelling to understand decision-making about coastal schemes https://projects.noc.ac.uk/co-opt/
Scottish Government Report: How much do people in Scotland value characteristics of marine and coastal areas https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2023/10/much-people-scotland-value-characteristics-marine-coastal-areas/documents/much-people-scotland-value-characteristics-marine-coastal-areas/much-people-scotland-value-characteristics-marine-coastal-areas/govscot%3Adocument/much-people-scotland-value-characteristics-marine-coastal-areas.pdf
Report on Storm Babet in Granton Harbour; Dr William Waites, University of Strathclyde https://personal.cis.strath.ac.uk/william.waites/babet-report.pdf

Climate risk to European fisheries and coastal communities Climate risk to European fisheries and coastal communities, Mark R. Payne, Manja Kudahl, Georg H. Engelhard, and John K. Pinnegar. PNAS 2021. 118 (40) e2018086118. https://doi.org/10.1073/pnas.2018086118 https://doi.org/10.1073/pnas.2018086118
A Coastal Definition: Classifying coastal communities to enable the evidence-informed 'levelling up' of Britain's periphery. The challenge of defining coastal communities… https://www.plymouth.ac.uk/research/coastal-communities/towards-a-coastal-definition
The well-being and human health benefits of exposure to the marine and coastal environment. Defra Evidence Statement 07 https://randd.defra.gov.uk/ProjectDetails?ProjectID=20097&FromSearch=Y&Publisher=1&SearchText=SD1712&SortString=ProjectCode&SortOrder=Asc&Paging=10
A Climate for Change: Adaptation and the National Trust. National Trust, 2023 https://nt.global.ssl.fastly.net/binaries/content/assets/website/national/pdf/a-climate-for-change-adaptation-and-the-national-trust-report-full.pdf?_sm_au_=iVVnrRRKjfDWJJtsQfTFLKQvM2BKc
Property Flood Resilience Climate Champions 2021. Climate Vision, 2021 https://climatevision.co.uk/wp-content/uploads/2022/01/CV-PFR-Climate-Champions771low.pdf
COAST-R Network (Defra & UKRI funded) https://www.hull.ac.uk/work-with-us/more/media-centre/news/2024/new-resilient-coastal-communities-and-seas-network-announced
Scotland's Flood Resilience Strategy (Consultation) https://www.gov.scot/publications/flood-resilience-strategy-consultation/
Dynamic Coast https://www.dynamiccoast.com/cca
Climate Outreach https://climateoutreach.org/
Wales Coasts and Seas Partnership (CaSP Cymru) https://www.gov.wales/wales-coasts-and-seas-partnership-casp-cymru-working-together-address-marine-resilience-html
Climate Cares Centre

https://teams.microsoft.com/l/message/19:meeting_ZWEyZjY1NGUtOGRjYi00Y2NmLTkxNjgtMjBiYjRkMjlhODgy@thread.v2/1719569191194?context=%7B%22contextType%22%3A%22chat%22%7D
National Risk Register https://access-national-risk-register.service.cabinetoffice.gov.uk/about-the-nrr
Centre for Coastal Communities, University of Plymouth https://www.plymouth.ac.uk/research/coastal-communities
Centre for Coastal Communities Policy Programme, University of Plymouth https://www.plymouth.ac.uk/research/coastal-communities/centre-for-coastal-communities-policy-programme
Centre for Coastal Communities, University of Essex https://www.essex.ac.uk/centres-and-institutes/coastal-communities
Natural England Report: State of Natural Capital Report for England 2024 – Risk to nature and why it matters https://publications.naturalengland.org.uk/publication/6683489974616064

MCCIP Secretariat
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MCCIP is the primary independent source of marine and coastal climate change evidence and advice in the UK