Our coastline is changing

We live in a part of the country with a unique and dramatic coastline, with coastal landscapes and seascapes that have been shaped by natural processes over geological timescales. Evolution of the shoreline is usually gradual but occasionally rapid and dramatic and it always involves change of some kind, but change also represents a threat to some coastal communities. In the past, attempts have been made to stop the effect of erosion or flooding. Rates of erosion and incidents of flooding are expected to increase by the end of this century, because of increasing storms and rising sea levels brought about by climate change. Protecting our coastal communities in traditional ways will become increasingly difficult.

This document provides a summarised overview of the Shoreline Management Plan (SMP) Review for Cornwall and the Isles of Scilly from Rame Head on the south coast to Hartland Point in the north. Over the last two years the first SMPs for Cornwall and the Isles of Scilly have been reviewed and updated, using the latest knowledge and with wider consultation. The end result is an updated Shoreline Management Plan (SMP2). The purpose of this summary document is to firstly provide an overview of the SMP process and its objectives and secondly to highlight issues specific to this SMP area and the most important conclusions of the SMP2. It is divided into the following sections:

1. What is a Shoreline Management Plan?
2. Background to the Cornwall & Isles of Scilly SMP area
3. Main issues
4. Main conclusions
5. The Action Plan

1. What is a Shoreline Management Plan?

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. The two most important aims are:

- To reduce the threat of flooding and coastal erosion to people and their property.
- To deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.

The SMP is a non-statutory policy document for coastal defence management planning. It takes account of other existing planning initiatives and legislative requirements, and is

intended to inform wider strategic planning. It does not set policy for anything other than coastal defence management but is targeted at achieving greater consistency in the assessments and presentation of coastal plans.

Policy Options

The generic shoreline management policy options considered in SMP2 are defined by the Department of the Environment, Food and Rural Affairs (Defra). They are outlined in the following statements:

Table 1. SMP2 Policy Options

No active intervention (NAI):	A decision not to invest in providing or maintaining defences or natural coastline.
Hold the line (HTL):	Maintain or upgrade the level of protection provided by defences or natural coastline.
Managed realignment (MR):	Manage the coastal processes to realign the 'natural' coastline configuration, either seaward or landward, in order to create a future sustainable shoreline position.
Advance the line (ATL):	Build new defences seaward of the existing defence line where significant land reclamation is considered.

N.B. The choice of a policy option that requires action does not guarantee that funding will be available from the public purse (or any other funding source) to carry it out.

Working in partnership – who reviews the SMP?

The SMP Review has been completed on behalf of Cornwall and the Isles of Scilly Coastal Advisory Group (CISCAG). Members of CISCAG formed the SMP **Client Steering Group**, including representatives from the Local Authorities, Environment Agency, Natural England, English Heritage and the National Trust, who have overseen and guided the production of this plan. In addition, **Elected Members Forums** were established for the councils of both Cornwall and the Isles of Scilly. The forums each comprised a number of elected councillors and provided guidance and representation of the local wards and Town and Parish Councils. They have also acted to formally endorse the plan and recommend its adoption to the Full Councils.

CISCAG commissioned consultant engineers Royal Haskoning to prepare the SMP Review and undertake the technical assessments. Coast and Country Projects Ltd were commissioned to undertake project management of the work and funding has been provided by the Government through Defra.

Why have they been reviewed now?

The first SMPs for Cornwall and the Isles of Scilly were developed and adopted by the Local Authorities in the late 1990s. Significant progress has since been made in the understanding of how climate change and sea level rise may affect the coast and there has been an important political shift towards longer term sustainable development and land use planning. There was, therefore, a need for the original SMPs (and indeed all SMPs covering England and Wales) to be reviewed.

What do we do to review the SMP?

There are four principal stages in reviewing the SMP:

- Technical assessments
- Policy development
- Consultation
- Adoption and finalisation

Technical assessments

The initial stage of review is the undertaking of a number of assessments that provide the basis for development of the preferred plan and policy. This includes a comprehensive review of the coastal and estuarine processes; a review of the coastal defence structures which are present; a thematic review of all the assets (natural assets, heritage, property, community infrastructure, transport links) along or adjacent to the shoreline; an economic assessment of the built environments and the costs of maintaining and building defences and environmental assessment – a Strategic Environmental Assessment (SEA) and a Habitat Regulations Assessment (HRA) are carried out to provide a sustainability audit of the proposed policies.

Policy development

The SMP Review provides a long-term policy framework over the next 20, 50 and 100 years to guide the management of the coast. The policy can change between these time periods (called epochs) to give communities time to adapt to coastal change. It is important to note that the implementation of these polices through specific actions is dependent on funding being available and the necessary planning and consents being in place. The SMP area is divided into 259 individual policy units, each with a preferred policy option for each of the three time periods up to the year 2105.

Consultation

Seeking the views of the coastal communities and the main interested groups (organisations like the National Trust, the Duchy of Cornwall, The Royal Society for the Protection of Birds (RSPB) and Wildlife Trusts) has been essential in selecting appropriate policy choices in

each location. We have also consulted closely with elected councillors across the SMP area through our Elected Members Forums, (as described above). Throughout the review, a large number of local meetings, road show drop-in events and tailored presentations have been undertaken, to make as much information available to interested parties at all times. The official public consultation period ran from March 2010 to June 2010 and throughout this period consultation meetings and events took place. In addition, the SMP2 website has made all documents and revisions of documents available throughout the official consultation period and will now host the full set of completed SMP Review reports.

Adoption and finalisation

The final stage of the SMP Review is the adoption of the plan by the Local Authorities and partner organisations. This is important as it officially signifies that everyone involved has 'signed-up' to the plan and have come to agreement on the best way forward in managing the shoreline over the 100 year time-frame of the SMP. This process has been undertaken during June – December 2010 and incorporated presentations to the full Councils and submissions of the full SMP Review to the Environment Agency's National Quality Review Group. At the end of December 2010, the final sign-off required for adoption of the plan was achieved and the SMP Review has subsequently been published.

This document provides a summary of the main SMP report. The full SMP document can be accessed at the CISCAG website: **www.cornwall.gov.uk/smp**.

2. Background to the Cornwall & Isles of Scilly SMP area

This SMP is a review of the first SMPs produced for the study area over 10 years ago. This SMP Review (or SMP2) has been developed on behalf of Cornwall Council (CC) and CISCAG. The SMP2 has been supported throughout its development by a Client Steering Group (CSG).

The SMP2 document sets out the results of the first revision to the four original SMPs for the area of coast extending from Rame Head (in the south) to Hartland Point (in the north); covering the majority of the Cornish coastline along with the Isles of Scilly and a small section of the Devon coastline between Morwenstow and Hartland Point. See Figure 2.1 below. A key difference in the updated plan is that it now covers all of the estuaries, tidal inlets and creeks up to the normal tidal limit. This now means that the plan covers nearly 1,000km of shoreline, inclusive of the estuaries and tidal waterways and the Isles of Scilly.

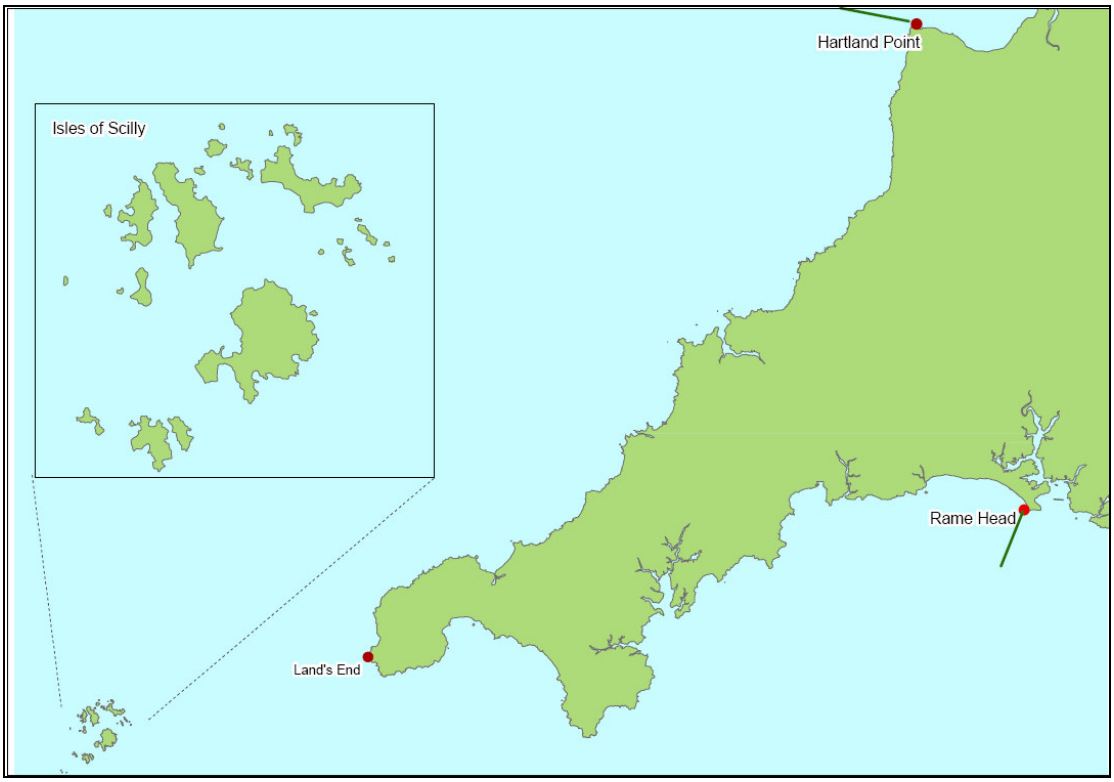


Figure 1. SMP2 plan area

The physical coastline

The south-west peninsula of England, including Cornwall and the Isles of Scilly has effectively formed as a drowned landscape, following downward movement of southern Britain after the retreat of the ice-cap at the end of the last ice-age, some 14,000 years ago. Although the ice-cap did not reach beyond the north coast of Cornwall, glacial melt-water streams and the onshore transport of eroded glacial material from the degrading ice-cap in the Celtic Sea, supplied huge amounts of sediment to the coasts. Rising and falling sea levels have also played a huge role in shaping the present day coast.

The geology of the entire coastline of the SMP area, from Rame Head to Hartland Point and including the Isles of Scilly, consists almost exclusively of ancient, resistant rock. Large tracts of the shoreline are dominated by rugged and steep sea cliffs which plunge straight into the sea with little or no intertidal area. These hard cliffs are primarily formed of the two dominant geology types - slates and granites.

The geomorphology and general shape of the SMP coastline is characterised by hard, craggy cliffs; resistant headlands; small and medium sized bays containing wide sandy beaches; rocky coves containing smaller pocket beaches formed from sand, gravel and cobbles; large areas of both relic and mobile dunes (locally often referred to as ‘towans’) and several examples of drowned river valleys, such as the Helford River system and the Camel Estuary. Many of the smaller bays and coves around the coastline coincide with minor faults in the bedrock geology.

The SMP coast experiences one of the highest energy wave climates in the British Isles, due to its extreme westerly mainland and (offshore) location and its predominantly south-west, west and north-westerly facing shorelines. In common with other high wave energy and hard geology environments in the British Isles, such as south-west Wales, the west coast of Ireland and the west coast of Scotland, the wave climate has been extremely influential in shaping a rugged coastline from the resistant geology. Therefore the consideration and understanding of waves and the energy they deliver to the coast, is essential in undertaking an effective review of the SMP.

The wave climate is very seasonal. Although large waves can occur at any time during the year, the autumn, winter and late spring period (October to April) generally experiences a much more energetic wave climate than the late spring and summer period. During the winter months the North Atlantic produces waves more consistently than any other ocean and much of that energy reaches the west coast of Britain. Much of the wave energy reaching the Cornwall and Isles of Scilly coasts is in the form of swell. Swell waves are generated great distances away in the North Atlantic by low-pressure systems and lose very little energy even after travelling thousands of miles. Swell waves tend to be different from locally generated ‘wind waves’ and storm waves.

Flooding and erosion, climate change and sea level rise

The shoreline, in whatever form it takes, is constantly under attack from the sea, through the effects of waves and tides. These forces have shaped the present day coastline over thousands of years. Therefore erosion risks and flood risks have always been present and as there is so much human settlement in areas directly exposed to these risks, we have been managing these risks by building seawalls, breakwaters, groynes and piers for hundreds of years. Around the coast, many examples of erosion can be seen, often adjacent to defences built to defend against the erosion.

Examples of erosion are found regularly in Cornwall wherever the hard cliffs give way to the softer glacial geology and sand dune areas.

Above left: Erosion caused by both waves and surface water run-off at Porthtowan.
Above right: Erosion of the foredunes at Constantine Bay.
Below left: Garden steps now stand isolated on the beach at Downderry, demonstrating how the cliffs have eroded.
Below right: Drainage pipes emerge where the low head cliff at Coverack has retreated.

Left: The Isles of Scilly, despite their granite origins are not immune from erosion. Low cliffs of loose head material (locally know as 'Ram') are behind many of the beaches. These are nearly all actively eroding and retreating landward.

The present day scenario is however made more complex because we have to consider the effects of climate change and accelerating sea level rise. Considering how rising sea levels and increasing storminess will impact on the shoreline and coastal communities is an essential part of the SMP process. Of course there is an inherent uncertainty in working with future predictions which are linked to the climate but nonetheless, there is sufficient scientific evidence to suggest we need to plan very carefully for the effects of climate change. It is no longer sufficient to simply maintain all defences in their current positions – we need to realise that communities will need to adapt and in some cases the shoreline position will need to be realigned to reduce the risks that climate change poses.

The SMP uses climate change figures supplied by Defra. This includes an allowance for sea level rise through the next century and allowances for overall increase in average wave heights and average wind speeds.

The human environment

The developed settlements of Cornwall and the Isles of Scilly are often vibrant communities, steeped in heritage. They represent a network of more traditional small port towns (Newlyn, Mevagissey, Fowey, Hugh Town/St Mary's); larger port towns, (Falmouth, Truro); heritage rich sites (Pendennis, The Garrison on St Mary's, Tintagel); and traditional resort areas (Perranporth, Holywell Bay, Praa Sands). In addition is the large number of historic fishing villages cum exclusive getaways such as Port Isaac, Padstow, St Ives, Coverack, Charlestown and the more contemporary resort areas such as Newquay, Rock and Watergate Bay.

Of course there are numerous locations which straddle a number of these categories, Fowey for instance being one of Cornwall's main working ports, but also rich in heritage and a popular destination for a large cross-section of visitors.

Defences

Extremely important aspects of shoreline management planning are the sea defences and coast protection structures which have been built to address the flooding and erosion problems which different communities and locations have experienced. These take many forms but are most commonly seen as vertical sea walls and sloped concrete or rock barriers (revetments). Of course as well as the man-made defences, the natural coastal landforms, act as natural defences against the sea, primarily by reducing the energy of waves as they approach the shoreline (the beaches and rock outcrops) or by acting as a buffer between the dynamic, coastal zone and the adjacent hinterland (the dunes).

Above: Defences at Marazion – a concrete wave return seawall is fronted by both rock and concrete sloped revetments

Heritage

An important aspect of human settlement is the historic environment associated with the coastline of Cornwall and the Isles of Scilly. Iconic engine houses dot the coastal landscape, particularly around the historic mining areas of Rinsey Head, Penwith and St Agnes which now form part of the larger Cornwall and West Devon Mining World Heritage Site.

The contribution of the historic coastal environment toward both the local and regional economies is very significant and therefore of strategic importance. Iconic sites such as St Michael's Mount, Tintagel, and Pendennis Castle are not just synonymous with Cornwall, but are also extremely important economically, in drawing visitors to the region.

Right: St Michael's Mount, located just offshore of Marazion in Mount's Bay. Rising sea levels mean that images such as this, where visitors walk across the low lying causeway, may be a thing of the past within 50 years.

Scheduled Monuments (SM) are historic sites of national importance, which affords them legal protection. There are over 1,800 SM present within Cornwall, with 213 within the SMP study area. The Isles of Scilly alone has over 230 SM, the highest density per hectare of any English authority (Isles of Scilly Council). There is also a wealth of listed buildings, shipwrecks and other marine archaeology around the Isles of Scilly archipelago and the Cornish mainland.

English Heritage and Historic Environment Teams within Cornwall Council are central in managing, monitoring and advising upon much of the heritage that exists. The National Trust also plays a central role and they are owners and custodians of an extensive number of historic coastal sites around mainland Cornwall.

The ancient historic environment that is typified by Bronze Age barrows, Iron Age hill forts, Neolithic stone circles, quoits and cairns, is characteristic of, and heavily associated with Cornwall (particularly the Penwith Area) and the Isles of Scilly. Within the narrow coastal zone considered in the SMP Review, the historic environment that is uniquely ***coastal*** in its nature is most important, as once lost, there are very few examples of this heritage further inland.

Left: Wheal Coates engine house helps define the skyline at Chapel Porth

Above: Fishing boats alongside the historic Victoria Pier at Mevagissey

A number of key categories can be identified which represent this unique coastal heritage:

- Historic ports & harbours (connected to both mining and fishing industries);
- Fishing industry infrastructure (e.g. pilchard canning factories);
- Safety at Sea (e.g. lighthouses,lifeboat stations, beacons, coastguard stations);
- Military installations and Civil War defences;
- Cliff castles;
- Mining heritage (including the World Heritage Site and a number of harbours);
- Communications (e.g. Porthcurno); and
- Submerged forests.

The natural environment

The coast of Cornwall and the Isles of Scilly supports a rich network of natural habitats and landscapes. Many of these natural areas are designated as nationally or internationally important areas. The open coast displays rocky intertidal foreshores, sand dunes and wide beaches, vegetated shingle ridges and shingle barrier beaches. The more sheltered estuarine areas are dominated by rich intertidal mud flats, sandbanks, saltmarshes and grazing marshes. The exposed cliff areas also support surprisingly diverse communities of flora and fauna and many are designated as internationally important coastal heathland (a good example being The Lizard peninsula) as well as nationally important maritime cliffs and slopes.

Left: The Fal Estuary at Malpas. This fragile and important intertidal estuarine habitat is a designated SAC. It is also a very popular area for recreational boating.

There are also important freshwater habitats within the coastal zone which affect how shoreline management can be taken forward, locations such as Marazion Marsh (an internationally important site and the largest area of freshwater reedbeds in Cornwall), Loe Pool and Swanpool are good examples of this, as all of these will be affected in the coming years by sea level rise and climate change.

Natural England, the Environment Agency, the Wildlife Trusts and nature conservation teams based within the Councils provide the principal regulation, monitoring and management of the natural environment around the coasts and estuaries.

Recreation and tourism

Recreation, encompassing both the leisure and recreation of residents and tourism, is a hugely important consideration when managing our shorelines. From the energetic water-based activities such as surfing, sailing, diving and coasteering, to the more leisurely land-based pursuits of dog walking, bird watching and visiting historic sites, the coast with its beaches, coves, cliff paths and dunes represents an enormous recreational resource. It is the basis for the majority of revenue generated within many of the coastal communities and it is inherently important that it is taken into account within shoreline management planning.

Above: surfing the north coast

Entire local industries are based around the shoreline and its recreational value. Important local employers and national bodies such as the Council and the Royal National Lifeboat Institution (RNLI), recognise this and invest in the future of the recreational and tourism industry in Cornwall. An example of this being the new RNLI lifeguard station at North Fistral beach, Newquay.

Far left: The new lifeguard station at North Fistral
Left: Surfers and dog walkers enjoying Fistral Beach

Far Left: Surf Life Saving Clubs exist at nearly all of the main recreational beaches
Left: Colourful pilot gigs line the shore at the Pilot Gig Rowing World Championships, held annually on the Isles of Scilly

Good management of the shoreline and its amenity benefits also provides support to a myriad of local clubs and charities, many of which are based around activities such as pilot gig rowing and surf life saving. Considerate management also has the additional benefit of generally looking after the natural environment at the same time, which not just helps habitats and the species which exist there, but helps to maintain healthy natural defences against flooding and erosion, which is of course a key objective of the shoreline management plan.

The key objectives for the Cornwall and Isles of Scilly SMP

Considering then the themes which we have explored in the preceding sections, the following list of principles reflects the aspirations of the people we work with across the SMP area. These objectives have been developed by consulting the Client Steering Group (CSG), Elected Members Forums (EMF) and key stakeholders. It is important to note that these come from the values that these stakeholders place on the issues and features in different areas and, as the above sections identify, the coastline and its features are extremely diverse. Some of these aims therefore conflict with others and because of this the SMP is not able to achieve all of these objectives at each location. The main objectives are listed below and are set out in no particular order.

- To manage the risks to communities from flooding and support their adaptation and development of resilience
- To manage the risks to communities from erosion and support their adaptation
- To establish a long-term action plan which helps to minimise and reduce the reliance on defences in the future.
- To support the essential diverse character of the landscape & seascape of Cornwall and the Isles of Scilly
- To allow natural evolution of the shoreline wherever possible
- To minimise impacts upon the historic environment, without unduly preventing natural coastal processes
- To support existing nature conservation values and minimise impacts upon habitats, while allowing adaptive response to natural change
- To support the viability and core values of coastal settlements, in a manner consistent with the Government's sustainable development principles
- To support diversification of tourism and recreational opportunities
- To support the adaptation and resilience of regional and county wide transport links

3. SMP key issues

There are a number of SMP wide issues which it is important to acknowledge when looking at the overall spatial extent of the SMP. These are broad-scale issues which affect either the SMP area as a whole or are principal drivers of policy at numerous important locations.

The wave climate

The influence of wave action at many locations around the SMP coastline is extremely significant. The impact of waves manifests itself in a number of different risks as far as shoreline management planning is concerned. Direct wave driven flooding on the open coast at exposed locations and erosion caused by wave action are the most obvious examples, but in addition to this is risk to life, structural damage, wave set-up occurring in sheltered locations, wave impacts on coastal habitats and disruption to transport routes and networks.

Above: Storm waves at Rinsey Head, November 2009.
Below: Harbours and breakwaters all around Cornwall provide effective protection to many communities from the worst of the wave climate. Mullion Harbour, February 2007.

Above and below: Hugh Town on the Isles of Scilly is exposed to extreme wave energy on both its east and west sides.

The widespread nature of this issue dictates that it is a key point for the SMP2 to pick up at a strategic level, as well as on a discrete location by location basis. An important aspect of this is for the SMP Review to identify the knowledge requirement to allow these risks to be fully assessed and accounted for by the land use planning system. This includes consideration of current monitoring strategies and how they may need to be improved in the future. Of particular relevance is the wave buoy network and requirements beyond the current arrangements. All open coast locations and most locations around the lower estuary mouths are affected to some degree by waves. Table 2 identifies the higher priority locations, i.e. those that have significant numbers of properties affected, high risks to life and structural assets or important transport routes affected by waves.

Table 2. Type of wave related risk at specific locations

Location	Type of wave influence / risk						
	Direct Flooding (wave run-up & overtopping)	Erosion	Indirect flooding (wave set-up in sheltered locations)	Risk to life	Structural damage	Transport disruption	Habitat
Downderry		X					
Seaton	X	X	X		X	X	
East & West Looe	X		X	X	X		
Fowey			X				
Mevagissey			X	X			
St Mawes	X		X				
Flushing			X				
Penryn			X				
Swanpool						X	X
Mullion				X			
Loe Bar							X
Porthleven				X	X		
Praa Sands		X					
Marazion	X	X					
Marazion Marsh	X						X
Longrock	X					X	
Penzance	X			X	X	X	
Newlyn	X						
Sennen Cove	X						
St Ives	X			X			
Hayle			X				

Location	Type of wave influence / risk						
	Direct Flooding (wave run-up & overtopping)	Erosion	Indirect flooding (wave set-up in sheltered locations)	Risk to life	Structural damage	Transport disruption	Habitat
Portreath	X			X	X		
Trevaunance Cove	X			X	X		
Perranporth	X			X	X		
Newquay Bay	X				X		
Porth	X					X	
Mawgan Porth	X					X	
Padstow			X				
Polzeath	X			X	X	X	
Port Issac	X			X			
Widemouth		X					
Bude	X	X		X			
Hugh Town (harbour)	X			X	X	X	
Porth Hellick	X						X
Old Town Bay	X						
Porthcressa	X	X		X	X	X	

The standard high level method for SMPs to assess coastal flood risks is to consider theoretical still water inundation levels. However, due to the dominance of waves in this SMP area, the true benefits gained from investment in maintenance of existing defences or a new scheme are not fully represented. At many open coast locations, we can say that 'still water flooding' simply does not occur based on extreme tide height alone – there is always a wave-driven element to the flooding. Therefore, many low benefit / cost ratios for actions promoted by the plan are expected to provide more robust economic support once a more detailed investigation into the risks is undertaken.

The risks due to waves also dictate a need for better understanding of the nature of the wave climate, both offshore and nearshore. Three wave buoys are already deployed at discrete locations around the Cornish coastline (Looe, Penzance and Perranporth) as part of the South West Coastal Monitoring Programme. These are representative primarily for their immediate localities (although they provide a useful reference for the wider coastline). A future combination of additional wave buoys and a programme of wave modelling would provide a much more comprehensive database of wave climate characteristics for use by a large number of engineers, managers and decision makers around the SMP coast. A better

understanding of the wave climate characteristics would also be hugely beneficial to the ongoing improvements to the Environment Agency's Flood Warning Service.

Monitoring

The South West Regional Coastal Monitoring Programme (SWRCMP) was put in place during 2006 and already provides a very useful resource for all coastal practitioners working in Cornwall. The programme covers the entire South West peninsula, including Cornwall and the Isles of Scilly, covering the open coast and the estuaries up to their normal tidal limit. The initiative utilises both remote sensing and ground-based survey techniques to capture a wide range of physical characteristics along the coastline.

Further refinement of the programme and recommendations for priority areas where sensitivity to climate change and sea level rise is expected to be most apparent, is an important aspect of future coastal management within the SMP area. In many instances, the results of monitoring during the remainder of epoch one will provide the technical justification and basis for policies which will be set in future iterations of the SMP Review. Therefore prioritisation of monitoring is an essential aspect relating to future policy setting. The Action Plan sets out comprehensive recommendations and proposed actions relating to this.

Wave buoy network

Because of the high importance of understanding the impacts of waves within this SMP area, the wave buoy network is a particularly important aspect of monitoring. Improvements to the wave buoy network could be achieved through additional buoy deployments. The most obvious location which would benefit from such data is probably Hugh Town (St Mary's) on the Isles of Scilly. If finances allowed, there may well be an argument for two buoys to be positioned, which record both the westerly and easterly wave climates as the two are quite distinct. Deployments in the nearshore zone to the north-west and south / south-east of Hugh Town would therefore be very useful. The nearshore bathymetry, deeper channels, small offshore islands and rock outcrops which surround St Mary's play a hugely significant role in dictating the amount of wave energy received at the shoreline. Therefore any actual positioning of buoys would need to be given very careful consideration. Other key locations around Cornwall which would benefit from nearshore wave buoy deployments would be St Austell Bay on the south coast, (particularly Mevagissey) and St Ives Bay and Bude on the north coast. Secondary locations which might benefit would be Falmouth Bay (south of Pendennis Point), Porthleven (south-west of Loe Bar), Newquay Bay and Polzeath.

Sand dune areas

The presence of sand dunes at a large number of locations is a unique quality of this SMP coastline. This links quite strongly to many of the more exposed and wave dominated open coast locations. High exposure to wind provides the conditions for saltation (the drying out

and mobilisation of sand particles) and aeolian transport (wind-driven movement of the sand) inland. Those frontages which are exposed to the dominant south-westerly, westerly and north westerly winds, are where significant dune accumulations are most frequently found, particularly those which have wide or very wide intertidal areas. Primary examples of these can be found at Gwithian, Penhale, Holywell and Crantock. There are also a large number of less significant dune areas along the open coast some of which face to the south or south-east (away from the dominant winds) and most of the sites along the south coast would be classed as such.

Within the context of this SMP, sand dunes have three particularly important attributes:

- Provision of sediment storage and natural dynamic coastal defence
- Importance as a UK Biodiversity Action Plan (BAP) habitat
- Significant landform asset within the coastal landscape (value to recreation and tourism)

The general intent of management for the majority of dune sites is to allow natural coastal processes to shape the frontages with minimal management intervention. However many of the dune sites have been allocated a preferred policy of managed realignment over the three epochs. This reflects intent to (where possible) seek grant aid for the funding of low key, low impact management measures. These would generally take the form of using fencing, netting and planting to aid dune growth and stabilisation, or use of boardwalks and fencing to control access points and actively reduce erosion due to recreational access. There is no intent to introduce significant engineered works to any of these dune frontages.

UK Biodiversity Action Plan Habitat Assessments

The importance of these dune sites as UK BAP habitats is a key consideration. The opportunity for sand dune management which enhances existing sites or helps to establish new sites (or re-establish former sites that have been lost), represents a very significant potential benefit to the SMP area. These also add Outcome Measure scores for possible future funding. It is likely that Cornwall can provide a significant contribution to the national target of 1,000ha of coastal dunes to be reinstated by 2019, with initial potential sites at Par Sands, Pentewan, Gwithian, Widemouth and Bude.

An assessment of losses (or gains) of all UK BAP habitat types around the SMP coastline is a key recommendation from the SMP review. Such work should look to tie in with and inform the South West Habitat Creation Programme (regional Environment Agency). The mapping and GIS layers produced for the baseline scenarios assessment can provide the basis for both qualitative and quantitative assessments. Aside from the sand dune sites discussed above, of particular importance would be consideration of changes in intertidal mudflat area,

particularly within the Upper Fal, Upper Fowey and Camel estuaries due to sea level rise. Also requiring consideration are the Maritime Cliff and Slopes BAP habitats, particularly around the The Lizard and Penwith peninsulas and the north coast above the Camel estuary.

The South West Coast Path

A particular feature of the Cornish coast that requires mention and consideration at both the strategic and local level is the South West Coast Path. This follows the coastline for the entire length of mainland Cornwall. It is a very important feature of the coast, which provides access to many designated historic and natural sites along the shoreline, as well as giving spectacular views and access to many of the more remote coves and beaches away from the main residential centres. In several areas the route of the coast path is threatened by erosion and in a few locations (such as Duporth) recent closures of the path have occurred due to significant cliff slips and land slides.

Coastal and tidal flood warning service

Historically, coastal flood warnings for mainland Cornwall relating to either wave driven or tidally driven flooding have been blanket warnings provided for either the north or south coast, dependent on conditions. Since 2006, the Environment Agency's Flood Incident Management (FIM) team have been developing improvement of the flood warning system, with the primary objective being the provision of community based warnings.

This would provide a more tailored warning service for anticipated flood risk at a given location, using a pre-determined set of condition criteria which are based on previous flooding events and known vulnerability to specific conditions. At a number of locations (policy units) throughout the SMP (specifically in Chapters 4 and 5 of the main SMP report) there are references to the use of the flood warning system to assist in managing flood risk to communities, properties or community assets etc. These references are made on the basis that a community based warning service is under development and expected to come into service over the next five years to assist with the management of flood risk as part of an integrated approach to flood and erosion risk management.

4. Key conclusions of the Cornwall and Isles of Scilly SMP Review

Priority locations

There are a number of key locations which the SMP Review regards as priority areas over the next 5-10 years. The following section provides an overview of the issues and the general intent of management at each of these priority locations. An indication of the priority actions considered necessary to support the intended management approach at each of these locations is also provided.

These locations are as listed below:

- Hugh Town/St Mary's, Isles of Scilly
- Mount's Bay
- Downderry to Seaton
- Looe
- Mevagissey
- Coverack
- Perranporth
- Praa Sands
- Fal Estuary
- Portreath
- Pentewan
- Hayle & St Ives Bay
- Loe Bar
- Widemouth
- Bude

St Mary's, Isles of Scilly

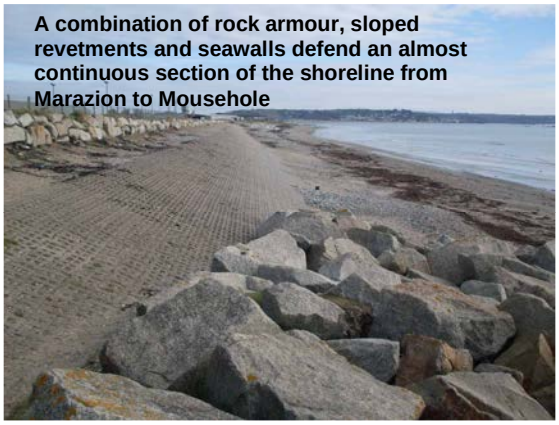
St Mary's, and particularly **Hugh Town**, is extremely vulnerable to wave overtopping and inundation during storms. Erosion is also a problem around parts of the Island. In addition, rising sea levels threaten the fresh water supply on St Mary's and also on the other inhabited islands. The overall intent of the plan is significant adaptation of the entire Hugh Town settlement in the longer term due to sea level rise and climate change impacts.

Large storm waves frequently impact on the Hugh Town frontage

Policy: A continuous **hold the line** policy is in place around Hugh Town harbour. A **managed realignment** approach is preferred at Porthcressa to provide flexibility.

Priority Actions for St Mary's:

- Wave climate study and monitoring
- Beach and cliff erosion monitoring
- Local Development Framework to identify St Mary's as a Coastal Change Management Area
- Strategy to assess flood and coast defence options for Hugh Town
- Island strategy to assess risk to fresh water supply



A combination of rock armour, sloped revetments and seawalls defend an almost continuous section of the shoreline from Marazion to Mousehole

Policy: The frontage is extremely pressurised and demands a flexible **managed realignment** approach in the medium to longer term to manage risks from flooding and erosion, particularly at Longrock and Wherrytown. The European Birds Directive designation of Marazion Marsh as a Special Protection Area (SPA) and important harbours at Newlyn and Penzance also necessitate sections of continued **hold the line**.

Mount's Bay (Marazion to Newlyn frontage, including Marazion Marsh)

The communities which make up the Mount's Bay frontage – Marazion, Longrock, Penzance, Wherry Town and Newlyn, together with the Marazion Marsh frontage present a difficult management challenge. A range of important objectives need to be satisfied as the frontage is under significant pressure from erosion and flood risks. Particularly vulnerable are the Longrock and Wherrytown frontages. Important transport infrastructure (A30, railway, Heliport and Ferry terminal) introduce further long-term considerations for adaptation of the frontage. Marazion Marsh has an international designation for its biological diversity and it is the largest area of freshwater reedbeds in Cornwall. It is particularly important that planned improvements for the Penzance frontage take into account the findings of the SMP.

Priority Actions for Mount's Bay:

- Beach and dune erosion monitoring
- Wave climate study and monitoring
- Local Development Framework to identify Mount's Bay as a Coastal Change Management Area
- Strategic assessment of managed realignment options
- Review Local Transport Plan
- Review Regional Rail Network Planning
- Penzance Development Framework to incorporate findings of SMP

Downderry to Seaton

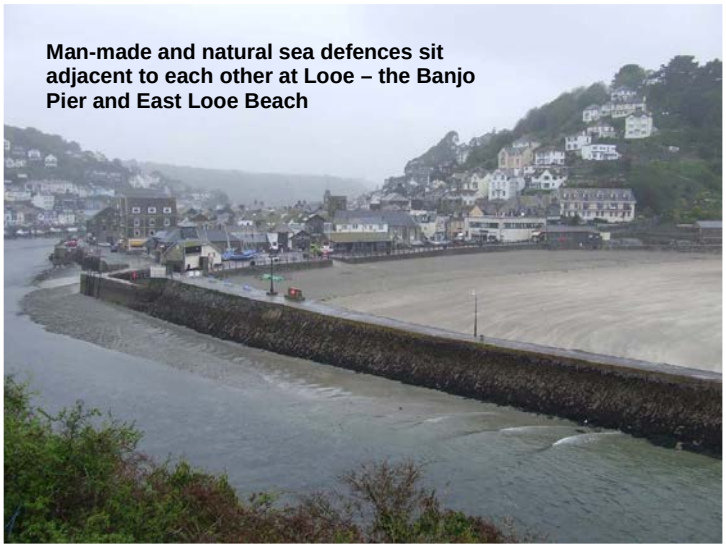
Cliff erosion affects this entire frontage and with an ad hoc variety of coastal defences in place, management of the risk is complex. There is a need for community adaptation in the longer term in order to respond to the changes which erosion will bring to the coastline. Continued monitoring of the rates of cliff erosion and of foreshore levels is an essential aspect of managing the complex Downderry shoreline into the future.

Priority Actions for Downderry:

- Beach and cliff erosion monitoring
- Continued monitoring of erosion 'Action Line'
- Local Development Framework to identify Downderry as a Coastal Change Management Area

The Inn-on-The-Shore at Downderry sits atop a substantial sloped masonry defence

Policy: The preferred policy at Downderry is an initial **hold the line** approach up to 2025. In epochs 2 & 3 the intent is to move to a more flexible **managed realignment** approach to allow an appropriate level of community adaptation to occur.



Man-made and natural sea defences sit adjacent to each other at Looe – the Banjo Pier and East Looe Beach

Priority Actions for Looe:

- Wave climate study & monitoring
- Beach monitoring (East Looe Beach)
- Condition assessment and economic benefits study for Banjo Pier
- Community adaptation strategy to climate change

Policy: The intent of management is to respond to the flood risk by supporting adaptation of the community however **hold the line** is still considered the most appropriate ongoing policy for both East and West Looe over the 100 year time-frame of the SMP.

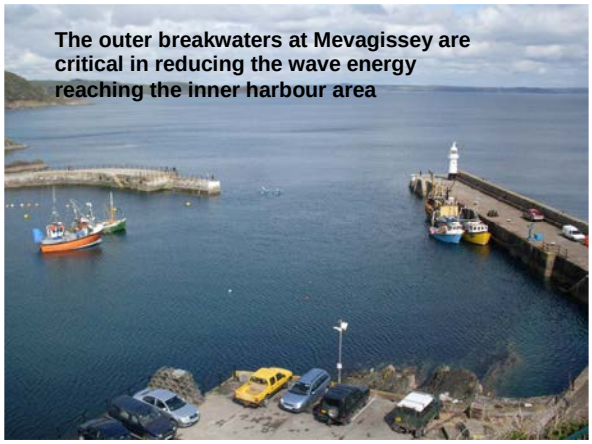
Looe

The level of risk at Looe is considerable with over 300 commercial and residential properties at risk from tidal flooding. Much of the area at risk is a Conservation Area and there are many listed buildings present. The quay structures themselves are also listed. The Banjo Pier and East Looe Beach are critical elements of the defence system at Looe.

The nature of flooding at Looe, which aside from quay overtopping includes quay wall permeability, drainage back-up and possible wave overtopping in extreme storm conditions, dictates that possible technical solutions to the risk are likely to be complex and any solution may need to employ a combination of measures.

Mevagissey

Mevagissey's historic harbour area is one of only two harbours in the county to have charitable status. It is very vulnerable to extreme tide levels and future sea level rise may mean that high spring tides bring significant flooding several times each year. The main area at risk of flooding is immediately adjacent to the harbour quays and the majority of this is a designated Conservation Area with many listed buildings present. This issue is complicated by the fluvial flood risk which also exists. The outer breakwaters of the harbour act to prevent a great deal of the offshore wave energy propagating into the harbour area. Without these in place, significant wave energy would reach the quaysides, resulting in significantly greater impacts than those observed during recent events (such as the storm of October 2004). An ongoing concern therefore is the costly maintenance of these structures and identifying alternative funding routes.

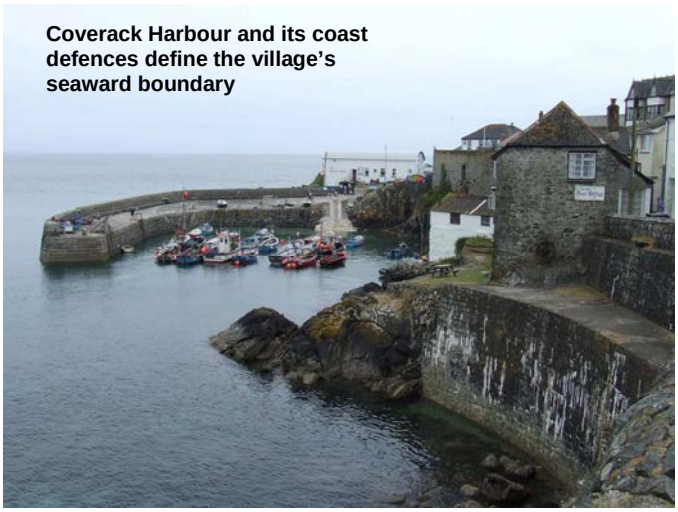


The outer breakwaters at Mevagissey are critical in reducing the wave energy reaching the inner harbour area

Policy: Because flexible adaptation of the community needs to be matched with careful management and improvement of defences, the preferred policy is a joint **hold the line / managed realignment** approach in the short and medium term. This mirrors other SMP locations where localised managed realignment will be beneficial within areas where most existing defences will be held.

Priority Actions for Mevagissey:

- Wave climate study & monitoring
- Breakwater condition assessment and economic benefits study
- Community adaptation strategy to climate change



Coverack Harbour and its coast defences define the village's seaward boundary

Policy: The preferred plan for Coverack is to continue with a **hold the line** policy during epoch 1 and then in theory continue to hold the line in epochs 2 and 3 – however this would be conditional upon the findings of the recommended geotechnical investigations. Dependent on the outcomes of this study, a future review of the SMP review may judge that it is more appropriate to move to managed realignment in the medium to longer term, but at present hold the line remains the default policy.

Coverack

Substantial erosion risk exists and loss of assets could result at Coverack under a no active intervention policy. Long-term sustainability of the current shoreline position at Coverack is difficult to determine. The road and the shoreline defences effectively delimit (and constrain) the high water position. It should be acknowledged that even if it is technically sustainable to hold the line at Coverack, based on the position of the hard geology, rising sea levels may still create a situation where coastal squeeze occurs. Therefore some erosion and loss of foreshore may be anticipated but this would then be occurring partly due to constraint by the natural geology and topography rather than attributed simply to the presence of man-made defences.

Priority Actions for Coverack:

- Wave climate study & monitoring
- Cliff and foreshore monitoring
- Geotechnical investigation into relict cliff face position and underlying geology
- Community adaptation strategy to climate change
- Local Development Framework to identify Coverack as a Coastal Change Management Area

Perranporth

Flooding from storm waves at Perranporth is a significant risk to the community and substantial flooding was experienced here in March 2008. An important aspect of moving toward a more sustainable shoreline position at Perranporth will be to manage the present day development pressures which exist along the frontage, particularly adjacent to the main Beach Road car park. Land use planners must be guided to avoid further unsuitable development in this area as it will be increasingly at risk in the future and will need to be considered spatially as part of any realignment strategy beyond 2025. It is likely that Perranporth needs to be considered as a Coastal Change Management Area due to the likely impacts on community infrastructure in the longer term.

Flooding at Perranporth during extreme wave and tide conditions, March 2008

Policy: Wave driven flooding is the driving issue which dictates that following a period of **hold the line** for the first 20 years, **managed realignment** should be introduced for the 50 and 100 year time horizons. This will allow for adaptation of the frontage to be made (following a period of further study and planning), to prevent a significant worsening of the risks to people and their property.

Priority Actions for Perranporth:

- Wave climate study & monitoring
- Beach and dune erosion monitoring
- Local Development Framework to identify Perranporth as a Coastal Change Management Area
- Community adaptation strategy to climate change
- Strategic Flood Risk Assessment to consider wave induced flooding

The sheltered waters of the Fal Estuary represent one of the most important natural conservations areas in Cornwall

Priority Actions for the Fal Estuary:

- Review of SAC boundaries
- Intertidal habitat sedimentation strategy
- Community adaptation strategies for vulnerable settlements at St Mawes; Tresillian; Devoran; Mylor; Flushing; Penryn; Falmouth.

Policy: Although **hold the line** is deemed suitable for the frontages of Falmouth, St Mawes and parts of Truro, **managed realignment** will become a crucial management tool in the coming years in both minimising impacts on the habitats of the SAC, and supporting the adaptation of the more vulnerable settlements, including Tresillian, Flushing and Penryn.

Fal Estuary

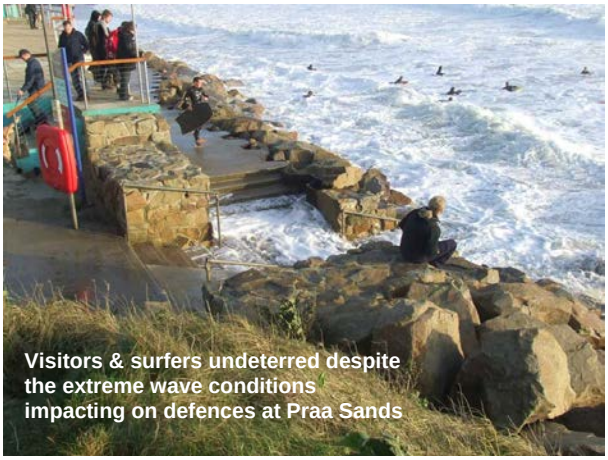
The Upper and Lower Fal estuary system is a priority area for the SMP in terms of habitat with the Fal and Helford Special Area of Conservation (SAC) the major designation. Intertidal mudflats and saltmarsh are found frequently through the upper parts of both the Fal (and Helford) estuaries and between them make up the most significant area of sheltered, estuarine nature conservation interest within the entire SMP area.

The overarching management intent for the Fal estuary is to promote shoreline management which prioritises the natural environment values based on their international importance, but importantly also supports the adaptation and resilience of the communities and developed frontages to the increased flood risks which will result from sea level rise.

Praa Sands

The assessment of risk at Praa Sands indicates high levels of erosion might be expected over the period of 100 years. With a maximum possible shoreline retreat of up to 120m, there are obviously significant implications for the Praa Sands settlement. A number of assets would be at risk, including Castle Drive, Hendra Lane, residential properties along the Hendra and Praa Green frontages, commercial properties and tourist facilities at Sydney Cove and the two car parks at Sydney Cove.

Praa Sands will be subject to significant coastal change and land use planners should consider identifying the area as a Coastal Change Management Area. This should be accompanied by policies to support any roll back of properties and community assets.

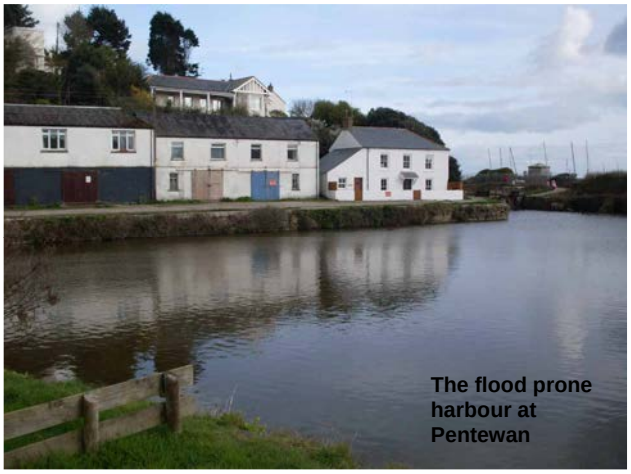


Visitors & surfers undeterred despite the extreme wave conditions impacting on defences at Praa Sands

Priority Actions for Praa Sands:

- Wave climate study & monitoring
- Cliff and beach monitoring
- Community adaptation strategy to climate change
- Local Development Framework to identify Praa Sands as a Coastal Change Management Area
- Consult with local community on potential managed realignment solutions

Policy: It is not viewed within the preferred plan as sustainable over 100 years to hold the shoreline of Praa Sands in its current position, given the soft nature of the low cliffs. It would be technically difficult to do so without very significant engineering works which would not meet objectives of the Area of Outstanding Natural Beauty (AONB) and could impact upon the amenity value of the beach. A policy of **managed realignment** is generally preferred across the frontage.



The flood prone harbour at Pentewan

Pentewan

With up to 100m of beach recession predicted in the area of the Caravan Park and Holiday Camp, Pentewan may be appropriate for consideration as a Coastal Change Management Area by the Local Development Framework. If not, there will nonetheless need to be a development plan led adaptation strategy for the village and holiday park to respond to rising sea levels from climate change. This should be addressed further in any community strategy. Future adaptation studies may be supported by the Environment Agency's emerging Cornwall Tidal Mapping Study.

Priority Actions at Pentewan:

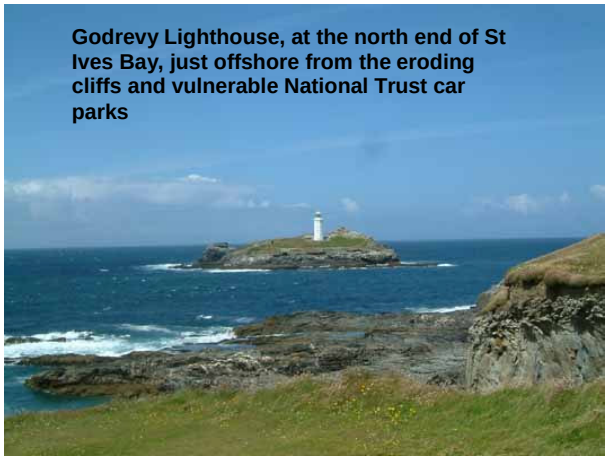
- Beach and dune monitoring
- Sand dune management plan
- Community adaptation strategy to climate change
- Flood Risk Management Scheme

Policy:

A **managed realignment** approach leading to a longer term **hold the line** is preferred for the village. Along the beach frontage, **no active intervention** followed by a **managed realignment** approach in the medium term.

Hayle and St Ives Bay

The Hayle Estuary and the adjacent open beach frontages of St Ives Bay present a number of management issues. Measures to address flood risk at Hayle and St Erth need to be considered alongside conservation values for the estuary. Parts of the open coast dune frontage are actively eroding at Lelant and along Harvey's Towans. At the northern end of the bay cliff recession threatens access to the large National Trust car parks at Godrevy Point.



Godrevy Lighthouse, at the north end of St Ives Bay, just offshore from the eroding cliffs and vulnerable National Trust car parks

Policy:
The management intent is necessarily wide ranging to accommodate the matrix of issues which need to be addressed. **Managed realignment** in the upper estuary areas will help with managing the flood risks to both Hayle and St Erth in the medium to longer term, by creating extra flood storage areas. This will also have nature conservation benefits. Around the quays and wharves of Hayle, a continued **hold the line** approach is preferred to manage flood risk to the community and protect heritage interests. Along the sand dune frontages of Harvey's Towans through to Gwithian an on-going managed realignment strategy is intended, to manage the risks of recession and protect the interests of the dunes as UK BAP habitats. At Godrevy, a **no active intervention** approach is preferred, supported by the National Trust, to ensure that natural evolution of the coastline is not constrained.

Priority Actions at Hayle & St Ives Bay:

- Wave climate study and monitoring
- Beach and dune monitoring and post storm monitoring
- Dune and beach management plans
- Managed realignment options for upper estuary
- Geotechnical study of cliff failure & associated risk assessment for Godrevy cliffs
- Community adaptation strategy (Hayle) to climate change
- Local Development Framework to identify Hayle and surrounding frontages as a Coastal Change Management Area

The long Finger Pier at Portreath Harbour plays an essential role in reducing the risk of flooding and erosion to the adjacent community

Portreath

At Portreath, the frontage will come under increasing pressure from sea level rise, with threat of coastal squeeze. This could lead to narrowing of the intertidal area with subsequent beach lowering, increasing pressure on defences and risk of structure failure. It is unlikely therefore to be in the best long-term interests of the community to continue to hold the line indefinitely. Some element of realignment in the medium to long term is suggested for the beach frontage and this should be coordinated with planning for future maintenance of the Finger Pier.

Priority Actions for Portreath:

- Pier condition assessment and economic benefits study
- Wave climate study & monitoring
- Cliff and beach monitoring
- Community adaptation strategy to climate change
- Local Development Framework to identify Portreath as a Coastal Change Management Area

Policy:

A combination of **hold the line** and **managed realignment** is to be employed at Portreath, to manage the process of adaptation to climate change whilst at the same time giving adequate provision of defence to the significant heritage assets which are present. Any realignment must take account of the World Heritage Site designation which covers Tregea Terrace as well as the pier and harbour.

Loe Bar

Some 2km along north-west from Gunwalloe, the Loe Bar barrier beach sits across the mouth of Loe Pool. Human influence here has included sediment extraction and forced breaching of the barrier. The barrier is moving landward at around 1m/yr and raising its crest height in response to the coastal conditions. Over the next 50 years the bar is expected to migrate landward by between 25m and 74m.

Loe Bar is one Cornwall s most impressive coastal landforms. It also protects the Loe Pool SSSI from saline intrusion.

Policy: The current management of water levels in Loe Pool requires the presence of the culverts and access chambers. An ongoing policy of **managed realignment** is recommended, to assist in managing both the flood risk to Helston and the saline intrusion risk to the Loe Pool, a Site of Special Scientific Interest (SSSI).

Priority Actions for Loe Bar:

- Beach erosion and crest position monitoring
- Post storm damage monitoring
- Managed realignment strategy
- Beach and bar management plan

Degraded dunes at Widemouth have been subject to attempts to arrest ongoing erosion in recent years

Widemouth

The dunes at Widemouth are in a degraded condition and Cornwall Council currently have sand-dune management polices in place where netting aims to capture and hold sand in place. This area is particularly vulnerable to damage from visitors gaining access to the beach from the car park. A larger and more naturally functioning dune system would provide a more robust and dynamic natural defence to the hinterland and area lying behind the car park, including Marine Drive.

Priority Actions for Widemouth:

- Wave climate study & monitoring
- Cliff and beach monitoring
- Sand dune management strategy
- Community adaptation strategy to climate change
- Local Development Framework to identify Widemouth as a Coastal Change Management Area

Policy:

A policy of **managed realignment** has been established for all three epochs at Widemouth to assist with ongoing efforts to restore the dune area to a more robust condition, whilst at the same time helping to manage the wider erosion risk which exists at north Widemouth. Other dune areas around the SMP coast are proposed for careful management under similar managed realignment approaches where the intent is to protect and improve their status as UK Biodiversity Action Plan habitats.

Bude

Although it is an open coast settlement, much of the residential and commercial development at Bude is set well back from the cliffs and beaches. Nonetheless there are significant assets adjacent to the shoreline around the Bude Canal, Summerleaze Beach and Crooklets Beach. The SMP's assessment of erosion risks shows some of these to be at risk under the no active intervention scenario and there is also a significant flood risk at Bude which will increase with climate change and sea level rise.

Summerleaze Beach at Bude, with the Sea Pool seen in the background

Policy:

An ongoing policy of **hold the line** is proposed in the Bude Haven and Canal area, to defend against flood risk. The pressurised open coast beaches ultimately require an approach which will allow adaptation of the frontage and active management of the risks to the community from the impacts of climate change. Therefore in the short to medium term a **managed realignment** approach is required at Summerleaze and Crooklets.

Priority Actions for Bude:

- Wave climate study & monitoring
- Cliff and beach monitoring
- Sand dune management strategy
- Community adaptation strategy to climate change
- Bude Weir and flood defence refurbishment programme

Community adaptation locations

In addition to the information above, the table below identifies other locations (alongside the priority locations) where the preferred plan and policies require an adaptation of the frontage to occur (at some level) in order to adapt to the impacts of on-going coastal erosion, sea level rise and climate change in relation to communities and built assets.

This may therefore involve some impacts upon, or potential loss of, private and commercial properties, community assets or infrastructure, either in the short, medium or long term due to a possible transition away from hold the line policies at some point in the next 100 years.

Each of these locations has been identified as either a Coastal Change Management Area (CCMA) or a location where a 'community adaptation strategy to climate change' would be appropriate. These could therefore be considered as potential candidates for the current 'Pathfinder' approach promoted by Defra. There is by necessity some overlap of this list with the priority locations identified above. In some cases these are small communities and the preferred shoreline management intent is no active intervention, however there will still be a requirement for some community adaptation.

Table 3. Community Adaptation Locations

Location	PDZ/ Management Area/ PU no.	Potential number of properties affected	Other built assets affected	Principal type of risk
Portwrinkle	1.2	5-10	Roads, harbour, slipway, public toilets, car parking	Erosion
Downderry & Seaton	2.1 & 2.2	>60	Roads, slipway	Erosion & flooding
Millendreath	3.2	1	Road, slipway	Erosion
Plaidy	3.3	0	Roads	Erosion
Looe	3.4 & 3.5	In excess of 330	Roads, quayside commerce, slipways, car parking, public toilets	Flooding
Lerryn	5.2	5-10	Roads	Flooding
Golant	5.3	<5	Roads	Flooding
Polkerris	6.2	5-10	Slipway, car parking	Erosion
Pentewan	8.2 & 8.3	>10	Roads, harbour, holiday park	Flooding & erosion
Mevagissey	8.4	70-80	Quayside commerce, aquarium, slipways, car parking, public toilets	Flooding
Portmellon	8.5	5-10	Roads, car parking, slipway	Flooding & erosion
Devoran &	11.5	20-25	Roads, car parking, quayside,	Flooding

Location	PDZ/ Management Area/ PU no.	Potential number of properties affected	Other built assets affected	Principal type of risk
Perranarworthal			slipway	
Mylor Quay	11.6	5-10	Slipways, quaysides, pontoons, car parking	Flooding
Flushing	11.8	>60	Roads, slipways, quaysides, car parking	Flooding
Penryn	11.9	>100	Roads, slipways, quaysides, car parking	Flooding
Coverack	15.4	25-30	Road, slipway, harbour, car parking	Erosion
Praa Sands	18.2 & 18.3	>40	Roads, car parking, public toilets	Erosion
Mounts Bay	PDZ8	In excess of 200	Roads, rail link, slipways, public toilets, car parking, promenade	Flooding & erosion
Hayle	MA27	>150	Roads, quaysides, slipways, public toilets, car parking	Flooding
Portreath	29.2 & 29.3	>20	Roads, quaysides, public toilets, promenade, car parking	Flooding & erosion
Perranporth	30.3	>80	Roads, public toilets, promenade, car parking	Flooding
Newquay Bay	MA32	20-30	Roads, beach access roads, holiday park, car parking, public toilets	Erosion
Mawgan Porth	33.3 & 33.4	5-10	Roads, holiday park, car parking, public toilets	Flooding & erosion
Harlyn Bay	34.2	5-10	Road, car parking, public toilets, lifeguard station	Flooding & erosion
Polzeath	36.2	5-10	Road, holiday park, car parking, public toilets, lifeguard station	Flooding & erosion
Widemouth	39.2 & 39.3	5-10	Road, car parking, lifeguard stations (2)	Erosion
Bude	40.2, 40.3 & 40.4	>70	Road, beach huts, car parking, public toilets, lifeguard station, canal structures	Flooding & erosion
St Mary's, Isles of Scilly	MA42	>100	Roads, pumping stations, hospital, fire station, incinerator, industrial park, reservoirs (water supply)	Flooding & erosion

Table 4. SMP2 Policies at Community Adaptation Locations

Location	Policy Epoch 1	Policy Epoch 2	Policy Epoch 3	Location	Policy Epoch 1	Policy Epoch 2	Policy Epoch 3
Portwrinkle	HTL	MR	MR	Penryn	HTL	MR	MR
Downderry west	HTL	MR	MR	Coverack	HTL	HTL/MR	HTL/MR
Millendreath	NAI	NAI	NAI	Praa Sands	MR	MR	MR/NAI
Plaidy	HTL	NAI	NAI	Mounts Bay	HTL & MR	HTL & MR	HTL & MR
East & West Looe	HTL	HTL	HTL	Hayle	HTL & MR	HTL & MR	HTL & MR
Lerryn	NAI	NAI	NAI	Portreath (Harbour)	HTL	HTL(with localised MR)	HTL(with localised MR)
Golant	NAI	NAI	NAI	Perranporth	HTL	MR	MR
Polkerris	MR (with localised HTL)	MR (with localised HTL)	MR (with localised HTL)	Newquay Bay	HTL & NAI	HTL & NAI	HTL & NAI
Pentewan Village	MR	MR	HTL	Mawgan Porth	MR	MR	NAI
Mevagissey	HTL/MR	HTL/MR	HTL/MR	Harlyn Bay	HTL	MR	MR
Portmellon	HTL	MR	MR	Polzeath	HTL	MR	MR
Devoran & Perranarworthal	MR	MR	MR	Widemouth	MR	MR	NAI
Mylor Quay	HTL	HTL(with localised MR)	MR	Bude (Summerleaze & Crooklets)	MR	MR	NAI
Flushing	HTL(with localised MR)	MR	MR	Hugh Town, St Mary's	HTL & MR	HTL & MR	HTL & MR

Highways at risk

A recurring risk around the entire coastline is that of erosion and flooding threatening the position and safety of coastal highways (or those immediately adjacent to estuary frontages, such as the A39 at Tresillian). There are a number of locations where actions are already being taken to address the current risks and to ensure that the transport requirements of local communities continue to be met. In other locations where future risks exist have been identified through the SMP, actions are being put in place to be pursued in the short to medium term, again to ensure that local transport needs continue to be met. The table below identifies locations where either main 'A' roads or locally important through routes could be affected. In addition to these there are local access routes (non-through routes) which are likely to be affected over the 100 year time-frame of the SMP.

Table 5. Highways at risk

Location	Road	Issue	Timescale of risk
Portwrinkle	Finnygook Lane	Erosion	Medium to long term
Downderry	Brenton Road	Erosion	Medium to long term
Seaton	Brenton Road	Flooding	Short term
Portmellon	Polkirt Hill	Flooding & erosion	Short term
Tresillian	A390	Flooding	Short term
Perranarworthal	A39	Flooding	Short term
Devoran	A39	Flooding	Short term
Swanpool	Swanpool Rd	Erosion & flooding	Medium to long term
Maenporth	Maenporth Rd	Erosion	Medium to long term
Halzephron	Gunwalloe - Winnianton	Erosion	Medium to long term
Praa Sands	Castle Drive	Erosion	Short to medium term
Marazion	Marazion Green Rd	Erosion & flooding	Short to medium term
Longrock – Chyandour	A30	Erosion & flooding	Short to medium term
Old Town (St Mary's)	Old Town Road	Erosion & flooding	Short to medium term
Porth (Newquay)	B3276	Erosion & flooding	Medium term
Mawgan Porth	B3276	Erosion & flooding	Short to medium term
Harlyn Bay	Harlyn Rd	Erosion & flooding	Medium term
Polzeath	Beach Rd	Erosion & flooding	Short to medium term
Widemouth	Marine Drive	Erosion	Medium to long term

5. The Action Plan

The Action Plan for the Cornwall & Isles of Scilly SMP Review provides the basis for taking forward the intent of management which is discussed and developed through Chapter 4 - and summarised through the preferred policy choices set out in Chapter 5. The SMP guidance states that the purpose of the Action Plan is to summarise the actions that are required before the next review of the SMP. However in reality the Action Plan is looking much further into the future in order to provide guidance on how the overall management intentions for the next 100 years may be taken forward.

For Cornwall and the Isles of Scilly SMP the Action Plan is a critical element, because there are various conditional policies for later epochs which need to be more firmly established in the future based on monitoring and investigation. The Action Plan can set the framework for an ongoing shoreline management process in the coming years, with the SMP3 in 5 to 10 years time as the next important milestone.

The Action Plan therefore attempts to capture all intended actions necessary, on a policy unit basis, to deliver the objectives at a local level. It should also help to prioritise flood and coastal risk management medium and long term planning budgets. A number of the actions are representative of ongoing commitments across the SMP area (for example to South West Regional Coastal Monitoring Programme).

There are also actions that are representative of wide-scale intent of management, for example in relation to gaining a better understanding of the roles played by the various harbours and breakwaters located around the coast in terms of coast protection and sea defence. Additionally, gaining a better understanding of the influence of wave driven flooding and damage around the coastline at particular locations (as opposed to the derivation of flood risks from still water flooding) is identified as a key issue for this SMP coastline, and one that makes it fairly unique within England and Wales.

At a local level, many of the actions relate to the monitoring of cliffs, dunes and beaches, in order to provide ongoing surveillance on the actual nature of morphological change at individual sites, where the preferred policies are based on the perceived pressure on the frontage due to sea level rise, increased erosion rates and so forth. Linked into this type of action, there are some discrete areas where it is felt that more intrusive studies such as geotechnical investigations would provide valuable insight into the longer-term sustainability of certain coastal settlements.

A number of the site specific intended actions have been identified for the priority locations discussed in Section 4 above. Actions for all other locations are listed within the Action Plan (Chapter 6) within the full SMP report document.

The CSG have approved the Action Plan based on the Preferred Plan. The Action Plan lists the identified measures necessary to implement the intent of management identified by the

Preferred Plan. It identifies partners and sources of funding as well as prioritising the actions into Low, Medium and High priorities. Through signing up to the Action Plan, each CSG partner is demonstrating a commitment of intent to undertaking each action, as priorities allow and funding permits.

A wide range of sources of funding have been considered in drawing up the Action Plan, which include Environment Agency Flood and Coastal Risk Management funding, Defra Grant in Aid funding, Plymouth Coastal Observatory (monitoring), National Trust, English Heritage, and landowners such as private developers, the Duchy of Cornwall and Wildlife Trust. While the Action Plan does not commit these organisations to providing funding, it does document the wide range of interests that could be involved with investing in the sustainable management of the coastline. Furthermore the potential sources of funding listed in the Action Plan are not exhaustive. All funding routes should be investigated further as the Action Plan is implemented.

It is intended that the SMP Action Plan remain a 'live' document and it is intended that updates to the Action Plan and details of completed or on-going studies and actions are reported via the CISCAG website.

Acknowledgements

The SMP Review has been completed on behalf of Cornwall and the Isles of Scilly Coastal Advisory Group (CISCAG). Members of CISCAG formed the SMP Client Steering Group, including representatives from the Local Authorities, Environment Agency, Natural England, English Heritage and the National Trust, who have overseen and guided the production of this plan. In addition, Elected Members Forums were established for Cornwall Council and the Council of the Isles of Scilly and their help in successfully completing this SMP Review is acknowledged.

CISCAG commissioned consultant engineers Royal Haskoning to prepare the SMP2 and undertake the technical assessments. Coast and Country Projects Ltd were commissioned by CISCAG to undertake project management of the work. Funding has been provided by the Government through the Department of Food and Rural Affairs (Defra).

Further information

The full SMP report

The final completed SMP Review document is available to view at the principal offices of Cornwall Council and the offices of the Council of the Isles of Scilly on St Mary's. It is also available to view or download at www.cornwall.gov.uk/smp

Accessibility

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