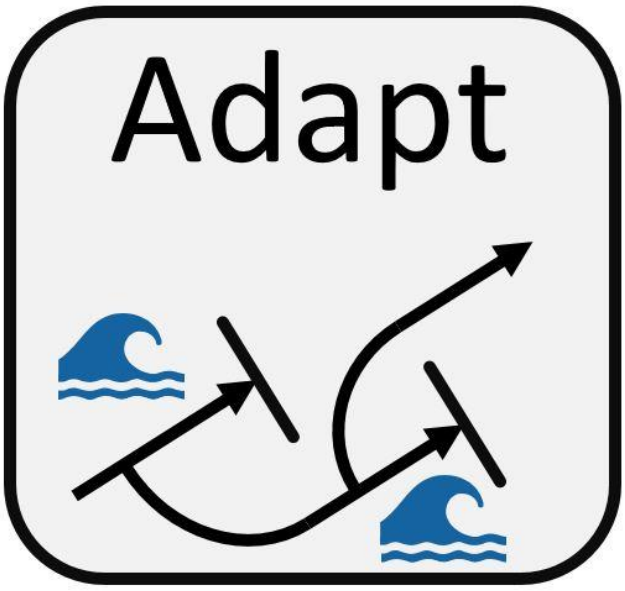
Coastal Change Adaptation Plan Guidance

Scottish Government

February 2023



Scottish Government
Riaghaltas na h-Alba
gov.scot

Structure of this Guidance

There are two main parts to the guidance. Part One sets out the context, wider policy links and an introduction to Coastal Change Adaptation. Part Two is the suggested process to draft a Coastal Change Adaption Plan. The Appendixes have more detailed information that may be useful when drafting the plan.

Contents

Tables

Figures

Part 1 - Context and Introduction to Coastal Change Adaptation

Introduction to this interim guidance

Key challenges and issues

Over the last thirty years sea level across Scotland has risen between two and three times faster than over the previous 100 years[1]. Mean sea level is anticipated to rise by between 0.30-1.16 m by 2100 (according to a high emissions scenario relative to a baseline period of 1981-2010). However, this does not include Antarctic ice sheet collapse with some estimates exceeding 2.5 m by 2100 for high emissions scenarios. Despite the uncertainties, sea level is projected to rise under all future emissions scenarios by 2100.

Scotland's 21,000 km long and complex coastline is where much of our critical national infrastructure is located[2]. Almost half of the Scottish population lives within 8 km of the coast and Scotland's artificial defences protect £5 Billion of assets from erosion. Natural informal defences (such as beaches and coastal habitat) protect £14.5 Billion of assets from erosion. However, coastal erosion and flooding affects more of our erodible shore than in the past, with the rate of erosion expected to quicken under all climate change emissions scenarios[3]. Sea level rise due to climate change will result in an almost doubling of the number of properties considered to be at coastal erosion and flood risk in Scotland by 2080s.

Coastal erosion and flooding (including erosion enhanced flooding) will affect society in many ways, impacting transport, power and water infrastructure, recreation, and businesses.

The impacts of flooding and erosion on our coastline and communities will vary locally depending on physical factors such as the underlying geology and existing natural or man-made defences. It will also depend on social factors like population demographics and vulnerability. Scotland's local authorities, planning system and coastal communities need to become *'sea level wise'* to adapt to future risks.

What is this guidance for?

This Scottish Government interim guidance aims to support local authorities and their partners across Scotland in their statutory functions in planning for our future climate at the coast and to support long term adaptation and resilience of our coastal communities. The guidance does not prescribe exactly how local authorities should develop their Coastal Change Adaptation Plans (CCAP). Instead, it provides guidance as to what they should seek to achieve and how it might be delivered. The guidance recommends a trigger based Dynamic Adaptive Pathways approach. This approach (see Appendix 1 and Page 25) will

[1] Collins & Aguilar, 2022
[2] DynamicCoast.com
[3] DynamicCoast.com

enable authorities to effectively plan their future actions whilst allowing for flexibility in response to future changes. It incorporates recent international and UK advances in adaptation and shoreline management planning to allow for local interpretation and involvement.

This guidance has been developed by a steering group comprising Scottish Government, SEPA, local authorities, Dynamic Coast Project Team, NatureScot and Adaptation Scotland.

Scottish Government will seek feedback from local authorities on the guidance and aims to monitor it efficacy in securing sustainable outcomes in respect of coastal management. It will be revised, reviewed, and refined based on user feedback and as the evidence evolves.

Target Audience

This guidance has been produced to help local authorities begin their coastal adaptation journey. It encourages collaborative working across coast protection authorities, planning authorities, community planning partnerships, public sector environment and asset management teams, community members and other stakeholders. Such a collaborative approach helps ensure our communities, businesses and infrastructure become more resilient and can adapt to future climate change. It will also allow us to protect natural coastal defences and, where needed, provide them with space to allow migration inland with sea level rise.

Aims of this guidance

1. Promote the resilience of our natural coastline and begin the process of adaptation to climate change;
2. Set out a process for a proactive approach to coastal adaptation planning that will maximise opportunities and minimise risk from climate change impacts;
3. Ensure our collective coastal adaptation journey starts now and;
4. Support local authorities to begin the process.

Scotland's National Approach

The Climate Change (Scotland) Act 2008 places duties on the public sector for climate mitigation (cutting carbon emissions) and adaptation (measures to increase resilience to the impacts of climate change).

The Act requires the development of a national adaptation programme to address the risks identified by the UK Climate Change Risk Assessment (UKCCRA) for Scotland. In the most recent National Summary for Scotland coastal erosion and flooding feature amongst the highest priority risks. The National Summary for Scotland also notes that existing adaptation efforts remain insufficient (such as published Shoreline Management Plans) and that adaptation planning through a pathways approach is required to address future coastal erosion and flood risks.

The development and implementation of CCAPs works towards achieving the outcomes set out in the Scottish Climate Change Adaptation Programme (SCCAP2), especially Outcome 1

on strengthening communities and placemaking and Outcome 6 on the resilience of the coastal and marine environment. They will also be a key part of development and delivery of the upcoming programme for publication in 2024.

The particular statutory instrument on public bodies' reporting duties[4] asks public bodies to report were applicable what contribution the body has made to helping deliver the Scottish Climate Change Adaptation Programme. Although not obligatory, production of a Coastal Change Adaptation Plan, would count towards this reporting.

Why Action is Required Now

If nothing is done to adapt to coastal change our ability to respond becomes more constrained and more expensive. Coastal adaptation provides an opportunity to plan for impacts and provides time to find and agree acceptable sustainable solutions with communities. Failure to do so will lead to sub-optimal decision making in the coming decades and needless waste of natural, social and financial capital. It is important to understand that the cost of inaction in response to expected sea level rise is high and could include the loss of life, property, critical infrastructure and wasted investment. The benefit of early action is that our current scientific understanding of the risks and opportunities allows advance preparation for the worst-case impacts of climate change. Early resilience and adaptation actions serve to both reduce risk and provide opportunities to innovate, lead and safeguard coastal communities from the joint climate and nature crisis.

Inevitably, there will be technical and economic limitations on what can be delivered through coastal change adaptation planning. Not all assets can be protected and protecting assets in one location may cause adverse impacts elsewhere by disrupting coastal processes / sediment transport. As sea level is expected to continue to rise long after any future significant control of greenhouse gas emissions is achieved, planning for the long term and initiating sustainable actions as soon as possible is paramount.

Effective management of coastal areas involves confronting and dealing with uncertainty. Incomplete understanding of current processes at the coast adds to the uncertainty of future sea levels and how coastal areas will be impacted. Despite advances in our understanding over recent years[5], significant gaps remain around the factors forcing change (tides, waves and nearshore bathymetry). The response of soft coastlines (beaches and dunes) to changes in forcing factors over the short term (e.g. extreme events) and long term (e.g. sea level rise) and the resulting increase in exposure to wave action is better understood yet the response of artificial shores to these same forcing factors remains uncertain.

Principles of adaptation

According to the Climate Change Committee's (CCC) Independent Assessment of UK Climate Risk (CCRA3), adaptation is currently failing to keep pace with the worsening reality of

[4] Amendment of the Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015 section 4(d)

[5] DynamicCoast.com

climate risk. The CCC recommends ten principles for good adaptation planning, intended to "bring adaptation into mainstream consideration by all levels of Government and business."[6] These are important principles to consider when developing CCAPs and are illustrated in Figure 1 below.

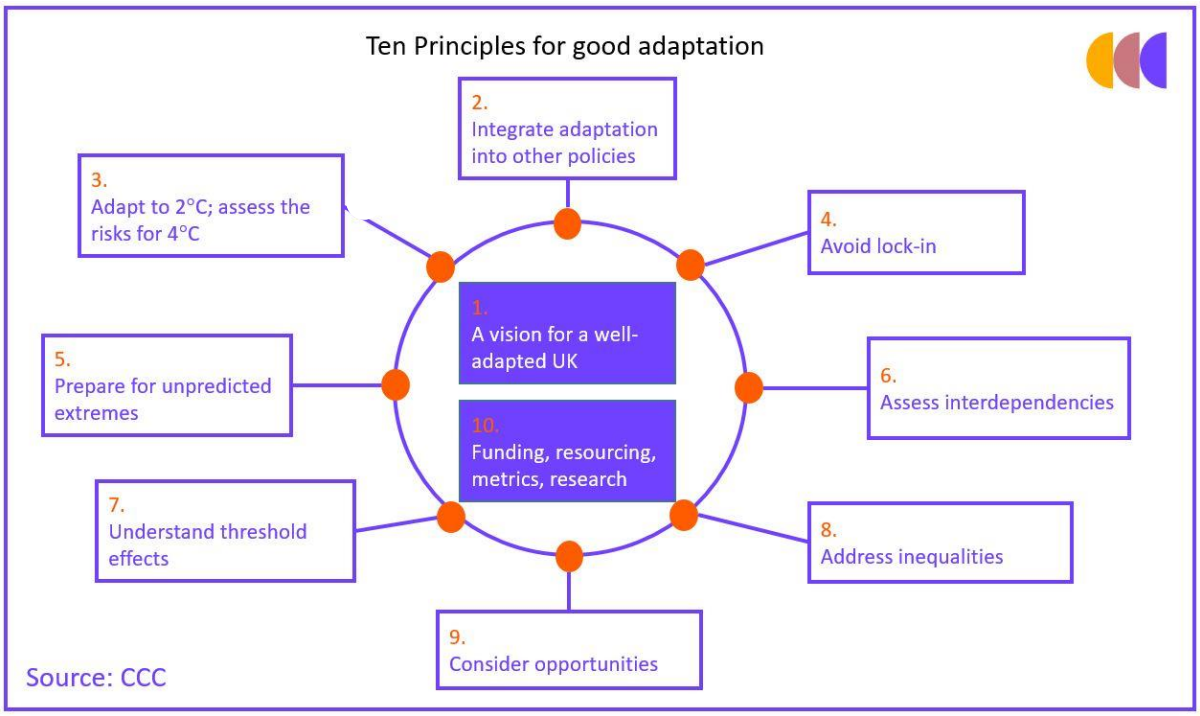


Figure 1, Principles for good adaptation from Climate Change Committee report

Caution is needed when applying principle 3 (in Figure 1): "adapt to 2C, assess the risks for 4C". This statement was intended as a **simplified representation** of the kinds of climate conditions to be expected under different climate scenarios.

In the coastal context, principle 3 refers specifically to the central estimates used by the CCC for 2100 for Representative Concentration Pathways (RCP) 2.6 and RCP 8.5 for 2100[7]. For RCP 8.5, the average central estimate of sea level rise for Scottish ports is approximately 60 cm of Relative Sea Level Rise (RSLR) with the upper estimate for Scottish ports of 96 cm some 58% higher. The use of central estimates was intended as a simplified representation of the kinds of climate conditions to be expected under different climate futures. However, under a given emissions scenario, the combination of global temperature uncertainty and process uncertainty (e.g. the collapse of ice sheets) does not map easily to specific global warming levels and is difficult to capture. As a result, this guidance recommends that local authorities use the 95th percentile figures or upper estimates of RCP 8.5 for coastal adaptation use.

This guidance recommends that local authorities, when preparing coastal adaptation plans:

1) Recognise that alongside mitigation efforts, adaptation planning is essential around the coast.

[6] https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/
[7] Climate Projections report December 2021 (adaptationscotland.org.uk)

2) Coastal change adaptation plans should be adaptive and sufficiently precautionary to changing risks alongside current and future opportunities.
3) Given uncertainties, plans should recognise a range of scenarios of future risks, via levels and thresholds rather than dates. At the time of writing, this guidance recommends trigger points based on using UKCP18 data; however, approaches should adjust as the consensus on the science changes. Plans should include a 'low emissions' future (such as RCP2.6 50%), a 'high' emissions future (such as RCP8.5 95%) alongside a credible maximum scenario (such as H++ scenario which includes a Mean Sea Level rise of 1.9 m above present by 2100), to test adaptive capacity. Further information on H++ is available via Lowe *et al* (2009) UK Climate Projections science report: Marine and coastal projections. Via The National Archives
4) Acknowledge that not all future risks need to be addressed immediately, but flexible approaches should be planned for to manage these growing risks if, and when, they occur. This can be achieved by defining and deploying incremental and locally relevant trigger points (based typically on levels and processes rather timescales) which acknowledge lead-in time and locally relevant considerations (coincident risks may include river flooding, tidal range change, extreme events etc). These approaches are a part of a Dynamic Adaptive Pathway. Adaptive approaches which 'jump directly' to address risks not expected until the end of the century may prove more costly in the short-term and risk community support, however in some cases this may be desirable where, for example, continuity of supply is critical.

Acknowledge the importance of local settings in the implementation of policies. For example, for new developments we have the opportunity to ensure new developments are not put in harm's way. However, for existing developments, we do not have that luxury and growing risks will need to be incrementally planned for as part of a Dynamic Adaptive Pathway approach.
See Appendix 3 for more detail on how these principles relate specifically to the coast.

Informing statutory land use and marine planning

Coastal Change Adaptation Plans help improve our understanding of the risks associated with coastal erosion and flooding in Scotland today and in the future.
The coastal adaptation planning process should identify areas of the coast where:

a) natural or artificial defences in a fixed or semi-fixed position will be needed in the long term;
b) no active intervention is needed and free coastal change is accepted and
c) managed re-alignment of the coast would be a more effective strategy in the long-term.

Decisions on future development and land use in coastal areas need to be informed by Flood Risk Management Plans (FRMPs) and CCAPs. It is important that Local Development Plans and planning application decisions are informed by relevant FRMPs and CCAPs (see Appendix 4). In Scotland, Local Development Plans (LDP) identify areas where future coastal development should, and should not, be located. Local Development Plans can help safeguard natural features, including those that protect the coast. Where there are risks of

erosion and flooding and coastal protection is not feasible, the planning authority may need to consider where infrastructure and assets should be relocated out of harm's way.

In regional marine planning, policy on coastal change and development or marine activities is necessarily broad/generic. CCAPs will provide important detail, both more locally and regarding future change, to support marine planning approaches.

The importance of working with natural systems

Scotland is noted for its landscapes, seascapes and natural heritage, including a long and varied coastline. Dynamic Coast (Appendix 5) has demonstrated that natural features such as dunes, beaches and saltmarshes already provide substantial flood and erosion benefits. Protecting, enhancing and restoring these features are relatively low-cost ways to build resilience against current and future flooding and erosion risks. Natural features also have added benefits, supporting biodiversity and carbon sequestration and through tourism and recreation supporting local communities and the economy. Historically, many of our beaches and dunes have successfully adjusted to past sea level rise by migrating inland where space has been available. It is important that CCAPs emulate this where possible by identifying adaptation space for these natural features to further migrate inland in the future, and additional space for displaced assets to be relocated.

Artificial structures have been installed at the coastline for a variety of reasons including flood and coastal erosion protection and port infrastructure, yet adverse impacts often follow where these structures disrupt natural systems. This includes beach lowering in front of engineered structures and enhanced alongshore erosion. By interfering with natural systems, we often reduce their ability to dynamically respond and adapt to changes such as sea level rise.

Whilst artificial structures will continue to play a valuable role in the protection of people, property and assets at the shoreline, there needs to be acceptance of their limitations under the current sea level rise projections. For example, how high is it acceptable to build and maintain seawalls into the future? Is beach loss acceptable where, due to sea-level rise, low water level now meets the seawall? What are the financial, environmental, embodied carbon and health and safety implications of building and maintaining bigger seawall infrastructure? What are the implications of disruption to natural systems that currently provide important services including flood and erosion protection? Within future coastal change adaptation planning there should be a general presumption against installing new artificial structures. Consideration should be given to the wisdom of maintaining existing structures especially when they reach the end of their design life.

The successful Netherlands Dynamic Conservation Policy shows that whereas allowing gradual coastal squeeze to occur with no active intervention places coastal land uses at risk, active coastal management (e.g. beach recharge) sustains the overarching goal of maintaining the assets and functions of the wider Netherlands coastal zone, including its hinterland.

Monitoring Change

Responsible authorities need to improve their coastal data collection and understanding of processes within coastal change adaptation planning so that they can better identify the trigger points that signal physical changes that may need a shift in management approach. Trigger points are discussed further in Part Two of this guidance. CCAPs should help to identify where improved data and understanding is required and should include actions to achieve that.

Communication and Engagement with Communities

Sea level rise driven erosion and flooding threatens the loss of land, property, infrastructure and habitat that impacts communities and individuals. However, coastal communities have a strong attachment to the places where they live and a vested interest in determining how it might adapt to change. Clear communication on how sea level rise is anticipated to impact upon the coast and its communities is key, as is communicating uncertainty in the timescale of change. Communities and other stakeholders also have valuable information on how the coast behaves, what are the key drivers for change on their coast, and how adaptation to accommodate change can be sustainably managed.

Supporting communities and individuals affected in a way that delivers both Scottish Government Fairer Scotland Action plan, Just Transition and the UN sustainable development goals through Scotland's National Performance Framework will be key.

The National Standards for Community Engagement are good-practice principles designed to improve and guide the process of community engagement. The NSCE defines community engagement as "a way to build and sustain relationships between public services and community groups - helping them both to understand and take action on the needs or issues that communities experience". Good community engagement builds trust, supports relationships, improves understanding for all, and helps to achieve positive change. Community engagement should begin early and be undertaken often. See Appendix 7 for more information and tools including the Scottish Government's Public Engagement Strategy on climate change.

Working across administrative boundaries

Coastal processes do not conform to administrative boundaries and neither do many infrastructure assets and communities. It is essential therefore that CCAPs are progressed in a way that reflects coastal processes systems and not administrative boundaries. The Hydraulics Research coastal cells and sub-cells (SNH Coastal Cell Reports) form a good starting point for discussions between local authorities on appropriate boundaries to identify the need for CCAPs transboundary working arrangements. These cells and sub-cells are also visible on the Dynamic Coast Advanced webmap here.

Whilst Flood Risk Management and Plans (FRMPs) do not specifically deal with coastal erosion, erosion enhanced flooding is implicit within the FRM Act and thus should be addressed. Local Flood Risk Management Plans turn the FRMPs into local delivery plans. The Local Plan District (LPD) partnerships may be able to act as a coordinating body in the

progression of CCAPs in Scotland. This may require broadening the membership and scope of the LPD Partnership and working across Partnership boundaries in many cases as the LPD Partnerships are predominantly set up on the basis of river catchments.

Coastal Forums will also have a role in coastal adaptation e.g. the Forth Estuary Forum, Moray Firth Partnerships, Solway Firth Partnership. These forums already contain a local authority membership and other key coastal partners and provide a good starting point for coastal adaptation discussions between LA's and other partners.

Regional partnerships that work collaboratively to prepare Regional Spatial Strategies (see Appendix 4), provide a useful opportunity to establish joint strategic working on transboundary coastal issues. However, one size does not fit all, and this guidance recognises the need to maintain flexibility for appropriate local and regional CCAP delivery structures to emerge.

The Policy Framework

Responsibilities and duties

In Scotland, Local Development Plans can identify areas where future coastal development should and should not be located, and can help safeguard natural features, including those that can protect the coast. Where erosion and flooding and coastal protection is not feasible, the planning authority needs to consider where infrastructure and assets should be relocated out of harm's way.

Flood Risk Management Plans (FRMPs) and CCAPs are the primary mechanisms for identifying flooding and coastal defence measures and so local development plans, and the decisions made on planning applications, must be informed by relevant FRMPs and CCAPs.

Planning authorities must consider coastal change and risk and address these issues in their Local Development Plans. Whilst strategic plans to address erosion and flood risk are not statutory, major benefits can be gained by adopting a long-term strategic approach to coastal flood and erosion management. They can also inform the process of preparing development plans via the land use planning process. Coastal adaptation also links into the Flood Risk Management Plan process which is a statutory requirement and more information on how land use planning, flood risk management and coastal adaptation intersect can be found in Appendix 4.

At present, responsibility for developing, approving and delivering coastal management lies solely with local authorities as Coast Protection Authorities under the Coast Protection Act 1949. Nevertheless, local authorities are advised to consult with Nature Scot, SEPA Flood Risk Assessment, local communities and stakeholders and to take account of advice and comments received. Scottish Government will support the process of producing CCAPs by providing this guidance and will expect to see that the required outcomes are delivered in the plans. However, the Scottish Government will not formally sign off or approve CCAPs.

Place-Based Working

Taking **a place-based approach** and using placemaking to deliver multiple benefits is at the forefront of the current Scottish policy context. It plays a key role in government priorities, infrastructure investment, climate action and planning policies. Taking a place-based approach involves dealing with complexity and considering all the physical, social, and economic elements of a place collectively. Working in a place-based way can identify key relationships and solve problems that cannot be solved incrementally or by one person or organisation acting alone. It can produce more than the sum of its parts by generating novel approaches, bringing in resources or tackling root causes. A place-based approach is about understanding the potential of a place and coordinating action to improve outcomes, with community participation at the heart of the process.

Using a place-based approach to coastal management and change is likely to yield greater buy in and support from local stakeholders than traditional approaches to policy development and consultation. A consistent approach is needed, and this is what the Place Based Framework is designed to provide, building on existing good work across Scotland. Scottish Futures Trust have harnessed learning from their work with local authorities, public bodies, and communities across Scotland to develop a new Place Guide which is a practical, step-by-step approach to implementing the place agenda collaboratively.

Areas with existing Shoreline Management Plans

This guidance recognises that, by definition, Shoreline Management Plans tend to focus on management choices along a narrow coastal strip: the shoreline. However, the anticipated increases in coastal change and associated flood risk together with increased use of techniques which 'adapt by avoidance', demand that land-use considerations inland of a narrowly defined "shoreline" be included. The SMP *refresh guidance* for England and Wales (DEFRA, yet to be published) addresses some of these points and they have been incorporated into this CCAP guidance. This strategic approach acknowledges that coastal retreat resulting from no actions being taken endangers existing and future coastal land uses. Active coastal management is often required to sustain the overarching goal of maintaining the assets and functions within a wider coastal zone, including its hinterland. Assets may include buildings and infrastructure or natural landforms and habitats. Functions may include businesses, recreation or community activities, flood protection provided by artificial or natural defences, or carbon sequestration within wider land-use decisions.

Several Shoreline Management Plans have already been published in Scotland over the last 20 years. The majority of these follow the Shoreline Management Plan Guidance produced for England and Wales (DEFRA, 2006) and therefore, much of the groundwork for CCAPs has already been done in these areas. Local authorities are encouraged to update existing SMPs in line with Part 2 of this guidance.

Delivering a CCAP – Local authority staff, resources and supporting services

Local authorities will have to coordinate and, in many cases, jointly procure consultants and other relevant specialists to advance CCAPs or parts thereof.

Local Authorities will require:

- Engineering and planning staff to run a place-based coastal adaptation planning process.
- A Community or Stakeholder Engagement Officer to facilitate and manage ongoing engagement activities, awareness raising and consultation with communities and elected members. They will also have to engage with multiple landowners by sharing information and consulting with them to co-design relevant policies and actions.
- To use the existing technical information from SEPA on coastal flood risk and Dynamic Coast on coastal erosion.
- Consultancy services – to deliver a CCAP, including potential surveys, assessments and modelling. This may also include ecologists/ coastal biodiversity specialists and landscape architects.

Coastal adaptation needs to be embedded into all our future thinking at the coast. Appendix 8 sets out various tasks required of SEPA and Local Authorities by Scottish Government, alongside the new Coastal Change Adaptation funds provided by Scottish Government (directed mainly at erosion) to be applied in conjunction with existing funding streams to provide a whole coast approach to adaptation.

For a CCAP with a managed adaptive approach to be successful it will be necessary for Local Authorities to demonstrate that:

- It comprises technically feasible and viable options and that the future cost of the options can be accounted for including the potential impacts of these options.
- The lead time between the need for an option being triggered and implemented is achievable.
- The fullest range of risks has been accounted for using the credible maximum scenario for sea level rise (See Appendix 2 for more information).

Part Two – The Coastal Change Adaption Plan Process

Introduction

The preparation of a Scottish CCAP is a two-stage iterative process. Figure 2 illustrates these stages and follows a tiered strategic coastal management approach (including Lodder & Slinger 2022). The Shoreline Management Plan guidance in England and Wales (DEFRA, 2006) and the SMP Refresh Guidance (EA, 2020) offer an effective template for Scotland, albeit with modifications.

Stage 1: The Policy Approach. This broadly follows the approach set out in the DEFRA 2006 SMP guidance on CCAP but deviates due to the different arrangements for coastal management in Scotland. This allows local authorities to widen the scope of strategic planning beyond the 'shoreline' to include the coastal hinterland and allow planning space for relocation adaptation. The CCAP process also aims to shorten the time it takes to adapt to coastal change and accommodate the different starting positions in terms of the supporting information and whether an SMP already exists. Stage 1 should be approved by all Local Authorities following their normal internal approval processes and with the support of a cross-agency steering group. Where a Shoreline Management Plan already exists, it would not normally be necessary to start again. In these cases, the existing Plan should be reviewed and updated in line with this guidance. In general any plan should be driven by coastal processes and the interconnected nature of coastal communities and not by Local Authority or other administrative boundaries.

Stage 2: The Adaptation Plan. This part of the CCAP process encourages authorities towards early uptake of a wide range of coastal adaptation approaches. It is designed to identify the policy to be adopted in the short term (managing current risks) and the longer term (most sustainable position), and to highlight what changes may be needed to transition between the two. It is crucial to frame the policy setting within a broader appreciation of the range of functions within the wider coastal zone. This includes the natural characteristics of the shore face and hinterland, but also the land-use characteristics of these areas. Broadening the scope in this way ensures that necessary coastal adaptations are planned for and integrated within wider adaptation inland, thus impacting on current planning decisions in these areas. The CCAP must be integrated with wider Local Authority adaptation planning.

A Dynamic Adaptation Pathways approach should be used within Stage 2. This approach **develops a series of pathways over time and** identifies the triggers for a change in management approach, as improved information becomes available and conditions change, before severe damage occurs. The approach to Stage 2 is inherently less prescriptive than Stage 1. It offers the opportunity for local communities to help co-design solutions that will deliver the long-term policy set out in Stage 1 by accommodating short term needs and progressing early planning and actions to meet the longer-term changes required.

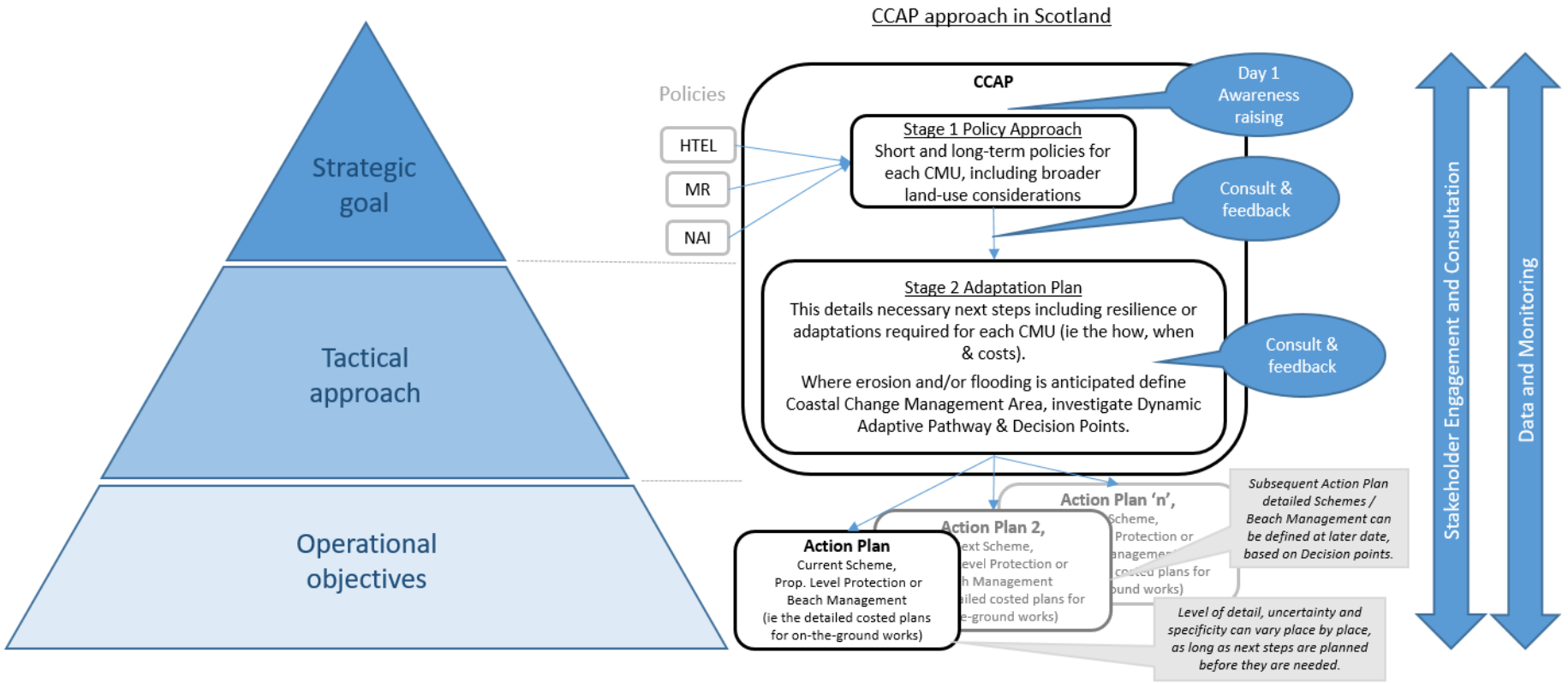


Figure 2 Process Diagram of the stages of Coastal Adaptation

Stage 1 determines the Modified SMP Approach; Stage 2 produces the Adaptation plan which leads into Action Plans for each Coastal Management Unit (CMU). Policies are chosen in Stage One from a choice of Hold the Existing Line (HTEL); Managed Realignment (MR); No Active Intervention (NAI). On the right the two activities of Stakeholder Engagement and Consultation and Data Monitoring are shown to be ongoing throughout the process. Awareness raising is advised from Day 1 and Consultation and Feedback reported on at the end of Stage one and prior to the adoption of the Action Plans (during stage 2). This process follows the tiered strategic coastal management approach on the left; Strategic Goal (Stage 1 Modified SMP Approach); Tactical Approach (Stage 2 Adaptation Plan); Operational Objectives (Action Plans)

.

CCAP Stage 1

The Shoreline Management Plan Guidance for England & Wales provide the basis for Stage 1: Policy Approach, which is a modified SMP Approach in Scotland.

What is required in Stage 1?

Stage 1 comprises a broad assessment of the risks of coastal erosion and associated flooding over the next 100 years or so, and identification of policies to manage or reduce these risks to people and the developed, historic and natural environment.

It follows the DEFRA / EA guidance for England (the SMP guidance) with some modifications. The stages set out in the SMP guidance which apply to CCAP Stage 1 are summarised in Table 1. Further details can be found in the full SMP guidance itself along with the additional information in this section

Table 1 Stage 1 of CCAP Policy Approach (Modified SMP Approach)

Step	CCAP Stage 1 procedure (Revised to include Scottish aspects)	Notes
1	**Scope Stage 1:** • Agree overall approach, • Define geographic extents and work required, • Identify stakeholders and outline engagement approach. • Raise awareness with stakeholders. • Collate data (including Dynamic Coast. SEPA Flood Hazard / Risk maps and Flood Risk management plans) • Identify and undertake any additional information collection needed to progress (e.g. defence condition assessments, heritage assessments, LiDAR).	**Step 1** should reflect the nature of the coast in the area in question and will influence the subsequent steps in the process. For example, in northwest Scotland the long and predominantly hard coastline may require a light touch in Step 1 and in the assessments required in Step 2. It is also important that stakeholder engagement and communication strategy is taken forward. At this stage how the CCAP will be progressed using in-house or external specialists or expertise should be agreed.
2	**Assessments to Support Policy Development:** • Define objectives including reference to Scottish Government policy outcomes, features, benefits, issues and agree with stakeholders. • Baseline understanding of coastal behaviour and dynamics (review Dynamic Coast data, consider necessary updates etc); define & map policy units • Assess existing defences (built and natural) • Baseline scenarios (No Active Intervention & With Present Management along with mapping predicted shoreline change) • Undertake risk assessment of existing assets and planned land use for NAI. & WPM • Consider wider land-use considerations and opportunities. • Initial consideration of strategic trigger points for policy changes.	In **Step 2** a lack of supporting information such as detailed flood and erosion strategies and studies should not hinder the progress of determining a strategic direction for coastal management. Uncertainties in the supporting information will have to be managed within the process and Scottish specific products such as Dynamic Coast should be used as appropriate.

3	**Policy Development:** • Identify key policy drivers and potential policy options; • Develop and assess policies (against shoreline response and delivery of objectives), • Consult the public (mainly local communities) on policy options; • Identify preferred policy(s) and sub-categories for each policy unit; • Further develop understanding of the strategic trigger points for policy change, confirm the preferred scenario(s); • Undertake sensitivity testing and socio-economic assessment), acknowledge uncertainty (science, funding, social aspects)	In **Step 3** it is important to assess and determine how policy choice can best deliver the desired outcomes for Scotland and to address local priorities. These include a strong desire to work with natural features and processes, to build resilience to coastal change, and where possible, to plan to restore natural features and processes. Policies should take account of the direction of Scottish Government Policy on Social Justice and Adaptation to climate change. Policies should not normally be set that are undeliverable or financially unsustainable in the long term. There is a desire, when this interim guidance is updated in the next 3 years or so, to move away from "hold the existing line" terminology to reflect the management of the whole coastal zone and to align more closely with land-use planning terminology. SG and partners would like to work on this with Local Authorities and in particular planning departments who are developing CCAP Stage 1 work, (or those Authorities reviewing and developing existing SMPs to align with this guidance).
4	**Public Consultation:** • Gain agreement in principle, • Confirm the consultation approach and prepare materials, consult. • Collate and assess consultation responses.	**Step 4** will need to be conducted in a thorough and honest manner setting out the pressures associated with coastal change and the consequences of our response to those pressures. It should clearly show the decision-making process for the short and long-term policy recommendations and detail how feedback will be considered within the decision-making framework of CCAP Stage 1
5	**Finalise Plan:** • Assess changes needed following consultation, agree changes if required and feedback to consultees;	In **Step 5**, key information and feedback from consultation will be important to inform Stage 2. The development of the Adaptation Plan must include a strategy for starting and progressing the adaptation

	• Produce final policy approach and identify what actions (High Level) are required including how to deal with consequences of the plan policies. • Finalise the plan, seek agreement as required with Local Authority and partners. • Develop links to Land Use Planning to accommodate outcomes of Stage 1 CCAP including seeking to define Coastal Change Management Areas. • Complete High Level Policy Plan. • Outline anticipated review period for CCAP.	journey in coastal communities including consideration of spatial and marine planning. It is recommended that **Coastal Change Management Areas** are defined and adopted into Local Development Plans. Significant adaptive actions will be needed not only where there is a policy change over time i.e. moving from Hold the Existing Line to Managed Retreat but also in many cases where the policy is unchanged. For example, continuing to Hold the Existing Line by maintaining and replacing existing defences may result in a significant increase in flood risk to those properties due to sea level rise. Whilst adaptive actions may include increasing resilience of buildings and communities to more frequent flooding, relocation of frequently flooded assets may also be required. Finally, an agreement should be reached on how to maintain and update the Plan with a preference for having frequent updates to keep the plan itself and the Policy Plan current
6	**Dissemination:** Publish accessible version and move straight to Stage 2 for implementation.	

In summary, Stage 1 aims to set a combination of policies that are likely to be "practical and acceptable" over the next 100 years or so. Whereas Defra's SMP guidance for England and Wales requires working with defined periods of short term (up to 20 years), medium term (20 to 50 years) and long term (50 to 100 years), for Scotland the preferred policies should be assigned only to the short term (present) and the long term (where we want to be before the end of the appraisal period). Another difference for Scotland is that the "advance the line" policy has been incorporated into Managed Realignment as a policy subcategory rather than as separate policy choice. The choice of main policies and sub-categories to be applied in Scotland are shown in Table 2.

Stage 1 aims to identify the initial strategic trigger points that would be associated with a change in policy. For example, a seawall failing / reaching the end of its practical life might signify a requirement to move to a different policy. Alternatively, the opening of a new opportunity to regenerate / redevelop a brownfield site could provide the trigger to agreeing a more sustainable coastal management policy approach.

Note on Main Policies to be Set at CCAP Stage 1 – Modified SMP Approach

Policies will be reviewed over the next 3 years in the light of experience in Scotland, noting a desire to move away from "hold the existing line" terminology to one that reflects management of the whole coastal zone and which is more closely aligned with land-use planning terminology. Setting the preferred main policy categories for most areas should be achievable even where there are data limitations and more than one preferred policy sub-category may be carried forward into Stage 2 of the CCAP process as conditions change.

Table 2 Coastal policies, sub-categories, and description.

Main Policy Category	Policy sub-category	Policy description
No Active Intervention (NAI)	No need to Defend	Where there are no assets at risk and no defences are present.
	Do not Defend	Where no defences exist at present and unacceptable to introduce any due to the impact. Any risks to assets are likely to increase and assets may suffer increased impacts, be lost or relocated in future.
	Cease to Maintain	Where defences are present but no further works are carried out to maintain them. Risk to any assets would increase and they may suffer increased impacts, be lost or relocated in future.
	Local Activity Only	Where works to repair or construct short sections of defences within a longer length of otherwise NAI shoreline might be permitted e.g. an isolated property.

Hold The Existing Line (HTEL) Or Protect	Maintain / Replace	Where protection is currently provided by defences and intent is to retain defence along current alignment replacing any failed defences as necessary. May involve upgrading structures to enhanced level of protection or accepting that the level of protection may reduce in time (e.g. due to beach loss or sea level rise)
	New defences	Where no defences currently exist but the intention is to introduce them (e.g. risk to existing assets increases).
	Repair not Replace	Where protection is currently provided by coastal defence structures, which may be maintained and repaired but not upgraded or replaced at end of life. Risk to any assets would increase (e.g. after end of life and may suffer increased impacts, loss or relocated in future.
	Temporary Intervention	Allowing non-permanent / short-term measures that temporarily reduce flood or erosion risk (e.g. with an aim to buy time for other response plans, including relocation).
Managed Realignment (MR)	Set Back Defence	Removing or breaching the current line of defence with the intent to move back to new defences at the realigned location.
	Slow Erosion	The introduction of non-permanent/ short term measures to slow down but not stop erosion (e.g. with an aim to buy time for other response plans, including relocation, to be established).
	Remove Defences	Where defences are present and intent is to remove them and allow the shoreline to erode or flood and migrate landward
	Natural Features	Where the intent is to maintain the integrity of the natural feature (e.g. dunes / beach) approximately in its current position to provide defence intended to be solely achieved by nourishment.
	Advance the existing line	Where the intent is to move the line of the defences or shoreline forward artificially. Usually in support of infrastructure development (e.g. ports and harbour facilities) and not as a means of reclaiming land for other developments (e.g. housing) due to the residual risks of flooding, the locking in of maintenance of the defended line, collateral impacts on adjacent coastal areas and / or environmental interests.

Note on Desired Outcomes of CCAP Stage 1 – Policy Approach

Coastal Change Adaptation Plans need to align with or support Scottish Government's National Performance Framework and help deliver Scottish Government strategic objectives and national outcomes in particular the outcome:

"We live in communities that are inclusive, empowered, resilient and safe."

Plans will also support the Scottish Government's Resilient Communities Strategic Framework and Delivery Plan for 2017 – 2021 by aiming to create the conditions in which 'communities, individuals and organisations harness resources and expertise to help themselves, assess and understand risk, take appropriate measures to prevent, prepare for, respond to and recover from emergencies, in a way that complements the work of the emergency responders.'

They should also align with the UN Sustainable Development Goals and the UKCCRA adaptation principles and take account of and inform other strategic planning initiatives (further details in Appendix 4), for including but not limited to;

- Flood Risk Management Plans and Local Flood Risk Management plans
- Land Use Planning system, Local Development Plans and national planning policy
- Marine plans – National Marine Plan and Regional Marine Plans
- River Basin Management Plans

UKCCRA Adaptation Principles

According to the Third UK Climate Change Risk Assessment (UKCCRA3) "adaptation is failing to keep pace with the worsening reality of climate risk. The Committee recommends ten principles for good adaptation planning. These are intended to bring adaptation into mainstream consideration by all levels of Government and business." These are important principles to consider when developing CCAPs and are illustrated below. See Appendix 3 for more information on how these principles relate specifically to the coast.

Areas with an existing SMP

Where SMPs have already been completed in Scotland, these usually form a strong basis for CCAP Stage 1. SMPs completed in line with the 2006 Guidance should be subject to review following the principles of the 2020 Refresh Guidance.

It is recommended that existing SMPs in Scotland are subject to a health check (ideally by a third party) to identify issues that are affecting / may affect delivery of the preferred policies including the likely availability / justification of funding to deliver a chosen policy. For SMPs completed in the last 5 years or less, health checks may wait until sufficient time has passed to identify challenges and blockers to progress. Nevertheless, it may still be prudent to update action plans as, engagement with planners may not have progressed as intended, or issues with actual deliverability of policies may have been identified. Clarity of policy intent has also been identified as a common shortcoming of all SMPs completed following the 2006 guidance.

The health check should review policies in the SMP and identified challenges to policy delivery. The common themes of challenges identified in the health checks may include:

1. Establishing governance and maintenance of the plan
2. Producing a new / updated action plan
3. Improving policy clarity
4. Engaging planners
5. Responding to change and engaging others
6. Addressing changes to the natural environment
7. Monitoring and triggers
8. Climate Change
9. Incorporating new information.

Once the health check on existing SMPs has been completed, progress through the stages in the Refresh Guidance to improve policy clarity, assign sub-categories and clarify management intent can be completed. It will also be necessary to draw out and report the high-level policy triggers for each policy unit as set out within Table 1 and any new information or studies since the SMP was published (e.g. latest Dynamic Coast outputs) checked to establish any impact on decisions. Checks on how policy choices for the existing SMP three-stage approach (short, medium, long) can be translated into the preferred Scottish short term and long-term policies should be conducted and timelines agreed. Once these checks and updates are complete, work moves to Stage 2.

Stage 2 Adaptation Planning

Introduction to adaptation planning

Stage 2 aims to translate high level policy choices into deliverable Adaptation Plans for Scotland's communities. The Dynamic Adaptive Pathways approach to adaptation planning is likely to be more straightforward where there is a good understanding of how the coast will change under the stated preferred policy approach.

The Scottish Government wants to ensure adaptation actions are forecast and planned for in good time. International experience indicates that, when initiating coastal adaptation planning, recognition of wider strategic goals helps to ensure land-use aspects are integrated. This helps the coast to sustainably support a full range of coastal uses in the future. For example, for high value urban shores maintaining a vibrant urban centre which remains resilient to erosion and flood risks is desired. On a rapidly eroding coast which provides flood protection functions to an adjacent town these functions may only be sustainable on a dynamically retreating basis. In both cases, the strategic goal may be to 'Sustainably maintain flood protection levels, functioning of natural and artificial defences and associated benefits.' Critically however, this acknowledges that current and future land use planning is integrated across the whole coastal hinterland, to maintain the resilience of community and business land-uses and of flood protection features (whether natural or artificial).

In less complex situations, such as partly rocky or undeveloped coasts, with limited or no asset at risk from anticipated erosion or flooding, identifying solutions with few secondary

impacts is relatively straightforward. For more complex and multifaceted coasts, with higher levels of anticipated erosion and flooding, high levels of uncertainty and greater asset risks, more in-depth assessments and monitoring will be required to develop the adaptation plan over time. Such needs should be clearly captured in the Action Plan(s) for each coastal change management area (CCMA). Dynamic Coast provides key datasets that are available to local authorities to use to rationalise this approach.

A key issue is how to manage future uncertainty particularly regarding how much sea level rise to anticipate since the rate at which global greenhouse gas emissions will be cut is unknown and the effect of ice sheet melting. Even if net zero is achieved quickly, erosion and flooding will continue to worsen due to past and current emissions. Such uncertainty makes it difficult to plan for future land use and development in coastal areas. Nevertheless, if current levels of emission continues, sea level is expected to rise across Scotland by about 1 metre by 2100 compared to the 1980 – 2000 baseline. (IPCC High emissions scenario, RCP8.5 95%). Additional uncertainty surrounds the trajectory of future climate, weather and storm impacts (See Appendix 2).

Dynamic Adaptive Pathways

Adopting a Dynamic Adaptive Pathway Approach offers flexibility in effectively managing future uncertainty. It relies on ongoing monitoring and planning for multiple scenarios and outcomes (perhaps at different levels of detail), which can be navigated between as future events unfold.

This has implications for assets located in areas anticipated to be at risk of coastal flooding or erosion. In some circumstances, notably where ongoing coastal protection is deemed not feasible, the only viable option may be adaptation by relocating infrastructure and assets out of harm's way. This can be made possible by defining a CCMA where accommodation space is secured to ensure that planning at decadal or century scales can consider the landward relocation of 'at risk' assets. It is important to identify vulnerable areas where future development should be avoided, and to safeguard natural coastal features that protect our coast (e.g. beaches, sand dunes, saltmarsh, seagrass beds and kelp forests).

Whilst some local authorities may elect to maintain and upgrade coastal defences *ad infinitum*, such a decision should be challenged. Figure 3 shows a range of planned management options and locally specific trigger points where alternative approaches might allow transition from resisting erosion to accommodating erosion. The schematic considers initial short-term maintenance of a sea wall to allow time for adaptation planning to be undertaken. The use of trigger points allows the chosen management action to change in response to new information or changing circumstances. Any second trigger point (for example a storm impacting assets), may trigger a switch in management (for example to beach replenishment). However, at a third or later trigger point, the management approach may switch to relocate assets out of harm's way, with the coastal methods that resist erosion becoming redundant.

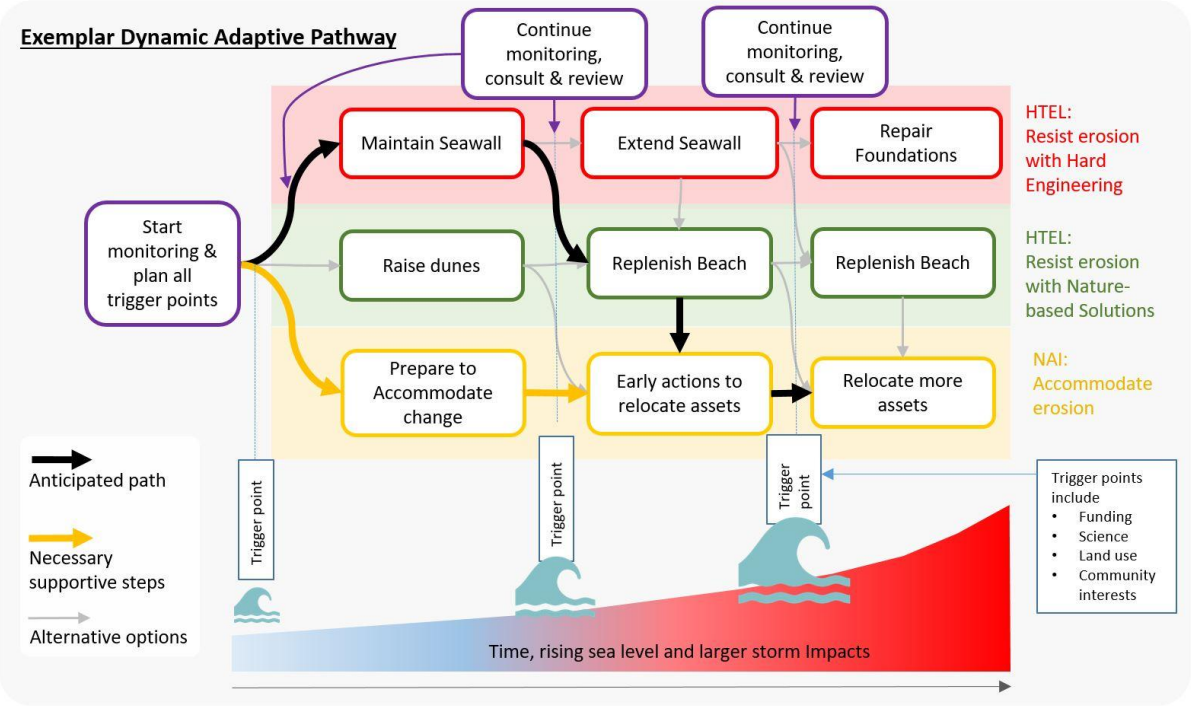


Figure 3 A simplified example of a Dynamic Adaptive Pathway approach

Triggers for change

The trigger for an adaptive transition will often relate to an actual or projected change in the physical processes at the coast but may also be driven by other, more enabling factors such as an injection of new funding or proposed change in land-use. Some examples are shown below, but in reality, triggers will be site specific (Table 3).

Physical process triggers are more likely to be readily quantifiable and, through monitoring can allow trends to be predicted. They can incorporate more sudden or significant change e.g. a major storm destroying a defence. However, waiting for storm damage before taking action could carry the risk of a short term engineering response, which is to be avoided. Enablers and inhibitors are not always quantifiable, may be binary in nature, and so are less predictable and certain.

A single threshold level is recommended for each trigger within the plan, defined as the 'change/decision point' at which a change in action is urgently required, rather than the point at which planning for the change begins. Information on dynamic adaptive pathways approach and the use of trigger points see climatexchange.org.uk.

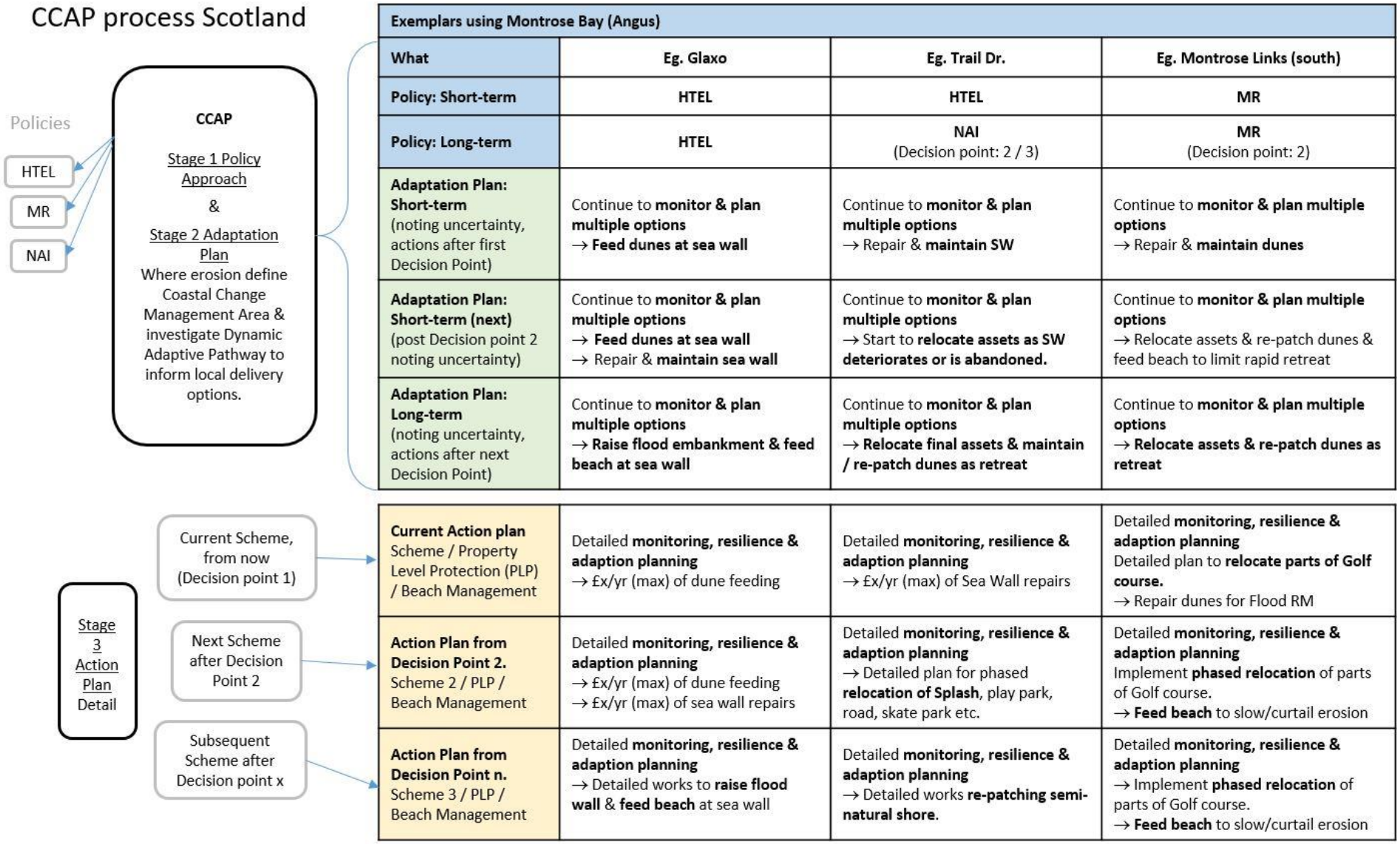
Table 3 Examples of common trigger points

Trigger type	Trigger description	Detailed example
Physical process triggers	Proximity of coast to asset	MHWS is < 20 m from house
	Proximity of coast to asset	Vegetation edge is < 15 m from road
	Flood Risk probability/frequency	Probability of over wash flooding is > 10% Annual Exceedance Probability
	Defence structure deterioration	Inspection reveals failure of necessary protection level, i.e. 10% Annual Exceedance Probability (AEP)
	Occurrence of Erosion / Flood event	Storm impacts defence structure and structure is undermined, or over-wash occurs leading to considerable damage to property or other assets
Enablers and inhibitors triggers	New information or studies	A new investigation identifies current land-use will not be sustainable
	Insufficient funding/lack of affordability	No funding available.
	Necessary defences / adaptations not viable.	Cost benefit analysis doesn't support intervention.
	Injection of Funding	Availability of (new) funding enabling adaptation or resilience activities.
	Relocation of infrastructure, property or people	Decision by council to cease repairs to existing defences.
	Changes in land-use	Business closes
	Changes in commercial / industrial operations	Business relocates to alternative site
	Social attitudes change	Community chose not to maintain activity
	Changes to government legislation / policy	New government funding stream becomes available

Action Plans

The CCAP approach in Scotland directly connects policy (Stage 1) and adaptation planning (Stage 2) to develop separate and detailed local Action Plan(s) that take forward local coastal management actions or schemes. Local authorities will have flexibility in how the Action Plans are costed and developed: for example, coastal erosion is not anticipated for

Dundee city waterfront so the policy choice could be Hold the Existing Line (HTEL) with foreseeable adaptations required related to managing increasing flood risk. There are numerous settlements smaller coastal settlements where continuing to resist erosion and flooding will become increasingly unfeasible, but topography limits the potential space, for asset relocation, necessitating a CCMA extending further inland and raising challenging considerations of community and funding. Figure 4 presents an exemplar process of Coastal Change Adaptation Plan followed by Action Plans.



Exemplars using Montrose Bay (Angus)			
What	**Eg. Glaxo**	**Eg. Trail Dr.**	**Eg. Montrose Links (south)**
Policy: Short-term	**HTEL**	**HTEL**	**MR**
Policy: Long-term	**HTEL**	**NAI** (Decision point: 2 / 3)	**MR** (Decision point: 2)
Adaptation Plan: Short-term (noting uncertainty, actions after first Decision Point)	Continue to **monitor & plan multiple options** → **Feed dunes at sea wall**	Continue to **monitor & plan multiple options** → Repair & **maintain SW**	Continue to **monitor & plan multiple options** → Repair & **maintain dunes**
Adaptation Plan: Short-term (next) (post Decision point 2 noting uncertainty)	Continue to **monitor & plan multiple options** → **Feed dunes at sea wall** → Repair & **maintain sea wall**	Continue to **monitor & plan multiple options** → Start to **relocate assets as SW deteriorates or is abandoned.**	Continue to **monitor & plan multiple options** → Relocate assets & re-patch dunes & feed beach to limit rapid retreat
Adaptation Plan: Long-term (noting uncertainty, actions after next Decision Point)	Continue to **monitor & plan multiple options** → **Raise flood embankment & feed beach at sea wall**	Continue to **monitor & plan multiple options** → **Relocate final assets & maintain / re-patch dunes as retreat**	Continue to **monitor & plan multiple options** → **Relocate assets & re-patch dunes as retreat**
Current Action plan Scheme / Property Level Protection (PLP) / Beach Management	Detailed **monitoring, resilience & adaption planning** → £x/yr (max) of dune feeding	Detailed **monitoring, resilience & adaption planning** → £x/yr (max) of Sea Wall repairs	Detailed **monitoring, resilience & adaption planning** Detailed plan to **relocate parts of Golf course.** → Repair dunes for Flood RM
Action Plan from Decision Point 2. Scheme 2 / PLP / Beach Management	Detailed **monitoring, resilience & adaption planning** → £x/yr (max) of dune feeding → £x/yr (max) of sea wall repairs	Detailed **monitoring, resilience & adaption planning** → Detailed plan for phased **relocation of Splash**, play park, road, skate park etc.	Detailed **monitoring, resilience & adaption planning** Implement **phased relocation** of parts of Golf course. → **Feed beach** to slow/curtail erosion
Action Plan from Decision Point n. Scheme 3 / PLP / Beach Management	Detailed **monitoring, resilience & adaption planning** → Detailed works to **raise flood wall** & **feed beach** at sea wall	Detailed **monitoring, resilience & adaption planning** → Detailed works **re-patching semi-natural shore**.	Detailed **monitoring, resilience & adaption planning** → Implement **phased relocation** of parts of Golf course. → **Feed beach** to slow/curtail erosion

Figure 4 A worked exemplar of the CCAP process alongside examples of local scheme

Community Engagement and Communication

Communication needs to be a central pillar of the CCAP process. There is no avoiding the fact that the changes facing our coastal communities over the coming decades will be hard to communicate and difficult to accept for those whose homes and livelihoods are at risk as sea levels rise. There will be many difficult conversations between those that stand to lose assets, including their homes or businesses, to inundation and those in local and national government that traditionally have been tasked with resisting coastal change, but who, in the future may no longer be able to achieve this. Clear communication on how and when sea level rise is expected to impact upon the coast, including the uncertainties, is essential. Communicating and engaging with local stakeholders including politicians, residents and local businesses is a vital part of moving people on the behavioural journey of accepting future risks and the changes that are coming and is essential in developing collaborative solutions which offer multiple benefits to coastal change.

The traditional approach to shoreline management planning whereby a draft plan is produced and put out for consultation at a relatively late stage in the process, is not appropriate for the conversations that we need to have about future coastal change. The most sustainable solutions come from involving many perspectives and insights at an early stage. Inclusive processes give greater ownership of the solutions and empowerment to people and communities. Taking a place-based approach to climate change adaptation necessitates involving communities from the outset. CCAPs are not something that should be done 'to' communities, rather they should be developed, reviewed, communicated, and updated in a long-term partnership between practitioners, residents, and businesses. Communities and other stakeholders will have valuable information to contribute as to how the coast behaves, what the key drivers on the coast are and how the coast can be adapted to accommodate change in a managed and sustainable way.

Working in collaboration takes time and careful management but will allow the CCAP project team to reach and engage new audiences, create opportunities for follow-up and legacy and lead to better knowledge-exchange. The purpose of communication and engagement within this process is to deliver a strong, effective and community supported change process that allows all stakeholders to plan and prepare themselves for the changes coming and ensure that all voices can participate in a conversation embracing solutions based on local knowledge.

The conversations that CCAPs will generate will get more difficult as sea level rises, yet communication charged by emotion often leads to misunderstanding and distrust. Communities need planning bodies and regulators to provide clear signals and long-term messaging on sea level rise and coastal change. Therefore, it is important to develop a communications and engagement plan early in the CCAP process and that it remains an integral part of the CCAP. It should be regularly reviewed as changes at the coast progress (and as regulatory, policy and financial mechanisms for compensation change) to ensure that it stays relevant (See Appendix 7 for more information and an exemplar communications and engagement plan).

Appendices.

Appendix 1. Glossary

Table 4 Glossary of terms used in this Guidance

Term	Definition
Accretion	The build-up of sediment resulting in the seaward movement of the coastline / Mean High Water Springs
Action Plan	The proposed strategy or course of action to be taken depending on trigger point reached
Advance	The seaward movement of the Mean High Water Springs line, however the cause of this movement is not inferred. See accretion, which is associated with natural coastal processes.
Advance the Line	A policy option that allows for the building of new defences on the seaward side of the original defences.
Adaptation	The adjustment in economic, social or natural systems in response to actual or expected climatic change, to limit harmful consequences and exploit beneficial opportunities.
Adaptation Space	Intentionally leaving ground available for the natural future migration of coastal features e.g. Dunes as a result of sea level rise or coastal erosion or making space for displaced assets to relocate to.
Adaptive Actions	A plan or policy option that promotes an adaptive approach to coastal change that makes use of long term or resilient solutions such as preserving natural features.
Amended Town and Country Planning (Scotland) Act 1997	The principal piece of legislation governing the use and development of land within Scotland.
Annual Exceedance Probability (AEP)	The **chance or probability of a natural hazard event (usually a rainfall or flooding event) occurring annually** and is usually expressed as a percentage
Artificial Coastline	A coastline characterised by the proliferation of coastal construction or structures such as walls, marinas, armour of other developments as opposed to natural or undeveloped features.

Artificial Structures	A traditionally engineered solution that has been built at the coast to provide protection such as a sea wall, groynes or rock armour
Asset	An item, such as a building or protected area, that is deemed to have an economic, social, or cultural value (or combination of)
Bathymetry	The measurement of depth of water in oceans, seas, lakes or estuaries
Carbon sequestration	The removal of carbon dioxide from the atmosphere and held in solid or liquid form.
CCAP Coastal Change Adaptation Plan	The Scottish version of a Shoreline Management Plan which combines Shoreline Management Planning and Dynamic Adaptive Pathways for Scotland's coast
CCRA Adaptation Principles	The Climate Change Risk Assessment (CCRA) is a 5- yearly assessment of the major risks and opportunities from climate change to the UK. The adaptation principle are priorities for early action on adaptation and include implementing measures that provide benefits in today's climate and in a range of future possible climates, known as 'low-regret' actions.
Climate mitigation	Efforts to reduce or prevent the emission of greenhouse gases for coastal change
Coastal Cell (sub-cell)	A coastal cell is section of coast, normally separated by headlands, which operates separately from adjacent cells. Sub-cells are smaller units within each cell (see map of cells and sub-cells)
Coastal System	the coast can be seen as a system to understand the processes and interactions involved. Inputs, processes and outputs work together to create coastal equilibrium. Human actions can affect this equilibrium and change the coastal system. The set of processes (especially sediment movement) within a coastal cell or sub-cell is often described as the (local) coastal system.
Co-design	A design approach that actively involves users and stakeholders from the beginning of a project, right through to roll-out.
Coastal Management Unit (CMU)	A Coastal Management Unit is a section of coast within which management options are planned for. It may often be smaller than a Coastal Sub-Cell. A length of shoreline with similar characteristics in terms of coastal processes and assets at risk that can be managed effectively.

CCMA Coastal Change Management Area	An area identified in plans as likely to be affected by physical change to the shoreline through erosion, coastal landslip, permanent inundation or coastal accretion.
DAP	A Dynamic Adaptive Pathway is a flexible management strategy, which plans for multiple management strategies, and allows planners to change between strategies at predefined trigger points or as events unfold.
Decision point	A management action based on a trigger being reached (often the trigger is a physical measurement, or attribute)
DEFRA 2006	A document which sets out the principles for moving SMPs forward in England/Wales and describes the task for doing so and developed to be a review of the original Shoreline Management Plan Guidance. It forms the basis for the Scottish adaptive approach. See also SMP Refresh Guidance.
Designated area	A designated nature site means it has special status as a protected area because of its natural and/or cultural importance. The protection means that these places have people and lases to make sure that nature and wildlife are not harmed or destroyed.
Development Plan	Sets out how places should change and what they could be like in the future
Development management	The process of planning application decision making (granting or refusing planning permission)
Digital Terrain Model	A three-dimensional representation of the terrain (earth's) surface. As such it excludes buildings and vegetation. It is used interchangeably with Digital Elevation Model Digital Surface Model A three-dimensional representation of the surface, including buildings and vegetation (if present)
Downdrift / updrift	Where a tide or wave-driven longshore current occurs, sediment is moved from updrift toward the downdrift section of coast
Dynamic Adaptive Pathways	A flexible way of managing future uncertainty by planning for multiple scenarios without rigid timelines responding to the nature of future changes as they unfold.

Dynamic Coast	Scotland's National Coastal Change Assessment. Provides the strategic evidence base on the extent of coastal erosion in Scotland
Erosion	The removal of sediment resulting in the landward movement of the coastline / Mean High Water Springs
Erosional bight	An area of erosion adjacent to the end of coastal defences, that commonly occurs as the sediment supply deficit (exacerbated by defences) is made up within the next available section of beach
EU Water Framework Directive	This Directive is European Union legislation which covers all inland and coastal waters. The Directive sets a framework which should provide substantial benefits for managing water over the long term.
Extreme event	Although the threshold is subjective, extreme events are often defined as those that occur in the highest or lowest 5% or 10% of known historical measurements. But this can alco refer to events that occur far beyond their recurrence interval or probability.
Geomorphology	The study of landforms and associated processes
Global Climate Emergency	Serious and urgent problems that are being caused or likely to be caused by changes in the world's weather, in particular the world getting warmer because of human activity increasing the level of carbon dioxide in the atmosphere
Hard coastline	coast that is comprised mainly of materials resistant to erosion such as hard rock types or artificial structures
Hard and mixed coast	A coastline composed of physically resilient rocks often with superficial sediments, which is unlikely to retreat rapidly. Erosion rates may be millimetres per year and adjacent assets are unlikely to be affected by erosion
High Emissions Scenario	Also called RCP8.5 and often referred to as 'business as usual' scenario suggesting that this is the likely scenario if society does not make concerted efforts to cut greenhouse gas emissions.
High Water Mark of Ordinary Spring Tides (HWMOST)	The HWMOST became mean high-water springs in later Ordnance Survey maps; this is a terminology modification and the definitions remain unchanged.

Hold the Existing Line	A policy option that involves maintaining or changing the standard of protection provided by the existing defence line by carrying out work in front of existing defences (such as beach replenishment, rebuilding the toe of a structure, building offshore breakwaters, etc).
Intertidal	The area between mean high-water level and mean low water level in a coastal region
Key driver of coastal change	A leading or primary factor in change at the coast e.g. loss of habitat or increased intensity of storms
Managed Realignment	A policy option that allows the shoreline to move backwards or forwards, with management to control or limit movement (such as reducing erosion or building new defences on the landward or seaward side of the original defences). NB out with CCAP, this term is only used to mean landward realignment.
Marine Policy Statement	The policy framework for preparing Marine Plans and taking decisions affecting the marine environment.
Mean High Water Springs (MHWS)	The height of MHWS is the average throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest. The values of MHWS vary from year to year with a cycle of approximately 18.6 years. (National Tidal and Sea Level Facility)
Mean Low Water Springs	The height of mean low water springs is the average throughout a year of the heights of two successive low waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is greatest.
Modified SMP approach	Stage one of the CCAP which determines the most sustainable/suitable policy to take based on the DEFRA SMP refresh guidance.
Multiple benefit action	Involves protecting more than one public benefit objective including habitat enhancement or protection, water quality improvement, historic resource protection or improvement, public access development, environmental education or any combination of such objectives/actions.
National Coastal Flood Maps	SEPA flood map to check flood risk and support decision making, planning and avoid development in flood risk areas at the coast Flood maps | Scottish Environment Protection Agency (SEPA)
National Islands Plan	Aims to improve the quality of life for Scotland's island communities. The plan has 13 objectives related to addressing population decline,

	tackling climate change and improving transport, housing and the delivery of public services and digital connectivity.
National Planning Framework 4	Sets out the Scottish Governments priorities and policies for the planning system up to 2045 and how to approach planning and development.
Nature-based solutions	Working with nature to tackle one or more of society's challenges. At the coast this means the sustainable management and use of natural features and processes to tackle coastal change, flooding and/or erosion.
Natural systems	A system that exists in nature, independent of any human involvement. The natural system consists of all the physical and biological materials and their intertwined processes.
LiDAR	LIDAR (Light Detection and Ranging) is a remote sensing method that uses lasers to measure distances thereby creating detailed three-dimensional maps
Local Plan District (LPD)	In the current flood risk management regime, Scotland has been separated into **14 Local Plan Districts** (LPDs). These districts are based on river catchments and cross administrative and institutional boundaries. Within each LPD there is a lead local authority who is responsible for the co-ordination and publication of their Local Flood Risk Management Plan
Long Term	Actions to be taken later because of trigger events
Negative gradient	Low-lying inland coastal areas, which are separated from the shore by a barrier, which if removed would allow tidal flooding
No Active Intervention	A policy option that means no investment will be made in coastal defences or other operations.
Potentially Vulnerable Area	Areas where a significant flood risk exists now or is likely to occur in the future. They are based on terrestrial sub-catchments and should be viewed alongside flood risk
Regional marine plans	Regional marine plans are prepared by Marine Planning Partnerships for specific Scottish marine regions. These plans provide a statutory policy framework for public authorities to make decisions on sustainable development and activities in the marine environment.
Regional Spatial Strategy	The Planning (Scotland) Act 2019 establishes a duty for a planning authority, or authorities acting jointly, to prepare and adopt a regional spatial strategy. Regional spatial strategies (RSS) are long-term spatial

	strategies which specify the are/s to which they relate and identify the need for strategic development.
Residual risk	The risk which remains after risk management and mitigation. It may include, for example, risk due to very severe storms (above design standard) or risks from unforeseen hazards.
Resilience-building solutions	A natural feature such as a dune, beach or saltmarsh that can provide low cost protection against flooding and erosion such as a dune, beach or saltmarsh.
Retreat	The landward movement of the Mean High Water Springs line, however the cause of this movement is not inferred. See erosion, which is associated with natural coastal processes.
River Basin	The entire geographical area drained by a river and its tributaries that includes lakes and estuaries
Scotland's National Marine Plan	Covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles).
Scotland's Regional Marine Plans	The National Marine Plan (2015) sets out the wider context for planning in Scotland, including what should be considered when creating local regional marine plans. There are 11 Scottish Marine Regions that have been created which cover sea areas extending out to 12 nautical miles. Regional Marine Plans will be developed by Marine Planning Partnerships, allowing more local ownership and decision making about specific issues within their area.
Scotland's Marine Planning Partnerships	Groups set up to undertake regional marine planning and are made up of marine stakeholders who reflect marine interests in their region.
Shoreline Management Policy	Generic term for any management option, e.g. no active intervention managed realignment or hold the existing line.
Shoreline Management Plan (SMP)	It provides a large-scale assessment of the risks associated with the linear shoreline including impact on coastal processes and landforms, presents a policy framework to reduce risk to people and the developed, historic and natural environment in a sustainable manner.
SMP Refresh Guidance	Environment Agency "Shoreline Management Plans Supplementary guidance for their ongoing maintenance and delivery. October 2020 unpublished

Short term	Actions to start now
Sediment budget	Sediment budget is a concept that applies to gravel, sand and mud shores in the context of the balance between sediment added to and removed from the coastal system; In this respect the coastal sediment budget is like a bank account. When more material is added than is removed, there is a surplus of sediment and the shore builds seaward. On the other hand, when more material is removed than is added, there is a deficit in sediment supply and the shore retreats landward.
Sediment circulation cells	A length of coastline and its associated nearshore area within which the movement of coarse sediment (sand and shingle) is largely self-contained. Interruptions to the movement of sand and shingle within one cell should not affect beaches in a neighbouring sediment cell.
Sediment supply	Sediment budget is a concept that applies to sandy and muddy shores and it refers to the balance between sediment added to and removed from the coastal system; in this respect, the coastal sediment budget is like a bank account. When more material is added than is removed, there is a surplus of sediment and the shore builds seaward. On the other hand, when more material is removed than is added, there is a deficit in sediment supply and the shore retreats landward.
Soft coast	A coastline composed of unconsolidated sediments, which is not inherently resilient to erosion, but relies on the balance of natural processes to maintain its shape in response to storms and everyday processes
Sea level rise (SLR)	Or more correctly 'relative sea level rise' is the combination of increasing elevation of the sea surface (due to thermal expansion of world's oceans and melting land-based ice) combined with land level changes.
Sustainable Development Goals	A collection of 17 interlinked global goals designed to be a 'blueprint to achieve a better and more sustainable future for all'. They were set up in 2015 by the UN General Assembly and are intended to be achieved by the year 2030.
The Climate Change (Scotland) Act 2009	Requires (among other things) the publication of a climate change adaptation programme for Scotland, every 5 years following the publication of the UK-wide risk assessment.
The precautionary principle	States that is a policy or action has a suspected risk of causing harm to the public or to the environment, protective action should be supported before there is complete scientific proof of a risk.

The Wellbeing Economy	An economy that is inclusive and promotes sustainability, prosperity and resilience that supports communities to access opportunities that deliver local growth and wellbeing.
Trigger point	Either a physical process or an enabler/inhibitor that when reached or a threshold is crossed.
UK Climate Change Risk Assessment (UKCCRA)	UK Government is required, under the 2008 Climate Change Act, to publish a climate change risk assessment (CCRA) every 5 years. The CCRA provides the evidence base to inform Government-led national adaptation programmes in England, Scotland, Wales and Northern Ireland.
Uncertainty	Refers to not knowing future events or impacts. Risk can be measured and quantified which enables steps to be taken to protect oneself from risk. Uncertainty makes taking those steps harder as you cannot exactly predict what future events or changes will be.

Appendix 2 Climate change and projections for sea level rise in Scotland

One of the most difficult aspects of adaptation planning is understanding and communicating what climate change means for Scotland's Coast. This section provides some general information and links to where up to date information can be found.

Adaptation Scotland has produced a Climate Projections for Scotland Summary.

More detail on the evidence for how flooding and coastal change has been assessed is in the UK Climate Change Risk Assessment (CCRA) Technical report, including what type of actions to adapt to climate risks and opportunities for the next five years.

Within Scotland, global sea level rise is being partially offset by glacial isostatic rebound (the ongoing rise of land formerly depressed by the huge weight of ice sheets during the last glacial period). Variation in isostatic rebound across the country is the key driver for the differences in the amount of cumulative rise shown in Table 1 below – greatest in the Western and Northern Isles and least around the Central belt. Table 1 gives the cumulative sea level rise from 2017 to 2100 based on the outputs from UK Climate Projections 2018 (UKCP18).

Mean sea level around the UK has risen by approximately 1.4 mm per year from the start of the 20th century, this is projected to accelerate in the decades ahead. As a result, the higher sea levels during storm events will lead to more frequent and severe coastal flooding, unless we take action to adapt.

SEPA guidance has recommended climate change allowances for flood risk assessment in land use planning. This guidance includes SLR allowance by region and can be used by planning authorities to underpin their land use planning decisions with the best evidence available. It is not intended that the allowances should be used for the design of flood risk management measures, for example to increase the height of direct defences without consideration other climate scenarios and local factors such as social thresholds etc.

Table 5 SEPA sea level rise allowances for land use planning by region

Region	Cumulative Sea Level Rise 2017 – 2100 (m)
Argyll	0.86
West Highland	0.89
Western Isles	0.93
North Highland	0.89
Orkney	0.93
Shetland	1.02
NE Scotland	0.87
Tay	0.85
Forth	0.86
Clyde	0.85
Tweed	0.89
Solway	0.88

It is important to note that how fast sea level will rise will depend on future emissions as well as location. If we continue on a high emissions trajectory, Glasgow is likely to need to adapt to sea levels which are about 1 m higher than today over the next 130 - 180 years. However, if emissions are cut in line with the Paris agreement, Glasgow may have more than 300 years to adapt to this amount of sea level rise. However, currently sea level rise is in line with a high emissions projection and so coastal erosion and associated flood risks will still be worse at any point in that time space than today, as demonstrated by the Dynamic Coast High or Low Emissions maps.

There is also a low possibility that sea level rise this century could be much faster than anticipated as a result of additional melt from the Greenland and Antarctic ice sheets. This means that a sea level rise of 2 m by 2100 cannot be ruled out for the UK.

This underlines the importance of looking at a range of sea level rise scenarios and testing what would be the management response for each. The range of scenarios chosen should include:

1. A credible maximum or worst-case scenario for sea level rise by end of the 21st Century of 2 m
2. A range of lower values which assume limited ice melting during the present century for example 0.25 and/or 0.5 m sea level rise from present day.
3. SEPA sea level rise allowance for your region

Given that sea level rise will continue well beyond the end of the 21st century, we recommend that an additional allowance of 0.15 m per decade after the year 2100 be applied where the design life of a development is known to extend beyond that date.

The benefit of planning to a change in sea level rise (as a variable) e.g. an increase of 0.25, 0.5 and 2 m as opposed to emission scenarios, is that this approach will be easily relatable to performance thresholds of defences or sea walls at a local level. These heights and levels will not change with emissions targets or climate model scenarios, and it will be simple to produce maps for the defined increments. Using an example at Millport (Clyde) one could consider the time periods when a rise of 0.25 and 0.5 m RSLR is anticipated. The lower threshold (0.25 m) is expected around 2080 under a medium emissions scenario or around mid-2040s under a high emissions scenario[8]. The higher threshold of 0.5 m is expected after 2100 under a medium emissions scenario or around 2070 under a high emissions scenario.

It is important that any development or coastal adaptation measure considers the residual uncertainty of the defence or chosen response. Flood risk management is inherently uncertain, storm flooding events are highly random and the relative performance of different options to manage risk at the coast is only partially understood. A precautionary approach to the assessment of risk should be taken which includes an appropriate

[8] These calculations the use the UKCP18 RCP4.5 50th percentile and the RCP8.5 95th percentile, altitudes are above 1980-2000 sea levels.

freeboard allowance and a range of measures, including combinations of measures should be explored to meet national and local objectives.

Variation in modelled projections of sea-level rise

Sea level rise allowances for each region have been calculated from the 95th percentiles for sea level rise for 2100 from UKCP18, in a high emissions scenario. The 95th percentile is considered very unlikely to be exceeded – it is the point at which 95% of the possible scenarios fall below it and 5% fall above it. However, there is additional uncertainty associated with ice sheet dynamics that is not fully taken account of in the projections – for further details please see the UKCP18 Marine Report. Under all emissions scenarios, sea level rise continues beyond the end of the 21st century. This is demonstrated in Figure 5 below.

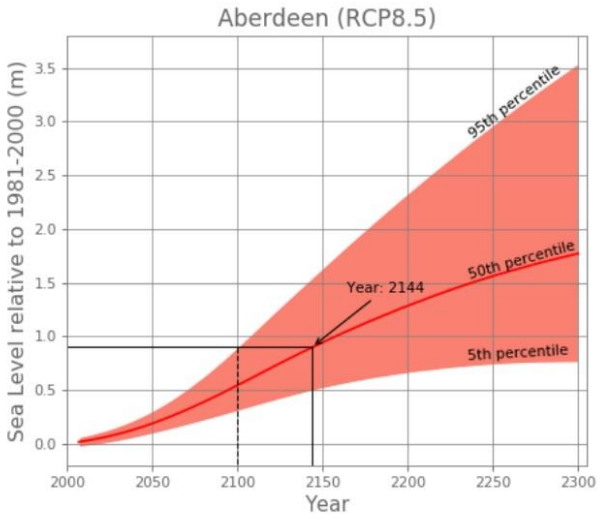


Figure 5 sea level rise projections to 2300 for Aberdeen

Sea level rise is recognised to be a key factor in the increasing extent of coastal erosion identified across Scotland's soft, erodible shores. It also underlies storm surges, thus increasing the apparent flooding frequency in coming decades. Uncertainties over future emissions and the environmental response are the reasons why it is important to use a range of projections (see 1, 2, 3 above).

Table 6 UKCP18 projections for a range of Scottish ports. Top table: relative sea level rise in metres above 1990 levels, bottom table rate of rise in mm/yr. Shading added for key levels and rates.

Name	Drummore			Millport			Stornoway			Kirkwall			Lerwick			Wick			Aberdeen			Edinburgh		
Yr	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%
2020	0.03	0.05	0.08	0.02	0.05	0.07	0.06	0.08	0.11	0.06	0.09	0.12	0.09	0.12	0.15	0.04	0.07	0.1	0.03	0.06	0.09	0.02	0.05	0.07
2030	0.05	0.09	0.14	0.04	0.08	0.13	0.09	0.13	0.17	0.1	0.14	0.18	0.13	0.17	0.22	0.07	0.11	0.16	0.05	0.09	0.14	0.04	0.08	0.13
2040	0.08	0.14	0.21	0.06	0.12	0.2	0.12	0.18	0.25	0.13	0.19	0.26	0.18	0.24	0.31	0.11	0.17	0.24	0.08	0.14	0.21	0.06	0.12	0.2
2050	0.11	0.19	0.3	0.09	0.18	0.28	0.17	0.25	0.35	0.18	0.26	0.36	0.23	0.32	0.42	0.14	0.23	0.33	0.11	0.2	0.3	0.09	0.18	0.28
2060	0.15	0.25	0.4	0.13	0.24	0.38	0.21	0.32	0.46	0.22	0.33	0.47	0.29	0.4	0.54	0.18	0.29	0.43	0.15	0.26	0.4	0.13	0.24	0.38
2070	0.19	0.33	0.51	0.17	0.3	0.49	0.26	0.4	0.58	0.27	0.41	0.6	0.35	0.49	0.67	0.23	0.37	0.55	0.19	0.33	0.52	0.17	0.31	0.49
2080	0.23	0.4	0.64	0.21	0.38	0.62	0.31	0.48	0.72	0.33	0.5	0.73	0.41	0.58	0.82	0.28	0.45	0.69	0.24	0.41	0.65	0.21	0.38	0.62
2090	0.28	0.49	0.79	0.25	0.46	0.76	0.36	0.56	0.86	0.38	0.58	0.88	0.47	0.68	0.97	0.33	0.53	0.83	0.28	0.49	0.79	0.25	0.46	0.76
2100	0.32	0.57	0.93	0.29	0.53	0.89	0.4	0.64	1	0.43	0.67	1.02	0.53	0.77	1.12	0.37	0.61	0.97	0.32	0.57	0.92	0.29	0.53	0.89

Yr	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%
2020	2	3	4	2	3	4	3	4	5	3	4	6	4	6	7	2	4	5	2	4	5	2	3	4
2030	2	4	6	2	3	6	3	5	6	4	5	6	4	5	7	3	4	6	2	3	5	2	3	6
2040	3	5	7	2	4	7	3	5	8	3	5	8	5	7	9	4	6	8	3	5	7	2	4	7
2050	3	5	9	3	6	8	5	7	10	5	7	10	5	8	11	3	6	9	3	6	9	3	6	8
2060	4	6	10	4	6	10	4	7	11	4	7	11	6	8	12	4	6	10	4	6	10	4	6	10
2070	4	8	11	4	6	11	5	8	12	5	8	13	6	9	13	5	8	12	4	7	12	4	7	11
2080	4	7	13	4	8	13	5	8	14	6	9	13	6	9	15	5	8	14	5	8	13	4	7	13
2090	5	9	15	4	8	14	5	8	14	5	8	15	6	10	15	5	8	14	4	8	14	4	8	14
2100	4	9	16	4	8	14	4	9	16	6	10	16	7	10	17	4	9	16	4	9	14	4	8	14

Communicating climate change and SLR through storylines

Developing storylines based on past events can help engage with stakeholders and increase awareness of risk e.g. what could happen if the surge event leading to the 1953 North Sea floods occurred in seas that were 0.5 m higher. Engaging stakeholders in the development of storylines at a local level will simplify the complexities of climate scenarios and help to illustrate the benefits (or drawbacks) of potential management options e.g. maintaining a sea wall or re-establishing a salt marsh. Engagement with stakeholders leads to qualitative rather than quantitative information and therefore it cannot be used to affect the formal economic appraisal of options but rather as a tool to assess policy choices more broadly and communicate actions to those impacted by sea level rises. Depending on the way storyline are framed, they may allow alternative futures to be compared to past events which will help communities and stakeholders understand the problem within a historical context.

Appendix 3. Adaptation Principles

Table 7 Principles of adaptation in the coastal context developed from the Climate Change Committee report 10 principles of adaptation.

	Principle	Coastal Context
1	A vision for a well-adapted UK	A vision for a well-adapted and resilient coast
2	Integrate Adaptation into other policies	Integrate coastal adaptation and resilience into other policies, by taking a more land use planning approach (including using planning-based language rather than engineering terms) and establishing formal planning protections. For land assigned to accommodate coastal change?
3	Adapt to 2°C assess the risks for 4°C	In coastal terms this requires us to adapt to the best estimates of sea level rise and the worst-case (high emissions) scenario.
4	Avoid lock-in	Avoid making decisions that lock-in future generations to unsustainable actions considering that sea levels are expected to continue to rise well beyond the end of this century. 'Hard' coastal engineering is an example, with both physical lock-in (seawalls/armour destroy the natural defensive function of coastal habitats) and behavioural lock-in (they also create expectation that the coastline can be protected forever, despite the high cost of repeatedly upgrading defences).
5	Prepare for unpredictable extremes	Climate change at the coast will result in future more severe and more frequent extreme events. Prediction of changes to storm severity, in particular is a very uncertain area of climate science. It is important to prepare in the face of this uncertainty.
6	Assess interdependencies	There should be a strategic and evidence-based approach to assessing interdependencies at the coast including linkages between erosion and flooding and how the risk to communities, their supporting infrastructure and the environment change with time.
7	Understand threshold effects	A time will come when current management at a particular location may no longer be viable or appropriate. There is a need to use a trigger based approach to denote when conditions have reached a point existing policies and risk

		management actions may no longer be effective, and the next stage of adaptation should commence.
8	Address inequalities	Sustainable coastal flood risk management should seek opportunities to support and regenerate communities and address inequalities. In particular, policy should anticipate that changes to property protection and property values will increasingly come into focus as adaptation pathways are developed.
9	Consider opportunities	Coastal flood and erosion risk management should deliver multiple benefits, (for example economic, environmental or amenity enhancements), should promote sustainable infrastructure and work to preserve natural features and ecosystems.
10	Funding, resourcing, metrics, research	This highlights the need for monitoring of both natural processes and built assets (especially coastal defences) together with our collective efforts to fund and deliver adaptive coastal management. Also highlights the need to identify research requirements essential to inform policy decisions / delivery and to support communication.

Appendix 4 Supporting and informing regulation

The Planning System

Scotland's planning system is used to make decisions about future development, and the use of land whether in towns, cities, the countryside or on islands. It decides where development should happen, where it should not, and how development affects its surroundings.

The planning system exists to manage the use of land and buildings in the long-term public interest. Decisions on planning applications are normally made by local planning authorities and need to be made in accordance with the statutory development plan and any other material considerations. The process of planning application decision making (granting or refusing planning permission) is referred to as Development Management.

The planning system is plan-led. The development plan sets out how places should change and what they could be like in the future. It identifies what type of development should take place where, and which areas should not be developed. It identifies locations for new homes, businesses and infrastructure, and protects places of value to people or wildlife.

The amended Town and Country Planning (Scotland) Act 1997 sets out that the development plan comprises the National Planning Framework (NPF), prepared by the Scottish Government, and the local development plan (LDP) prepared by local authorities.

The National Planning Framework sets out:

- a national spatial strategy which is a shared vision of how each part of Scotland can be planned and developed;
- 'national developments' which are developments of national significance to support the delivery of the spatial strategy;
- national planning policies including on climate change, flooding, coastal development and nature-based solutions; and
- delivery actions.

Local development plans set out:

- a local spatial strategy which is a detailed statement of the local authority's policies and proposals as to the development and use of land;
- The areas where new development should take place (e.g. for housing, business and industrial development), and where it should not (areas that should be protected from development); and
- Maps, site development briefs and masterplans, with minimal policy wording.

By taking account of current and future coastal erosion and flood risk, the development plan is an important tool for determining where coastal development should and should not take place.

Local authorities, either individually or collectively, have a duty to prepare regional spatial strategies to coordinate development and infrastructure at a regional scale. Regional spatial strategies identify:

- The need for strategic development;
- The outcomes to which strategic development will contribute;

- Priorities for the delivery of strategic development and
- Proposed locations for strategic development.

Regional spatial strategies do not form part of the development plan; however, the National Planning Framework and local development plans need to have regard to adopted regional spatial strategies.

National Planning Framework

NPF4 was approved by the Scottish parliament on 11 January 2023 and adopted on 13 February 2023. It notes that Local Development Plans should reflect the diversity of coastal areas and opportunities to use nature based solutions to improve the resilience of coastal communities and assets (page 51).

Local Place Plans offer communities the opportunity to develop proposals for their local area, expressing their aspirations and ambitions for future change. Local Place Plans were introduced by the Planning (Scotland) Act 2019, which contains a new right for communities to produce their own plans as part of the new Scottish planning system. Local Place Plans contain the community's proposals for the development and use of land and provide a new opportunity for communities to feed into the planning system with ideas and proposals. More information is available at Planning circular 1/2022: Local Place Plans.

NPF4 contains planning policies to address the Climate Emergency. These policies seek to address how local development plans should:

- strengthen community resilience to the current and future impacts of climate change identifying opportunities to implement natural flood risk management and blue green infrastructure.
- recognise that rising sea levels and more extreme weather events resulting from climate change will potentially have a significant impact on coastal and islands areas, and that a precautionary approach to flood risk including by inundation should be taken.
- recognise the importance of utilising nature-based solutions to coastal adaptation

Following its adoption, NPF4 now forms part of the statutory development plan, the primary basis for decisions made through Scotland's planning system.

The role of Coastal Change Adaptation Plans in supporting in supporting the planning system

CCAPs should inform local development plan policies and spatial strategies, land use allocations, and development management decision-making. CCAPs should also inform regional spatial strategies to identify coastal management issues that need to be addressed across local authority boundaries.

Local planning authorities are advised to pay due regard to the relevant CCAPs when:

- identifying areas at risk from coastal erosion and/or flooding;

- predicting longer-term coastal change and the implications for land use and development in coastal areas including establishing Coastal Change Management Areas (CCMAs)[9] in line with NPF4;
- identifying where future development and infrastructure should, and should not, be located in coastal areas including housing, business and industrial land allocations;
- identifying suitable locations for coastal defence infrastructure including nature based solutions;
- considering the requirements for infrastructure and assets that need to be relocated due to coastal erosion and/or flooding risk/impacts, should coastal protection be unfeasible;
- identifying natural features that protect the coast and how they might be safeguarded;
- formulating suitable development plan policies for coastal development, coastal erosion and flood risk.
- making planning decisions on whether, in principle, any coastal defence works or improvements would be acceptable, including the consideration of any impacts on the wider coastal system.
- making planning decisions on proposed development that could be affected by coastal erosion and/or flooding.

Relationship with other plans

CCAPs will contain data, spatial information and management approaches that can help to inform other coastal development and management plans. Preparation of CCAPs jointly by coastal stakeholders and local planning authorities will help to develop a co-ordinated approach to managing the coastal areas.

CCAPs will inform Flood Risk Management Plans and Local Flood Risk Management Plans. They should be aligned in terms of taking an adaptive approach to flood management including the relationship with managing erosion risk at the coast. The next cycle of Flood Risk Management Planning commences in 2022.

CCAPs will be one of several non-statutory plans supporting river basin management plans (RBMPs) needed under the EU Water Framework Directive. They will also help inform the National Islands Plan.

Scotland's National Marine Plan (2015) sets out strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles. Decisions made by public authorities (e.g. certain agencies, local authorities, harbour authorities) are required to be made in accordance with the National Marine Plan, unless relevant considerations indicate otherwise.

The National Marine Plan sets out a general policy (GEN 5) for addressing climate change through mitigation and adaptation efforts, as well as guidance for regional planning authorities.

[9] See Appendix 5 for more information on Coastal Change Management Areas.

Regional marine plans, which sit under the National Marine Plan, also contain statutory policies to guide marine authorisation and enforcement decisions by public authorities. These plans are prepared by Marine Planning Partnerships (MPPs) that are made up of marine stakeholders who represent the economic, environmental and recreational interests within a marine region. There are eleven marine regions around the coastline of Scotland extending from Mean High Water Springs out to 12 nautical miles. MPPs have been established in the Clyde, Orkney and Shetland, and these partnerships are currently preparing their first regional marine plans. It is anticipated that MPPs will be established in other areas of Scotland over the coming years.

Like the National Marine Plan, regional marine plans set social, economic and marine ecosystem objectives, and objectives relating to the mitigation of, and adaptation to, climate change. They also state policies for the sustainable development of the area to which the plan applies, which can include polices on matters such as climate change, coastal processes, coastal protection and nature conservation.

Regional Marine Plans and the relevant CCAP processes are advised to pay due regard to each other when:

- identifying areas at risk from coastal erosion and/or flooding;
- identifying suitable locations for coastal defence infrastructure including nature based solutions;
- identifying natural features that protect the coast and how they might be safeguarded, and
- formulating suitable policies for coastal development and policies to address coastal erosion and flood risk.

Where no regional marine plan is adopted, the Marine Policy Statement and the National Marine Plan will continue to apply.

In Scotland, marine plan boundaries extend to Mean High Water Springs and local development plan boundaries extend to Mean Low Water Springs. It is therefore important that these plans are appropriately aligned to ensure consistency in policy and spatial planning in intertidal areas and the wider coast. Local development plan jurisdiction extends to 3 nautical miles for marine fish farming only.

Appendix 5. How to use Dynamic Coast to inform Coastal Change Adaptation and Management

Dynamic Coast provides national and regional assessments of past and anticipated coastal change under a High Emissions Scenario (HES) and assuming a 'do nothing' coastal policy. As such, it uses coastal and sea level changes to calibrate future coastal erosion under anticipated future Relative Sea Level Rise (RSLR). The indicative maps do not show a certain future but an informed estimate of the order of magnitude of change to be updated as time goes on. They should be used in an ongoing and staged process with continuous monitoring to better inform decision making, and resilience and adaptation planning.

The anticipated erosion areas from Dynamic Coast (map layers called Future Erosion 2050 & 2100) provide planners with indicative areas of increased coastal erosion risk that should be considered in any CCAP and ideally all planning decisions. The maps also show the supporting information, so that the reliability of trends can be considered in the context of any update of data needed to enhance the robustness of planning decisions and identifying further monitoring required for the CCAP process.

Dynamic Coast analysis applies only to those shores which are likely to experience the greatest future change, i.e. erodible natural shores on wave dominated coasts- typically those with beaches. No analysis was undertaken for rock-dominated shores (where erosion is far slower) or salt marsh-dominated shores (where shoreline change is more influenced by tidal processes). The absence of any coastal change projections on such shores does not imply future stability, simply an absence of projections under the Dynamic Coast method. Erosion may occur beyond the anticipated erosion shown on the maps. For artificial shores (built defences or made ground), Dynamic Coast mapping shows a fixed amount of erosion by default; extra data sets need to be examined, such as the underlying susceptibility to erosion if defences are not maintained into the future.

The Dynamic Coast maps should not be interpreted as the 'final and complete prediction on the next 80 years', these maps provide our current expectation of future changes, assuming a High Emissions Scenario and no management intervention. There is an expectation that monitoring will continue thus any future erosion that unfolds will be incorporated within subsequent updates to the maps. As mentioned elsewhere in this guidance and reiterated here; given the uncertainty there is with climate change, coastal change and our coastal management decisions in the coming decades, it is appropriate to take a precautionary approach.

A step-by-step guide to using Dynamic Coast (DC) to inform Coastal Change Adaptation and Management, for planners and/or their consultants

1. Consider coastal sediment circulation cells & sub-cells and define coastal management units (CMU) based on boundaries (e.g. headlands, deep water proximity, sediment transport directions, seawall absence/presence etc). These CMUs are the geographically constrained and consistent areas within which coastal changes and management

decisions are determined. They should be defined such that actions within one CMU will not substantially influence coastal processes within adjacent CMUs.

2. Within each CMU, conduct a Coastal Erosion and Flood Risk Assessment, considering the location of both existing local assets (buildings, roads, flood protection features etc) and Local Development Plan proposals against the anticipated risks of coastal change (Identified from DC maps) and coastal flood risk (from SEPA maps and DC).
3. Assess the quality of the data supporting this (i.e. consider the currency of the data (check DC map supporting data), uncertainty, local considerations etc).
4. If data is not adequate, consider more data gathering and plan monitoring options. Once improved return to step 2.
5. If supporting data is adequate, define Coastal Change Management Areas if not already done so (i.e. the area expected to be at risk by 2100 for erosion and or flooding[10]).
6. Evaluate resilience and adaptation options within Coastal Change Management Areas.
7. Undertake community consultations on resilience and adaptation options within Dynamic Adaptive Pathways. The earlier this can start the better to include local views and concerns.
8. Develop local schemes to progress resilience and adaptation actions on the ground.
9. Undertake the scheme (do the resilience or adaptation works).
10. Continue to monitor and periodically review the adaptation plan to consider decision points.

[10] Coastal Change Management Areas A National Overview (sweep.ac.uk)

How to use the maps

The Dynamic Coast evidence base on coastal change is available via a series of interactive webmaps (link), WMS data to display within desktop GIS software or down-loadable data. Such an approach ensures that different users can interact with the data in different ways. For example, quick questions can be informed via the webmaps, which can also be used by those with limited mapped experience; whilst more advanced questions and analyses are available via desktop software using local copies alongside third-party data.

What do the webmaps show?

A list of available datasets and an explanation is available via the data list.

The Basic webmaps shows the key coastal change data (historic and current shoreline positions) alongside modelled future shoreline positions, under a High Emissions and Do Nothing coastal management strategy. The land area anticipated to be lost by 2050 and 2100 is also shown and has been used to identify assets at risk (see WS2RA for further detail).

The Advanced webmap shows additional data including the coastal cells, sediment drift directions, outputs from Coastal X-Ray and Coastal Zone Classification summarising the density of assets (road, rail and properties) within each 1 km coastal segment.

The Coastal Erosion Disadvantage webmap shows a classification of social vulnerability (inland areas grouped from most socially vulnerable to more socially resilient) alongside the anticipated erosion. When these are combined, we appreciate Coastal Erosion Disadvantage.

The Coastal X-Ray map shows the relative elevation of the UK and island of Ireland's shore, derived from satellite imagery. It shows the average elevation since 2015.

The HES/LES webmap shows side-by-side maps of anticipated coastal erosion (under a Do Nothing coastal management strategy) comparing a High Emissions future with a Low Emissions future. Such maps are indicative but provide an impression of the residual risk even if aggressive emissions reductions are enacted.

How to set-up desktop a GIS with Dynamic Coast data

Dynamic Coast data can be visualised within a Geographic Information System, alongside other data to provide a rich an informative understanding of coastal change, asset locations, risks to inform management options. The datasets listed below should be taken as a starting point, and planners and other users can supplement or replace datasets as they require.

If your organisation is a member of the PSGA, you can request an ArcMap template or a QGIS template, from the following links (dynamic.coast@nature.scot).

These templates include:

DC2 General Results:

1. Marine flood levels & RSLR data (Flood levels etc) (Basic Webmap)
2. Anticipated coastal erosion (Future MHWS, 2050 & 2100 Erosion maps) (Basic Webmap)

3. Coastal change data (Transects) (Basic Webmap)
4. Shoreline data (1890, 1970, OS Smart MHWS & all available MHWS lines) (Basic Webmap)
5. Coastal defences (lines and polygons) (Basic Webmap)
6. Uncertainty (Basic Webmap)
7. Coastal Zone Classification (Developed, Less and Undeveloped shores) (Advanced Webmap)
8. Coastal Zone Classification (assets within 50 m of MHWS, NCERA results per 1 km coastal segment)
9. Coastal Type (Advanced Webmap)
10. Vegetation Edge (Advanced Webmap)
11. X-Ray derived shorelines (Advanced Webmap)
12. Coastal Erosion Disadvantage (Social Vulnerability by datazone, & CED raster) (CED webmaps)
13. Coastal erosion enhanced flood polygons (SEPA's CC flood polygons incl. risk of erosion) (not yet avail as webmap)
14. HES, MES & LES results are also available. (LES and HES shown on COP26 page)

DC2 sampled 3rd party data

15. Asset data (Original and Eroded under HES & DNCMS)
16. Local authority boundaries and link to SMP (if available).
17. UKCP18 RSLR projections

Background data

18. OS Zoomstack
19. SEPA's flood data (all flood sources)
20. SG RSWG LiDAR index
21. LiDAR raster (Scot Gov LiDAR Portal WMS)

A step-by-step guide

1. Planner/Consultant looks at Dynamic Coast maps
2. Considers cells & sub-cells, considers management units (via cells data and sediment arrows)
3. Reviews all shore line positions (via 1890 - latest)
4. Considers 2050 and 2100 erosion against assets (via built assets and flood polygons)
5. Considers rates of change, currency, confidence etc (via Transect data)
6. Review Coastal X-Ray, low water and vegetation edge data (via X-ray or Advanced Map)
7. Consider if the data current and does it support a clear reliable interpretation? Would additional data improve understanding? Are there local aspects that have not been incorporated within Dynamic Coast analysis?
8. If erosion is reliably evidenced, then consider implications for planning on adjacent land use.
9. Are there terrestrial aspects which may curtail or exacerbate erosion (see rock head elevation, or negative gradients).
10. If erosion isn't reliably evidenced, then consider monitoring and improvements alongside planning considerations.

Appendix 6 Other considerations for Coastal Change Adaptation Plans

Taking **a place-based approach** uses placemaking to deliver multiple benefits by considering all the physical, social, and economic elements of a place collectively. Place-based working can identify key relationships and solve problems that cannot be solved incrementally or by one person or organisation acting alone. It can produce more than the sum of its parts by generating novel approaches, bringing in resources or tackling root causes. A place-based approach is about understanding the potential of a place and coordinating action to improve outcomes, with community participation at its heart. Using a place-based route to coastal management and change is likely to yield greater buy in from local stakeholders than traditional approaches to policy development and consultation.

Biodiversity strategy to 2045: tackling the nature emergency sets out a clear ambition: for Scotland to be Nature Positive by 2030, and to have restored and regenerated biodiversity across the country by 2045. Our vision is:

- By 2045, Scotland will have restored and regenerated biodiversity across our land, freshwater and seas.
- Our natural environment, our habitats, ecosystems and species, will be diverse, thriving, resilient and adapting to climate change.
- Regenerated biodiversity will drive a sustainable economy and support thriving communities, and people will play their part in the stewardship of nature for future generations.

Coastal management, if considered from a multiple benefits perspective can be an important means to promote nature-based solutions which reinstate, restore and protect natural habitats and enrich Scotland's biodiversity.

Climate Change mitigation and carbon capture

Scotland's climate change legislation aims for net zero emissions of all terrestrial greenhouse gases by 2045. A strong response to climate change is part of Scotland's planned 'green recovery' from COVID-19, an economic recovery that moves toward net zero emissions in a way that is both fair and maximises opportunities to deliver a thriving, sustainable economy. To meet Scotland's targets, a rapid transformation across all sectors of our economy and society is required. Cutting carbon emissions and capturing greenhouse gases requires action from everyone and all investment will need to consider how to further national climate goals. The Infrastructure Commission for Scotland is clear that all infrastructure investment decisions should be prioritised based on their contribution to inclusive net zero carbon economy outcomes. Infrastructure projects should be designed in a way which minimises their emissions of greenhouse gases to the atmosphere, and by the support, restoration or creation of green infrastructure which allows for the capture of excess greenhouse gas emissions from the atmosphere and storage in habitats such as saltmarsh, seagrass, wetlands and woodlands.

Social justice and the Just Transition

The transition from a carbon intensive economy to net zero will impact Scotland's whole economy and necessitate an economic transformation. The Scottish Government and Just Transition Commission see the transition away from a fossil fuel-based economy as an opportunity to seek out lasting positive societal change: for example, by choosing climate

change actions which deliver social justice and do not leave any community behind. Action will be needed at the national and local government level to ensure fairness will be integral to securing and maintaining support for the scale and pace of change required. In terms of how this agenda maps across to coastal management, it will important that coastal management actions deliver multiple benefits and support efforts to decarbonise, to enhance biodiversity and be resilient in the face of the impacts of climate change that are already here and those anticipated to impact on future generations. It is also imperative that the costs for resilience do not burden those least able to pay, the benefits of the transition are shared amongst all communities, and that the costs of climate change do not become a burden for future generations. Dynamic Coast's coastal erosion disadvantage (report and interactive webmap) inform aspects of social justice within CCAPs.

The Wellbeing Economy

In many countries around the world, there is a growing realisation that economic growth is not the only measure of a successful society. There is a growing realisation that we must give much greater priority to the wellbeing – and the quality of life - of people and to the health and wellbeing of the environment upon which we rely. Building a Wellbeing Economy is now a national policy priority in Scotland and is core to the National Strategy for Economic Transformation. Building a Wellbeing Economy means building an economy which delivers social justice and environmental health for all; an economy that is inclusive and that promotes sustainability, prosperity, and resilience, where businesses can thrive and innovate, and that supports all our communities across Scotland to access opportunities that deliver local benefits and wellbeing. There are several ways in which wellbeing economy concepts translate to coastal management, for example: ensuring that options appraisal and success criteria of coastal actions extend beyond financial metrics.

Appendix 7 Communication and Engagement Plan

Within the context of the CCAP process the National Standards for Community Engagement (NSCE) should be used by public sector bodies and elected representatives to plan how to involve communities to shape local plans, identify who should be involved, and make sure that the community engagement process is inclusive, fair and effective. The NSCE includes seven components, all of which should be addressed in any communications pertaining to the CCAP process. These are:

1. Inclusion
2. Support
3. Planning
4. Working together
5. Methods
6. Communication
7. Impact

Each of the seven standards sets out clear principles for effective community engagement. They provide detailed performance statements that everyone involved can use to achieve the highest quality results and the greatest impact. The NSCE are not designed to replace existing community engagement or participation frameworks. Rather they are intended to act as a central benchmark and reference point for best practice, and reflect developing policy relating to participation, engagement, and community empowerment in Scotland.

Communication needs to be a central pillar of the CCAP process. There is no avoiding the fact that the changes facing our coastal communities over the coming decades will be hard to communicate and difficult to accept for those whose homes and livelihoods are at risk as sea levels rise. There will be many difficult conversations between those that stand to lose assets to inundation and those in local and national government that traditionally have been tasked with protecting our coasts, but who, in the future may no longer be able to achieve this. Clear communication on how sea level rise is expected to impact upon the coast is important as are the uncertainties in the timescales for those changes to occur. Communicating and engaging with local stakeholders including politicians, residents and local businesses is a vital part of moving people on the emotional journey of accepting future risks and the changes that are coming and is essential in developing collaborative solutions which offer multiple benefits to coastal change.

The traditional approach to shoreline management planning whereby a draft plan is produced and put out for consultation at a relatively late stage in the process, is not appropriate for the conversations that we need to have about future coastal change. The most sustainable solutions come from involving many perspectives and insights at an early stage. Inclusive processes give greater ownership of the solutions and empowerment to people and communities. Taking a place-based approach to climate change adaptation necessitates involving communities from the outset. CCAPs are not something that should be done ‘to’ communities, rather they should be developed, reviewed, communicated, and

updated in a long-term partnership between practitioners, residents, and businesses. Communities and other stakeholders will have valuable information to contribute as to how the coast behaves, what the key drivers on the coast are and how the coast can be adapted to accommodate change in a managed and sustainable way.

Working in collaboration takes time and careful management but will allow the CCAP project team to reach and engage new audiences, create opportunities for follow-up and legacy and lead to better knowledge-exchange. The purpose of communication and engagement within this process is to deliver a strong, effective and community supported change process that allows all stakeholders to plan and prepare themselves for the changes coming and ensure that all voices can participate in a conversation embracing solutions based on local knowledge. Effective stakeholder participation and engagement requires adequate resources and specialist skills within CCAP project teams.

The conversations that CCAPs will generate will get more difficult as sea level rises, yet communication charged by emotion often leads to misunderstanding and distrust. Communities need planning bodies and regulators to provide clear signals and long-term messaging on sea level rise and coastal change. Therefore, it is important to develop a communications and engagement plan early in the CCAP process and that it remains an integral part of the CCAP. It should be regularly reviewed as changes at the coast progress (and as regulatory, policy and financial mechanisms for compensation change) to ensure that it stays relevant (See Appendix 6 for an exemplar communications and engagement plan).

A CCAP Communications Plan should be specific to each location, but the following good practice may be universally appropriate:

- Begin the process by mapping key local stakeholders and community groups and institutions by which they can be engaged.
- Base the communications plan on best practice standards for engagement and pre-existing tools.
- Use multiple communications channels and formats to maximise exposure of the message to as many people as possible within the local community and reduce language and accessibility barriers.
- Provide the opportunity for local people to share their lived experience and local knowledge helps local stakeholders feel a sense of agency. It is important to recognise that this tacit knowledge should be respected and provides additional, beneficial detail and a social context that will enhance the CCAP and allow local stakeholders to take ownership of the plan.
- Include underrepresented voices and marginalised communities. In many instances this is best enabled by relying on local expertise (i.e., neighbourhoods' teams, youth workers, those with disability and accessibility expertise, translators, refugee and migrant groups, voluntary organisations, community groups) to identify who these communities are and how best to engage them.

- Communities have voiced frustration about past placemaking efforts as perceived to be one-way and that stakeholder's queries and comments are not satisfactorily answered in a timely fashion. Provide and sustain communications routes for the community to ask questions (and to receive timely and accessible answers), and for solutions to be cocreated between practitioners and the community and opportunities to influence the process to be communicated well in advance.
- Foster broad, long-term, external engagement and working relationships with key actors in the area including organisations which may not have been engaged with in the past such as:
    - Adaptation Scotland whose Scottish Government funded programme is delivered by the sustainability charity Sniffer to help the public sector, businesses and communities understand what climate change will mean across Scotland and identify the best way for them to plan for the impact – taking the opportunities and preparing for the risks.
    - The Scottish Communities Climate Change Action Network (SCCAN) supports community-led action to address the climate and nature emergency and work for a just, thriving, and resilient Scotland. SCCAN has an excellent understanding of community action across Scotland,
    - Community Development Trusts are in the vanguard of community led regeneration in many locations,
    - Community Climate Action Hubs have been established to provide support in local areas, and facilitate better networking, ensuring a joined-up approach is being taken to tackling climate change at a regional level.
- Connect with different actors within your own organisation. Dealing with coastal change will impact on a wide range of local government policy areas and services and it is vital to communicate well within a local authority and to liaise with colleagues from other teams to make use of their expertise. For example, it is valuable to work closely with local communities and neighbourhood officers to ensure that marginalised voices are heard and to build upon local knowledge and experience.
- Good communication and engagement are about more than content and coverage. and how we communicate with people is what differentiates between success or failure. The experience of climate change communication campaigns suggest that facts and figures are not very motivating for many people and that novel communication styles are needed to provide the social and emotional narratives that allow people to make sense of the science i.e.;
    - Develop narratives based on values that are locally relevant.
    - Use story-telling approaches to create a narrative that people can relate to.
    - Work with creative practitioners, such as local artists, writers, photographers, filmmakers, and social media users to connect people to the science, inspire people to think about solutions, help convey messaging in engaging ways and to encourage local people to create their own content on the topic of coastal change.

- Citizen science projects involving local schools and colleges and / or social media can gather evidence to help local people accept the reality of coastal change, for example citizen science projects can be used to identify coastal change and help identify trigger points.

Communications tools and standards to use

Engaging with local stakeholders in a more effective and meaningful way than the traditional approach to consultation may include the following tools / standards in your communications plan:

National Standards for Community Engagement

The National Standards for Community Engagement are good-practice principles designed to improve and guide the process of community engagement. The NSCE defines community engagement as "a way to build and sustain relationships between public services and community groups - helping them both to understand and take action on the needs or issues that communities experience".

Within the context of the CCAP process they will be helpful for public sector bodies and elected representatives to help them plan how to involve communities in shaping local plans, identify who should be involved, and ensure that the community engagement process is fair and effective.

Place based framework

Place is at the forefront of the current Scottish policy context. It plays a key role in government priorities, in infrastructure investment, climate action, and planning policies. Taking a place-based approach involves dealing with complexity, recognising that to achieve real change demands tackling more than one thing at a time. A consistent approach is needed, and this is what the Place Based Framework is designed to provide. The Place Based Framework is also intended to build on existing good work across Scotland and provide a mechanism for how place-based working can be implemented effectively on the ground.

Scottish Futures Trust have harnessed learning from their work with local authorities, public bodies, and communities across Scotland to develop a new Place Guide which is a practical, step-by-step approach to implementing the place agenda collaboratively. The process is summarised in the graphic below:

Place Standard with a Climate lens

The Place Standard Tool (PST) is an effective and widely used means for considering the places and environments we live, work, and play in, with a focus on health and wellbeing. It provides a simplified framework to help stakeholders (organisations, communities, businesses, etc.) consider the physical and social elements of places, and it challenges organisations to have targeted and timely conversations to help inform and initiate action towards positive outcomes. The Place Standard Tool (PST), in use in Scotland since 2015, can be used at any time when people want to discuss the current state of a place, and to consider its future. While the Place Standard Tool was not designed as a climate change tool, good place-making is essential for designing a robust local response to the climate emergency, such as taking local action to cut emissions and to increase resilience to local climate change impacts. A Place Standard Tool with a Climate Lens (PST CL) can be used to help understand how climate change might play out in a local area, and support communities to design their future place. This video may also be useful tool when working with communities.

Adaptation Capability Framework

The Adaptation Capability Framework (ACF) developed by the Adaptation Scotland Programme, identifies capabilities that every public organisation needs to adapt to climate change impacts such as rising sea levels and provides tailored, step by step tasks to guide adaptation. While the ACF looks to advance the adaptation actions of public sector bodies on an organisational level, many of the tasks within the guide are useful at a project level where adaptation needs to be considered and as such are useful when considering how to communicate the CCAP process.

The following ACF tasks provide a step-by-step guide which could assist with developing a communications plan for a CCAP:

- WTC2 Develop communication and engagement activities with partners;
- WT3B Engage a wide range of stakeholders;
- WT4B Sustain engagement with partners and stakeholders.

Other resources

- Climate Change Public Engagement Strategy
- Britain talks Climate is an evidence-based toolkit designed to support any organisation that wants to engage the British public on climate change. It offers a shared, strategic understanding of the British public, and – against a backdrop of growing concern about polarisation – identifies effective ways to engage across the whole of society.
- Talking climate handbook – how to have a climate change conversation is an evidence-based, practical guide to help with difficult climate change conversations.

The handbook is based in part on a citizen science project with over 550 individuals from over 50 countries and includes how to run a Talking Climate workshop with guide, slide deck and script.

- Communicating climate change adaptation – a practical guide to values-based communication is part of the Adaptation Scotland programme providing clear, concise summaries of the principles of engagement, importance of message framing, telling positive stories and engaging with people on all parts of the political spectrum. Practical examples are included of how public bodies, the private sector and communities in Scotland can use the principles in their work.
- Sell the Sizzle is a seminal report on climate communication and sets out how to design compelling climate messages to change attitudes and behaviours.
- Communicating climate change adaptation: A practical guide to values based communication | weADAPT is a how to guide that introduces values based climate change communication.

Appendix 8 Wider Policy Links

Coastal adaptation needs to be embedded into all our future thinking at the coast.

Scottish Government provide funding support to SEPA and Local authorities to undertake various tasks as shown in Table 7. To support coastal adaptation, it is important that the organisation undertaking these tasks are encouraged to embed an adaptive approach to the management of coastal areas. This will allow the funds provided by Scottish Government through the new Coastal Change Adaptation funds (directed mainly at erosion) to be applied in conjunction with existing funding streams (Table 2) to provide a whole coast approach to adaptation. Coastal Change Adaptation Plans need to consider the full range of pressures on the coast including coastal erosion, coastal flooding and aging / obsolete defences or other structures that provide a defence.

Table 8 Tasks requiring funding and lead organisation

Task	Organisation	Need
Mapping and Modelling	Mainly SEPA	Visualisation of multiple scenarios in flood hazard and risk maps. New Product.
Strategic Planning	Lead by SEPA – Agreed by Partners	Flood Risk Management Plans to incorporate more adaptive FRM planning especially at the coast. Requires adaptive mapping and modelling improvements first
Flood Studies	Mainly LAs	Consideration of a range of outcomes in relation to coastal flood hazard and the application of dynamic adaptive approach in all (coastal) flood studies. New Guidance.
Works and Schemes	Mainly LAs	Works and schemes must consider future change including sea level rise. An adaptation plan should be developed to manage this uncertainty. Links to updated Options Appraisal and Adaptation Planning Guidance, and SG / SEPA / COSLA prioritisation work
Provide new and adapt or maintain existing infrastructure	Other Infrastructure Providers, including Transport Scotland, Network Rail, Scottish Water etc	New and existing infrastructure must consider future change including sea level rise. An adaptation plan should be developed to manage this uncertainty.

There are a range of potential funding streams which can be used on their own or in combination to address coastal adaptation (Table 8). The types of funds include direct support from Scottish Government to Local Authorities to manage flood and erosion risk; funds to support restoration of natural features that may have flood or erosion benefits; and funds that are available directly to coastal communities to improve resilience or help them adapt as communities.
As part of developing coastal adaptation plans, funding strategies to deliver the requirements of the plans should be considered.

Table 9 Potential funding streams to address coastal adaptation

Name	£ / year	Recipient	Notes / Links
Coastal Change Adaptation Fund (Capital budget)	£11.7m 2022-2025	24 Coastal local authorities	https://www.gov.scot/news/support-to-protect-scotlands-coastlines/
Revenue Budget	~£0.8m per year	24 Coastal local authorities	based on soft shoreline length (from Dynamic Coast 1). {Funding group to consider improvements}
Crown Estate Revenue Budget		Local authorities	
Coastal Community Funds	Varies locally	Coastal communities	Varies funding opportunities available to coastal communities. Includes windfarms, coastal community funds.
SMEEF Scottish Marine Environmental Enhancement Fund		Applications	https://www.nature.scot/SMEEF
Nature Restoration Fund		Applications	https://www.nature.scot/funding-and-projects/scottish-government-nature-restoration-fund
Grant Aid for Flood Protection	£42m per year	Distributed to local authorities	This is the element of the general capital grant available to local authorities to invest in flood protection measures
Flooding Revenue Money	~£3m per year	Distributed to local authorities based on flood risk	To support flood risk management planning
Community Funding		Applications	Suggested links to search for community funding: Funding Support - Scotland's Towns Partnership (scotlandstowns.org) Funding Scotland SRN Funding Search | Scottish Rural Network

End of Document.