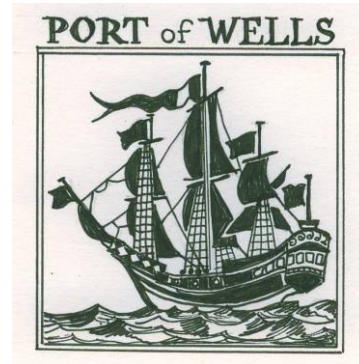
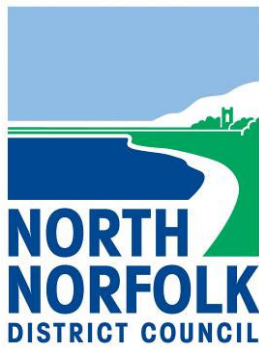




North Norfolk Shoreline Management Plan

Draft for public consultation

July 2009



Public consultation

The North Norfolk SMP is out for public consultation from Monday 20th July to Friday 16th October 2009. We have produced a summary document so that everyone with an interest in the plan can easily see which policies we are proposing for each part of the North Norfolk coast. The summary document contains a CD with the full draft SMP and all appendices, for those who would like to see the information we have used to select the draft policies.

Both the summary document and the full draft SMP and appendices are available on a website at www.environment-agency.gov.uk/research/planning/105014.aspx, then click on the link for 3a Hunstanton to Kelling Hard (North Norfolk). They are also available for viewing at the offices of North Norfolk District Council, the Borough Council of King's Lynn and West Norfolk and the Environment Agency's office in Norwich. Copies can also be viewed in the libraries in Hunstanton and Wells-next-the-Sea. The relevant addresses are:

North Norfolk District Council
Council Offices
Holt Road
Norfolk
NR27 9EN

Borough Council of King's Lynn & West Norfolk
King's Court
Chapel Street
King's Lynn
PE30 1EX

Environment Agency
Dragonfly House
2 Gilders Way
Norwich
NR3 1UB

Hunstanton library
Westgate
Hunstanton
Norfolk
PE36 5AL

Wells library
Station Road
Wells-next-the-Sea
Norfolk
NR23 1EA

Further information about the public consultation can be obtained by e-mailing to northnorfolksmp@environment-agency.gov.uk, or by phoning 01473 706806 to speak to the Environment Agency's project manager.

All comments about the content of the draft SMP should be e-mailed to the above address, or sent by post to:

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by 4pm on Friday 16th October 2009.

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Glossary of terms

Term	Definition
Adaptation	<p>Implies that there may be some actual change in the way a feature, such as a habitat or a community, functions. In supporting adaptation, management has to recognise certain principles:</p> <ul style="list-style-type: none"> • that adaptation may take time and may evolve slowly so that change to the overall community does not happen immediately • that management should not encourage a progressively more vulnerable situation to develop, where there is a sudden change from one condition to another • that specific aspects of a feature, such as individual properties or elements of habitat may change or be lost, but without substantial loss to the value of the community or the overall ecological function of feature.
Aeolian	Formed by wind
Agricultural land classification	GIS dataset that provides an assessment of the quality of agricultural land as a grade from 1 (best quality) to 5 (poorest quality).
Area of Outstanding Natural Beauty	A statutory designation by the Countryside Commission. The purpose of the AONB designation is to identify areas of national importance and to promote the conservation and enhancement of natural beauty. This includes protecting its flora, fauna, geological and landscape features.
Barrier island	A long, relatively narrow island running parallel to the mainland, built up by the action of waves and currents, that provides shelter to the shoreline behind.
Baseline scenarios	Concept used in developing a SMP to illustrate the role of shoreline management by assessing the effect of two extreme management approaches: no active intervention and with present management, for all frontages and all epochs.
Bathymetry	Bed level topography of a water body
Beach nourishment	Artificial process of replenishing a beach with material from another source.
Benefits (related to issue)	The service that a feature provides. In other words, why people value or use a feature. For example, a nature reserve, as well as helping to preserve biodiversity and meet national legislation, may also provide a recreation outlet much like a sports centre provides a recreation function.

Term	Definition
Benefit cost ratio	This is the ratio between the value of the benefits that a section of defence protects and the cost of maintaining that defence over the period of the SMP. This is used to assess the economic viability of a proposed policy.
UK Biodiversity Action Plan	This sets out a programme for conserving the UK's biodiversity through targets for a range of specific habitats with the aim of reducing loss of biodiversity.
Brackish water	Freshwater mixed with seawater.
Breaker zone	Area in the sea where the waves break.
Chart Datum	Reference water level for navigation, generally a low tidal level.
Chenier	Beach ridge, usually composed of sand-sized material resting on clay or mud.
Climate change	Long-term change in the patterns of average weather. Its relevance to shoreline management concerns its effect on sea levels, current patterns and storminess.
Coastal squeeze	The reduction in habitat area that can arise if the natural landward migration of a habitat due to sea level rise is prevented by the fixing of the high water mark, for example a sea wall.
Condition grade	Indicator based on visual inspection of flood defence condition, ranging from condition grade 1 (very good) to 5 (very poor).
Department for Food, Environment and Rural Affairs (Defra)	Government department responsible for flood management policy in England and Wales. Incorporates the former Ministry of Agriculture, Fisheries and Food.
Defra procedural guidance	Guidance produced by Defra to provide a nationally consistent structure for producing future generation Shoreline Management Plans.
Downdrift	In the direction of longshore movement of beach materials.
Ebb-tide	The falling tide, part of the tidal cycle between high water and the next low water.
Ecosystem	Organisation of the biological community and the physical environment in a specific geographical area.
Enhance (improve)	The value of a feature increases.
Environmental impact assessment	Detailed studies that predict the effects of a development project on the environment. They also provide plans for mitigating any significant adverse effects.
Esker	A feature of glacial origin. An esker is a long winding ridge of sand and gravel deposited by a glacial stream.

Term	Definition
EU Bathing Water directive	The aim of this directive is to protect public health and the environment from fecal pollution at bathing waters. It sets a number of microbiological and physio-chemical standards that bathing waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards).
EU Habitats directive	European legislation on the conservation of habitats.
European Annex I priority habitats	Annex I of the European Habitats directive defines certain habitats as being 'priority' because they are considered to be particularly vulnerable and are mainly, or exclusively, found within the European Union. There are two of these habitats in the North Norfolk SMP area - saline lagoons and grey dunes.
Eye	Local term for till island.
Facies	Characteristic of a particular rock unit.
Feature	Something tangible that provides a service to society in one form or another or, more simply, benefits certain aspects of society by its very existence. Usually this will be in a specific place and relevant to the SMP.
Fetch	Area of water over which waves are generated by the wind.
Flood-tide	Rising tide, part of the tidal cycle between low water and the next high water.
Foreshore	Zone between the high water and low water marks.
Gabion	A cage filled with rock used to stabilise the shoreline against erosion.
Geomorphology/ Morphology	The branch of physical geography/geology that deals with the form of the Earth, the general configuration of its surface, the distribution of the land, water, etc.
Groyne	Shore protection structure built perpendicular to the shore and designed to trap sediment.
Heritage coast	A non-statutory designation by the Countryside Commission for coasts of scenic quality, their largely undeveloped nature and their special wildlife and historic interest. Local authorities assist with the management of heritage coasts, often with heritage coast officers.
Hinterland	Generally, area landward of the shoreline. In north Norfolk, this is the area landward of the tidal flood zone.
Indicators	Used to support the appraisal of policies against criteria.
Integrated	An approach that tries to take all issues and interests into account. In taking this approach, managing one issue adds value to the way another is dealt with.
Listed building	A building or other structure officially designated as being of special architectural, historical or cultural significance.
Local Development Framework	A collection of local development documents that outlines how a local authority will manage planning in their area.

Term	Definition
Local Nature Reserves	A statutory designation for sites established by local authorities in consultation with Natural England (formerly English Nature). These sites are generally of local significance and also provide important opportunities for public enjoyment, recreation and interpretation.
Maintain	That the value of a feature is not allowed to deteriorate.
Mean sea level	Average height of the sea surface over a 19-year period.
Mean high water	The average of all high waters observed over a sufficiently long period.
Mean low water	The average of all low waters observed over a sufficiently long period.
Mudflat	Low-lying muddy land that is covered at high tide and exposed at low tide
Natura 2000	An ecological network of protected areas in the EU (SPAs under the Birds directive and SACs under the Habitats directive).
National Flood and Coastal Defence Database	National database for managing flood risk management asset data.
National property dataset	GIS dataset that provides information on the location and type of properties in England and Wales. This includes the value of properties based on 2005 values.
National Nature Reserves	A statutory designation by Natural England (formerly English Nature). These represent some of the most important natural and semi-natural ecosystems in Great Britain and are managed to protect the conservation value of the habitats that occur on these sites.
No-regret policies	Policies that don't have irreversible negative implications.
Objective	A desired state to be achieved in the future. An objective is set, through consultation with key parties, to encourage the resolution of an issue or range of issues.
Offshore zone	Extends from the low water mark to a water depth of about 15 metres (49 feet) and is permanently covered with water.
Ordnance Datum	Elevation used on ordnance survey maps for deriving height. In the UK this is mean sea level in Newlyn, Cornwall measured between 1915 and 1921.
Playing field	Range of realistic shoreline management policies, used in the process of developing SMP policies.
Policy	In this context, "policy" refers to the generic shoreline management options (no active intervention, hold the existing line of defence, managed realignment and advance the existing line of defence).

Term	Definition
Policy development zone (PDZ)	A length of coastline defined to assess all issues and interactions to examine and develop management scenarios. These zones are only used to develop policy.
Policy scenario	A combination of policies selected against the various feature/benefit objectives for the whole SMP frontage.
Present value (PV)	The value of a stream of benefits or costs when discounted back to the present day. For this SMP the discount factors used are the latest provided by Defra for assessing schemes, that is 3.5 per cent for years 0-30, 3.0 per cent for years 31-75 and 2.5 per cent thereafter.
Principle	High level statement agreed by partner authorities and used to develop the SMP.
Prograding	When the shoreline is developing and building seaward by accumulation or deposition.
Ramsar site	Designated under the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971. The objective of this designation is to prevent the progressive encroachment into, and the loss of, wetlands.
Registered parks and gardens	Parks and gardens registered for their historic value so they are considered in the planning process. Local planning authorities must consult English Heritage where planning applications may affect these sites.
Rapid Coastal Zone Assessment	Survey of the historic assets on the coast that were started by English Heritage to improve knowledge and understanding.
Residual life	Period of time until a defence has deteriorated to a state in which it no longer performs its function.
Special Area of Conservation (SAC)	This designation aims to protect habitats or species of European importance and can include Marine Areas. SACs are designated under the EU Habitats directive (92/43EEC) and will form part of the Natura 2000 site network. All SACs are also protected as SSSIs, except those in the marine environment below mean low water (MLW).
Scheduled monument	A statutory designation under the Ancient Monuments and Archaeological Areas Act 1979. This act, building on legislation dating back to 1882, provides for nationally important archaeological sites to be statutorily protected as scheduled monuments.
Setback	Prescribed distance landward of a coastal feature (for example the line of existing defences).

Term	Definition
Shellfish Waters directive	Aims to protect or improve shellfish waters in order to support shellfish life and growth. It sets physical, chemical and microbiological water quality requirements that designated shellfish waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards).
Shoreline Management Plan	A non-statutory plan that provides a large-scale assessment of the risks associated with coastal processes and presents a policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner.
Special Protection Area (SPA)	A statutory designation for internationally important sites, being set up to establish a network of protected areas of birds. SPAs are designated under the EU Birds directive (79/409/EEC)
Special Site of Specific Scientific Interest (SSSI)	A statutory designation under the Wildlife and Countryside Act 1981. Notified by Natural England (formerly English Nature), representing some of the best examples of Britain's natural features including flora, fauna, and geology.
Storm surge	A rise in the sea surface on an open coast resulting from a storm.
Sustain	Refers to some function of a feature. A feature may change, but the function is not allowed to fail.
Swell	Waves that have travelled out of the area in which they were generated.
Tidal prism (or tidal diamond)	The volume of water within an estuary between the level of high and low tide, typically taken for mean spring tides.
Tide	Periodic rising and falling of large bodies of water resulting from the gravitational attraction of the moon and sun acting on the rotating earth.
Topography	Configuration of a surface including its relief and the position of its natural and man-made features.
Transgression	The landward movement of the shoreline in response to a rise in relative sea level.
Tumulus	A mound of earth and stones raised over a grave or graves that are of historic value.
Water Framework Directive	The most substantial piece of EU water legislation to date. Designed to improve and integrate the way water bodies are managed throughout Europe.
Water table	The upper surface of groundwater. Below this level, the soil is saturated with water.
Wave direction	Direction from which a wave approaches.
Wave refraction	Process by which the direction of approach of a wave changes as it moves into shallow water.

List of abbreviations and acronyms

Organisations directly involved in SMP	
AW	Anglian Water
BCKL&WN	Borough Council of King's Lynn & West Norfolk
EA	Environment Agency
EH	English Heritage
NCC	Norfolk County Council
NE	Natural England
NNDC	North Norfolk District Council
RFDC	Regional Flood Defence Committee
RSPB	Royal Society for the Protection of Birds
External/Other organisations	
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CLG	Communities & Local Government
DEFRA	Department for Environment, Food and Agriculture
EACG	East Anglia Coastal Group (formerly ACAG - Anglian Coastal Authority Group)
EERA	East of England Regional Assembly
EU	European Union
IDB	Internal Drainage Board
OS	Ordnance Survey
QRG	Quality Review Group
RNLI	Royal National Lifeboat Institute
UEA	University of East Anglia
SMP Groups (Consultation)	
CSG	Client Steering Group
EMF	Elected Members Forum
KSG	Key Stakeholder Group
Plans/Strategies/Studies & Assessments	
AA	Appropriate Assessment
CFMP	Catchment Flood Management Plan
CHaMP	Coastal Habitat Management Plan
ICZM	Integrated Coastal Zone Management
LDF	Local Development Framework
MSfW	Making Space for Water
NI 188	National Indicator 188 (Climate change)
NI 189	National Indicator 189 (Flood Risk)
PPG	Planning Policy Guidance
PPS25	Planning Policy Statement 25
RBMP	River Basin Management Plan
RCZA	Rapid Coastal Zone Assessment

RFRA	Regional Flood Risk Appraisal
RSS	Regional Spatial Strategy
SA	Sustainability Appraisal
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SMP	Shoreline Management Plan
SNS2	Southern North Sea Sediment Transport Study
UKCP	United Kingdom Climate Programme (formally UKCIP, United Kingdom Climate Impact Programme)
WFD	Water Framework Directive
WLMP	Water Level Management Plan
Special interest sites	
AONB	Area of Outstanding Natural Beauty
LNR	Local Nature Reserve
NNR	National Nature Reserve
SAC	Special Areas of Conservation
SM	Scheduled monument
SPA	Special Protection Area
SSSI	Site of Special Scientific interest
Technical terms	
AOD	Above Ordnance Datum
AtL	Advance the line
BAP	Biodiversity Action Plan
BCR / B - C Ratio	Benefit cost ratio
GIS	Geographical Information System
HtL	Hold the line
HWM	High water mark
IROPI	Imperative reasons of overriding public interest
LiDAR	Light detection and ranging
MR	Managed realignment
NAI	No active intervention
NFCDD	National flood and coastal defence database
NPD	National property dataset
OA	Operating authority
ODN	Ordnance Datum Newlyn
OWF	Offshore wind farms
PDZ	Policy Development Zone
PV	Present value
SAR	Synthetic aperture radar
SOP	Standard of protection
WPM	With present management

1 Introduction

1.1 The Shoreline Management Plan

A Shoreline Management Plan (SMP) is a high-level policy document in which the organisations that manage the shoreline set their long term plan. The SMP aims to identify the best ways to manage flood and erosion risk to people and the developed, historic and natural environment and to identify opportunities where shoreline management can work with others to make improvements.

This document is the draft SMP. It presents the suggested plan, based on a full appraisal of options against a wide range of criteria, for consultation with all people and organisations with an interest in the shoreline of north Norfolk from Old Hunstanton to Kelling. All feedback will be assessed and taken into account in finalising the plan.

The SMP is an important part of the Department of Environment, Food and Rural Affairs (Defra) strategy for managing flooding and coastal erosion. This strategy has two key aims:

- to reduce the threat of flooding and erosion to people and their property
- to benefit the environment, society and the economy as far as possible, in line with the Government's 'sustainable development principles'. These are standards set by the UK Government, the Scottish Executive and Welsh Assembly Government for a policy to be sustainable.

The SMP is the highest-level planning stage of Defra's strategy for flood and coastal risk management. The SMP sets high-level policies that are implemented through delivery plans (such as strategies and asset management plans) and subsequently by projects and actions (such as schemes).

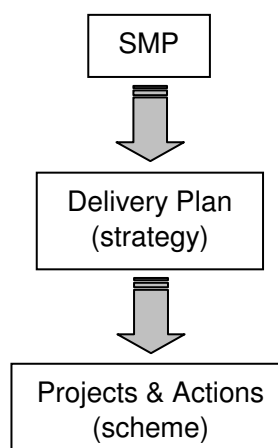


Figure 1.1 Defra's flood and coastal risk management strategy hierarchy

About ten years ago, a first round of SMPs was completed for the entire length of the coastline of England and Wales. The first SMP for North Norfolk was completed in 1996. The revised SMP (SMP2) builds on the first round of plans, taking into account updated information collected, changing circumstances or revised boundaries.

The main aim of the SMP is to develop an 'intent of management' for the shoreline that achieves the best possible balance of all the values and features that occur around the shoreline, for the coming 100 years. This 'intent of management' mainly concerns how we manage the shoreline and its flood and erosion defences. There is, of course, also a strong relationship with social, economic and environmental activities and values around the shoreline.



Wells-next-the-Sea beach huts

The SMP does not make decisions about land use and environmental values, but it does set one of the parameters within which coastal land use and the coastal environment will function. The SMP has therefore been developed through a partnership approach between the Environment Agency, the local authorities, Natural England, English Heritage and other organisations with an interest or responsibility in those fields. The SMP has been set up to take full account of the plans that these organisations make. Similarly, these organisations intend to take full account of the SMP in their decisions (such as the Local Development Framework for the local authorities' land use planning). Section 1.5 explains how the SMP takes account of other related plans and procedures.

The 'intent of management' is usually expressed in terms of the effect of shoreline management on land use and environment. It describes what we want to achieve by managing the shoreline. However, for use in coastal flood and erosion management, the intent of management has to be translated into

one of four policies that describe the actual management of the shoreline itself:

- **Hold the line (HtL)** – this involves holding the defence on its existing alignment.
- **Advance the line (AtL)** – this involves building new defences seaward of the existing defence line. If relevant, this policy should only be used on those stretches of coastline where significant land reclamation is considered.
- **Managed realignment (MR)** – this involves allowing the shoreline to move seaward or landward, with associated management to control or limit the effect on land use and environment. This can take various forms, depending on what we want to achieve. All are characterised by managing change, not only technically (by breaching and building defences) but also for land use and environment (by aiding or ensuring adaptation).
- **No active intervention (NAI)** – this involves no further investment in coastal defences or operations.

It is important to note that the central decision in the SMP concerns the ‘intent of management’ to be achieved. This is the actual plan. The policies are only a means to implement the plan.

The first three policy options usually involve building or maintaining defences. The policies don’t imply any particular standard of protection to be provided. They could be implemented by maintaining or changing the standard of protection. This is usually a decision taken in a strategy study or scheme.

The SMP needs to provide the ‘intent of management’ and associated policy for each section of the shoreline for the short, medium and long term up to 2105. All SMPs use the following three time periods which are referred to as epochs:

- epoch 1: now till 2025 (short term)
- epoch 2: 2026 – 2055 (medium term)
- epoch 3: 2056 – 2105 (long term)

For the later epochs, as uncertainty increases the intent of management and associated policies will be less fixed. Shoreline management planning is an ongoing process so SMPs are reviewed as new information and knowledge becomes available. In principle, this review occurs every five to 10 years.

1.2 Project area

The project area is the section of shoreline for which the SMP describes the plan and sets the policies. For the North Norfolk SMP, this is the frontage from Old Hunstanton up to the end of the shingle ridge at Kelling Hard.

Chapter 2 provides a description of the project area and explains how the character of the area has played a vital role in developing the plan.

The boundaries at Old Hunstanton and Kelling Hard match the neighbouring SMPs (the Wash SMP and the Kelling to Lowestoft SMP). These boundaries have changed from the original SMP. The boundary at Old Hunstanton was selected so that the whole of the Wash could be covered by one SMP. The boundary at Kelling Hard was selected to coincide with the north Norfolk drift divide (this is known to drift between Cromer and Weybourne). There are also inland boundaries where rivers flow toward the shoreline. The SMP has four river boundaries and these match the downstream boundary of the North Norfolk Catchment Flood Management Plan (CFMP).

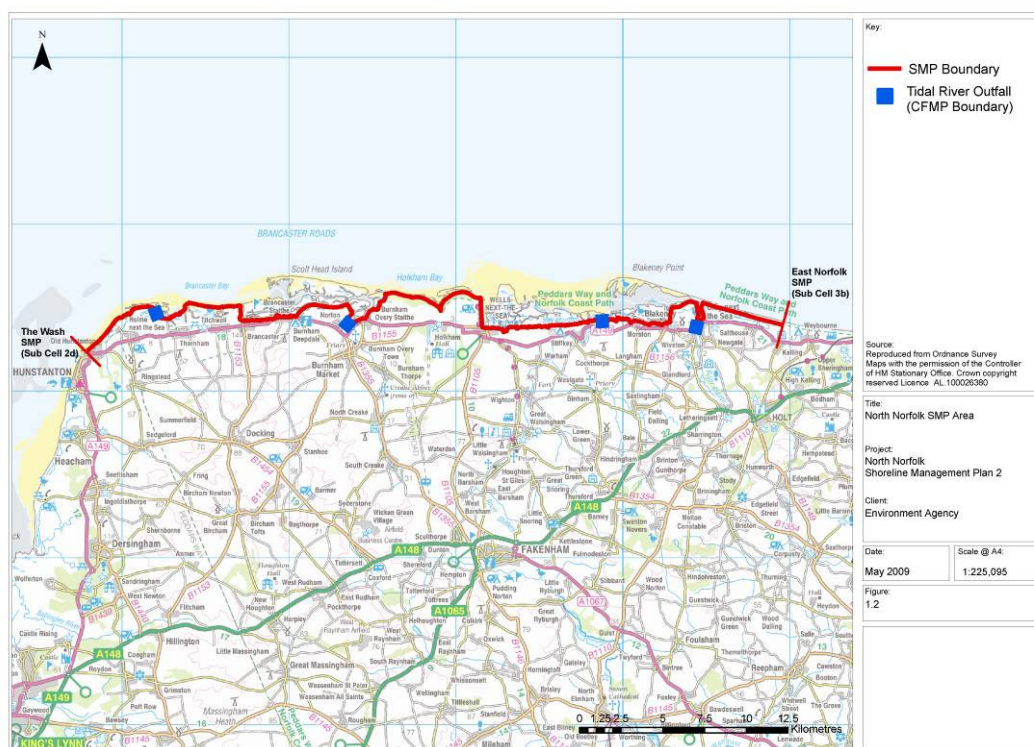


Figure 1.2 North Norfolk SMP area

The exact location of the two 'open coast boundaries' is:

- western boundary – the transition from cliffs to dunes to the immediate east of Old Hunstanton. This is the eastern boundary of the Wash SMP
- eastern boundary – the transition from shingle ridge to cliffs at Kelling Hard. This is the western boundary of the Kelling to Lowestoft SMP2.

The exact location of the four river boundaries is:

- River Hun – outfall at Thornham
- River Burn – outfalls at Burnham Overy Staithe
- River Stiffkey – outfall north-east of Stiffkey village
- River Glaven – outfalls located around Cley-next-the-Sea

A much wider area has been taken into account in developing the plan. This so-called study area includes everything that can influence shoreline management and everything that can be influenced by it. This study area covers much of the North Sea, the rivers up to at least their tidal limit, the whole area within the tidal flood zone and to some extent also the hinterland and further afield that has links to all the features in and around the north Norfolk coastline.

1.3 The plan development process

1.3.1 Organisations involved

The SMP has been developed through a partnership approach between all relevant authorities: the authorities that manage the shoreline, the planning authorities, the statutory stakeholders and other organisations that have an interest or responsibility. These organisations have been involved through both officers and elected members.

The SMP is mainly the long-term plan of the authorities that manage the shoreline. For the North Norfolk SMP this is the Environment Agency who manages the flood defences for the whole of the SMP area.

Interaction between the SMP and land use planning is essential so all planning authorities have been involved as full partners. There are two local authorities and one county council covering the North Norfolk SMP area:

- Borough Council of King's Lynn and West Norfolk
- North Norfolk District Council
- Norfolk County Council

The statutory stakeholders for the Strategic Environmental Assessment (see section 1.5) are:

- Natural England
- English Heritage

Of the other organisations that have an interest or responsibility in managing the North Norfolk coast, the following two are involved as partner organisations:

- Wells Harbour Commissioners
- Norfolk Coast AONB partnership

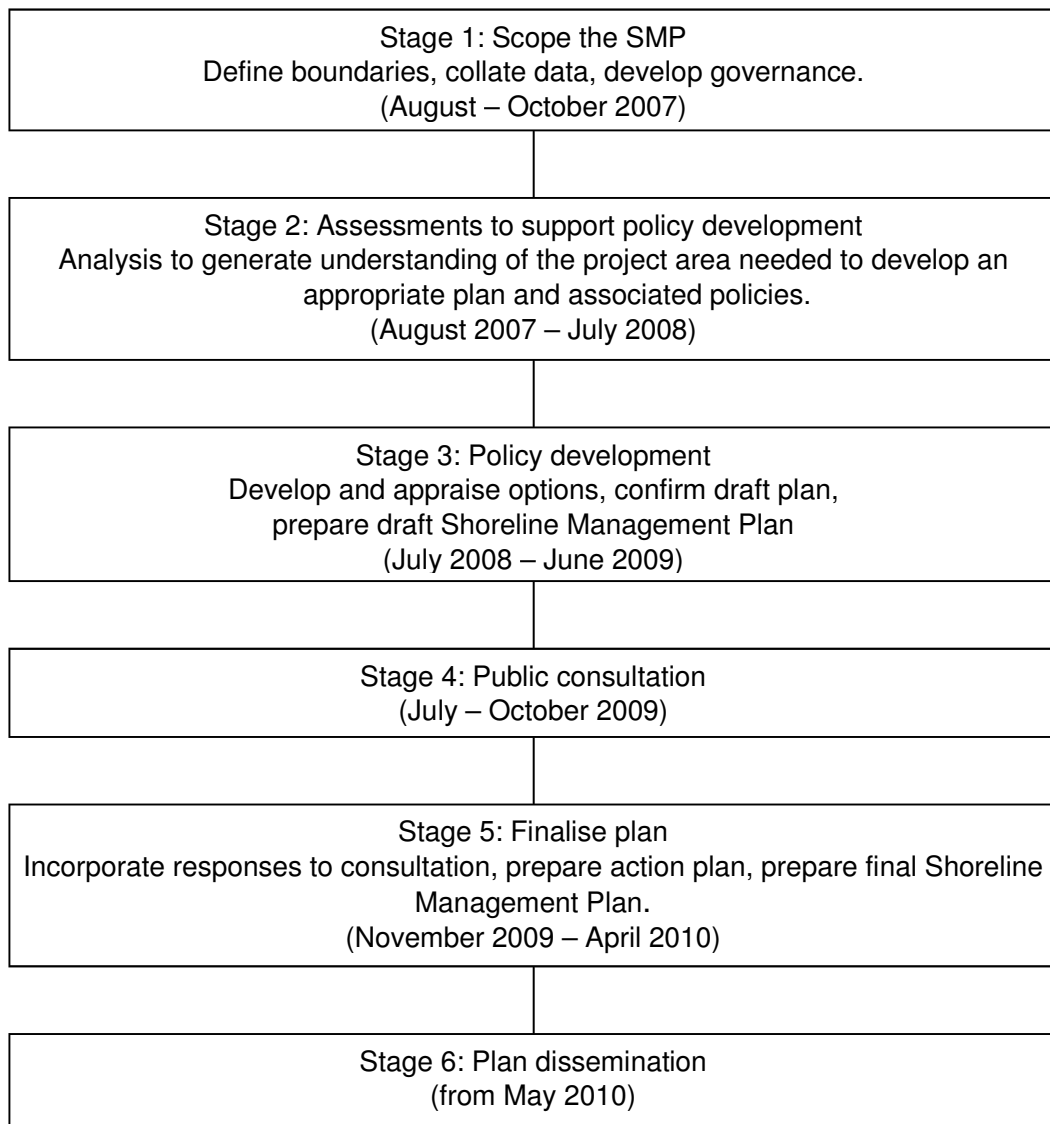
1.3.2 Stakeholder involvement

Appendix B contains a detailed account how we have involved stakeholders in developing the North Norfolk SMP. The process of developing this SMP has been led by the organisations listed above (the Client Steering Group). In addition, we have involved members from both local authorities, Norfolk County Council and the Environment Agency's Regional Flood Defence Committee in the Elected Members' Forum. These representatives have scrutinised the SMP process from the start, and have provided a way for these authorities to influence the draft plan.

We have also identified a group of more than 60 key stakeholders who have a greater interest in the outcome of the SMP. We have met with some of these organisations on a one-to-one basis to explain how the SMP might affect them, and to obtain more detailed local knowledge about the SMP area. We have also held meetings for all key stakeholders to inform them that we are revising the existing SMP and asking for their input into the process. We have been in touch with other people and organisations who live and work along this coastline through public drop-in events and articles in local newsletters.

1.3.3 Overview of SMP development process

The development of SMPs follows the principles and processes set out in the Shoreline Management Plan guidance issued by Defra in March 2006. This guidance identifies six stages:



This draft Shoreline Management Plan marks the end of stage 3. The current public consultation is stage 4. Appendix A contains more detailed information on the development process up to now (stages 1, 2 and 3).

1.4 Principles for shoreline management of north Norfolk

The development of the SMP has been based on a set of principles agreed among all the organisations involved in the process. Some of these principles can be, by their nature, contradictory. This reality is one of the main challenges of shoreline management. It is unlikely, perhaps impossible, to completely achieve all these principles. Instead, the SMP aims to provide the best achievable balance between the principles in the short, medium and long term. As a whole, this set of principles represents the balance of values to which the SMP aspires. The order of the principles does not indicate the order of importance.

1. To manage the coast to reduce reliance on defences and to promote flexible coastal management options for present and future generations.
2. To ensure that local policy decisions do not adversely affect wider natural coastal processes
3. Work with coastal change to take account of uncertainty about the future in the timing of policies
4. To consider social and economic wellbeing and allow communities and individuals to adapt to coastal change
5. To consider the effects of coastal change on local industries (tourism, agriculture, fisheries, etc.)
6. To take account of the value of the North Norfolk coast area to wider society
7. To ensure that the timing of the policies allows the land use planning system to respond to any shoreline management changes and their consequences
8. To contribute to maintaining and enhancing protected sites and species, subject to natural change
9. To support maintenance and enhancement of biodiversity in the wider coastal countryside
10. To contribute to maintaining and enhancing the character of the coastal landscape
11. To have regard for the historic environment and its value for the heritage, culture and economy of the area

1.5 Compliance with procedures

This SMP takes full account of the requirements from a number of important related fields. It has been developed through a parallel and integrated process with a Strategic Environmental Assessment (SEA, related to the associated EU directive) and an Appropriate Assessment (AA, related to the EU's Habitats directive), which have supported the development of the plan and are provided as stand-alone documents in appendices L and M. Furthermore, the SMP's inclusion of general sustainability criteria has been demonstrated through a signposting exercise based on the sustainability appraisal (SA) process. This is included in appendix J. Finally, compliance with the EU's Water Framework Directive is demonstrated in appendix K.

1.6 Structure of the Shoreline Management Plan

The Shoreline Management Plan is divided into a number of parts. There is the main SMP document (this document), which includes a set of accompanying appendices. Also, there is a separate non-technical summary, a stand-alone Appropriate Assessment (AA) and a stand-alone Strategic Environmental Assessment (SEA) – see above.

This document (the main SMP document) is aimed at a wide audience, typically an elected member of a relevant authority or an interested member of the public. The document is intended to be as concise as possible without leaving out important details. The aim is to justify the draft plan and policies and to identify what they mean. As a result, the information in the main document is only about the draft plan. Information about other policies considered during the SMP process is included in the relevant appendices.

The structure of this document is as follows

- Chapter 2 presents a summary of the technical background of the SMP and refers to a set of technical appendices for more details.
- Chapter 3 provides a high-level description of the draft plan and policies, the overall reasoning behind it and its implications.
- Chapter 4 provides more details about the draft plan in the form of maps and tables.
- Chapter 5 will contain the action plan. This will be an overview of the specific activities that the partner organisations have agreed to implement the plan and policies. The action plan is not included in this draft SMP but will be prepared after the public consultation to reflect the final plan and policies.

The non-technical summary is a concise and more accessible version of the main document. For this reason, it only contains information that is included in the main document itself and not in any of the appendices. This non-technical summary is aimed at a wider audience than the main document and is intended to be understood by the general public.

The AA and SEA are stand-alone documents based on their respective guidance. They have been developed in discussion with the Environment Agency, Natural England and English Heritage.

2 Basis for plan development

This section describes the background of the Shoreline Management Plan. Management of the shoreline combines technical elements with 'softer' elements. The SMP aims to use coastal processes and management to achieve the best possible balance between all relevant uses of the land and the environment. This section starts by describing both the technical side (in section 2.1) and then describes land use and the environment of the north Norfolk shoreline (in section 2.2).

2.1 Coastal processes and coastal defences

2.1.1 Introduction

The north Norfolk coastline stretches over 75 kilometres, or about 42 kilometres as the crow flies. It faces the North Sea with tidal patterns that are the main (but not exclusive) control of sedimentary processes that lead to the coastline's distinctive physical features. The general drift along the coast is in a westward direction created by weak but frequent events. There are reversals in the drift caused by seasonal variations and north-east storm surges.

This text box introduces and explains some of the key coastal processes in the North Norfolk SMP area. These have played an important role in developing the plan.

Tidal prism:

The volume of water that flows in and out of a tidal channel during a complete cycle of high and low tide. For tidal channels behind a spit (such as Blakeney spit) or barrier island (such as Scolt Head), the tidal prism depends on the size of the area between high and low tide. Increasing the tidal prism means that more water flows through the channels, which will increase their size.

Formation of bays:

Bays along the open coast form because of varying geology. They typically have a curved (parabolic) shape between headlands as a result of the way that waves interact with changes in depth ('wave refraction'). Headlands can be hard or soft, natural or artificial. Headlands are control points for the shape of the bay. Changes in their location will change the shoreline in the bay. In north Norfolk, the bays are controlled by the outer estuaries of the rivers, for example at the ends of Scolt Head Island and Blakeney spit.

Text box 2.1: Key coastal processes in north Norfolk

There are three major control points along the frontage - Gore Point (associated with the River Hun outfall), Scolt Head Island and Blakeney Point. Consequently the coast has been divided into three units referred to as super-frontages. These super-frontages are mainly independent, but there are important interactions within them. They are therefore appropriate units for broadly assessing coastal processes and are also relevant for developing policy.

The three super-frontages are:

- super-frontage 1: from Old Hunstanton dunes (SMP boundary) to Thornham. Within this super-frontage the processes along the shoreline take place from east to west. The ebb estuary of River Hun influences Gore Point which in turn can be seen as a control point for the 'bay' formed by the Old Hunstanton dunes. The tidal prism is currently restricted by the reclaimed land between Thornham and Holme-next-the-Sea



Old Hunstanton dunes

- super-frontage 2: from the western end of Brancaster bay to the eastern end of Stiffkey bay. Scolt Head Island is the main physical feature in this unit. Its two ends are control points for the bays on either side - Brancaster bay and Holkham bay. In the long term, there is a chance that Scolt Head Island will continue to roll back towards land and may even reattach to the land. This would have a big influence on the area directly behind Scolt Head Island and also on the neighbouring bays. The tidal prism is currently restricted by various reclaimed areas behind the barrier coast. Warham and Stiffkey marshes east of Wells-next-the-Sea form a typical 'open coast' and are not greatly affected by how the neighbouring frontages are managed.



Stiffkey channel / marshes

- Super-frontage 3: from the western end of Blakeney spit to the eastern end of the Cley-Salthouse shingle ridge at Kelling Hard (SMP boundary). Blakeney spit is the main feature and, as for Scolt Head Island, it is possible that the current process of roll-back will eventually cause it to reattach to the land. The eastern end is characterised by the Cley – Salthouse shingle ridge fronting brackish marshes. The tidal prism is currently restricted by various reclaimed areas behind the barrier coast.



Blakeney spit ridge



Figure 2.1: Super-frontages in the North Norfolk SMP area

Some of the coastline is not defended where the land rises gradually from the shore to higher ground. Other sections, particularly reclaimed land, are defended by vegetated embankments and by partly-managed dunes. There are several small settlements fronted by hard defences. Seaward of these areas are areas of intertidal saltmarsh and mudflats defined by the control points of Gore Point, Scolt Head Island and Blakeney spit.

A full assessment of the coastal processes in the north Norfolk area is in **Appendix C** and a brief summary is provided in the following sections.

2.1.2 Geological development

Underlying chalk and glacial tills are the foundations of the area. Chalk underlies the whole of the north Norfolk coast area but it is only seen at the surface in two sections of the coastline: Hunstanton cliffs and a wave-cut platform from Weybourne to Cromer (just outside the SMP area). There is a long west to east valley that runs parallel to the shore that is located along the back marsh of the existing coast. This valley is thought to have been caused by faulting of the chalk. This valley dips from Holme-next-the-Sea to Salthouse and then leads offshore.



Kelling Hard and beginning of chalk cliffs

The repeated advance and retreat of glaciers and ice sheets (known as ice ages) that have happened during the last two million years (Pleistocene) has been instrumental in forming the modern landscape of north Norfolk. The old cliff line that extends along the edge of the hinterland rises above present day high water mark (HWM) and marks the likely high sea level during the last warm period following a cold glacial period, known as the Ipswichian, 130,000 to 125,000 years before present.

Mud and sands lie between the chalk bedrock and the deposits from the Holocene, a period extending from 11,000 years ago to the present day. These vary from two to five metres thick and were mostly laid down during the last glacial period when the front of the Devensian ice sheet lay along the coast. There are still some tills that extend beyond the existing coastline. These are thought to have provided coarse-grained sediment for Holocene coastal deposits and may still do so. There are some exposures of this glacial till above the intertidal zone that form till islands known as 'eyes' (Cley Eye, Blakeney Eye, Little Eye and Gramborough Hill).

Early Holocene geomorphology was dominated by low sea levels of 16 metres below current ordnance datum and characterised by fluvial processes. This resulted in local generation of freshwater peats that developed 7,000 to 6,000 years before present. A key feature of this was a layer of mudflat sediment up to 15 metres thick and then the development on top of the mudflat layer of saltmarsh as the area became more waterlogged with increased salinity. During this period, there was landward progression of barriers at around one metre a year in response to sea level rise with little loss of intertidal zone. However, Andrews et al. (1999) have proposed that the Holocene sediment prism, the area over which sediment processes affect the coastline through transport, is now half its original size. This paper also proposes that the barriers of Scolt Head Island and Blakeney spit are relatively young, being further out to sea than others, with Scolt Head

developing as a spit from Holkham and Blakeney spit developing as a response to land reclamation.

2.1.3 Recent development

Many of the settlements along the north Norfolk coastline have developed from small fishing settlements. Records for Cley-next-the-Sea date back into the middle ages when St. Mary's church was built during the 13th century. Next door, Blakeney was once a medieval port and had been ranked as the fourth most important port in England. However, the port began to lose its importance into the 17th century as land reclamation dominated the shoreline and reduced the navigability of the channels. Further along, the settlement of Holkham was created by the Vikings with the name 'Holkham' translating as 'ship town' in Danish. The settlement is now dominated by the Palladian Holkham Hall where Lord Coke lives.

Reclamation was introduced to the United Kingdom in the 1580s. Some areas in north Norfolk were the first to be reclaimed from the sea for use in agriculture, using dykes and ditches. Two of the main documented reclamations were at Cley-next-the-Sea during the 17th century. Before this reclamation, Cley had been a trading port but it ended up one mile inshore after the reclamation. There was also a significant amount of saltmarsh reclaimed at Burnham Overy. This process began in 1639 and was completed in 1859 with the building of the Wells sea wall extending from south to north along the harbour channel.

It is thought that the reclamation of saltmarsh for use in agriculture was one of the main drivers for the growth of Blakeney spit (and Scolt Head Island) at the eastern end of the frontage. The reclamation generated a series of barriers by limiting drift along the shoreline and restricting sediment transport rates transverse to the shore. This is how the coastline that we know today has developed.

2.1.4 Contemporary processes and geomorphology

The north Norfolk coastline has varying tidal ranges and levels across the frontage. The tidal range at Hunstanton is nearly 6.5 metres whereas at Cromer, just east of the SMP area, it is only 4.4 metres.

The wave climate of north Norfolk is characterised by higher wave heights at Cley to the east than at Scolt Head in the middle of the frontage. The Environment Agency Norfolk Area monitoring programme shows that at Cley, the wave height approaching the shingle ridge seems to be similar to the offshore wave height, while the waves at the seaward edge of Scolt Head are only around 80 per cent of the offshore wave height. This represents an average over the survey. The wave heights at Scolt Head could be greater than those at Cley during specific events. The north-north-east wave directions generated through storm events show a wide variety of offshore

directions. This highlights the difficulty in determining wave climate information for this stretch of coastline.

Sediment transport rates have been modelled from the 1970s to recent times with improving technologies. The basic method generates information through a time series of wave heights, periods and directions, transport rates along the shoreline and drift rates. The rates calculated range from 160,000 cubic metres a year (m^3/yr) at Weybourne to 600,000 m^3/yr at Blakeney and 190,000 m^3/yr for Scolt Head. Some of these results could be disputed due to uncertainties in the modelling but it gives an overview of the processes occurring. Research into sediment budgets (the difference between sediment inflow and outflow of a given area over a period) from the University of Newcastle (1998) has concluded that the north Norfolk coastline has a positive sediment budget.



Salthouse – Cley shingle ridge

Barrier beaches of the north Norfolk coast are of different types and sizes with gravel ridges and sand dunes. These are transgressing at about one metre a year and, in some cases, new ridges are being created on their seaward side implying a more complex process. The landward movement of sediment is due to the progressive movement of material in a landward direction due to storm waves transporting material to the landward edge of the barriers. Some barriers are also developing sideways with the western ends of Blakeney spit and Scolt Head moving westwards by up to 3.5 metres a year. In the case of Blakeney Point, local observations have indicated a storm surge from the north regularly (about every 40 years) transports this material back to the south east and creates a cyclic system of growth and decay of the barrier.

The sand dune systems are generally single ridges colonised by *Ammophila*, a grass accustomed to sand environments. In some places there is some fore-dune development. Holkham dunes have recently seen a large amount of development of the fore-dunes with the mature dune ridges being

colonised by extensive flora. The dunes at Blakeney Point and Scolt Head are eroding as they are forced to roll back by wave action.

There are seven tidal deltas along the coast: Gore Point, Thornham, Titchwell, Brancaster Staithe, Burnham Overy, Wells harbour and Morston / Blakeney. The intertidal areas of these deltas reduce wave energy but the effect depends on the tidal currents from the inlets relative to the transport rate along the shoreline. Therefore, a change in the tidal exchange of the inlet can have an effect on the delta and the neighbouring shoreline.

The north Norfolk coast has an area of around 2,200 hectares of saltmarsh ranging from pioneer through to upper saltmarsh. This size is significant at a European scale. The rollback of barriers is resulting in a gradual overall loss of saltmarsh area as the landward edge is fixed at the higher ground. This loss has been offset by saltmarsh developing in the areas behind newly-formed barriers, such as at the Holkham Gap in the 1990s. Around 50 per cent of the original saltmarsh area has been reclaimed in the last 300 years. Most of these reclaimed areas are used as grazing marsh. They are of great ecological importance due to their salinity gradient created by saline seepage and freshwater springs, but they are also among the most fragile habitats of the north Norfolk coastline.

2.1.5 Coastal defences

Over half the defences along the north Norfolk coastline are earth embankments, commonly known as sea banks. Around 15 per cent of defences are classed as natural defences, either sand dunes or shingle ridges. Several of these defences protect private sections of land such as golf courses and nature reserves. Others are there to protect settlements from flooding. The quaysides of Wells-next-the-Sea and Blakeney are also classed as hard defences.



Morston flood embankment

There are a few sections of undefended land where there is enough land between high and low water to reduce the effect of waves. These areas are also limited by the gradually-rising ground level.

The condition of flood and coastal defences is regularly checked by those who manage them. Most of the defences along the north Norfolk coast are assessed to be in 'good' or 'fair' condition, which is typical for defences of this type. The condition can be used to estimate the residual life of an individual defence in the extreme scenario that the defence would no longer be managed (a 'no active intervention' scenario). This information is needed to determine the effect that shoreline management has. A table showing the results of this assessment is in **Appendix F**.

The main conclusion of the assessment is that, under a scenario of no active intervention, assuming no further management of the defences, almost all defences would stop functioning within a period of 20 years. Only the embankment at Wells is predicted to last until after 2025.

Figure 2.2 shows the estimated defence failure for the existing defences for each epoch under a no active intervention scenario, as well as where there are 'natural' defences. These are defences such as sand dunes and the shingle ridge at Salhouse.

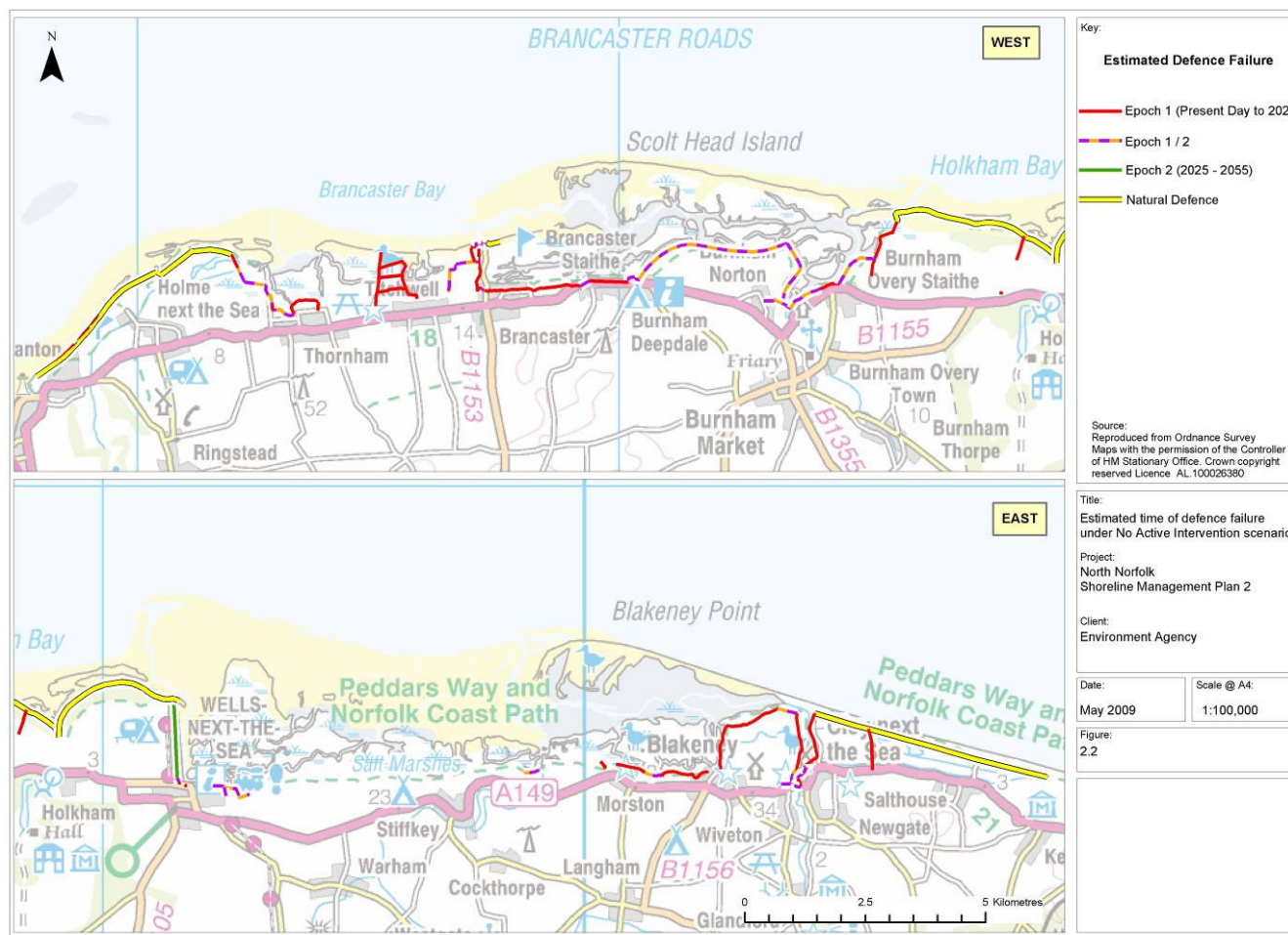


Figure 2.2: Estimated time of defence failure under no active intervention scenario

2.1.6 Future external development

Sea level has risen between one and two millimetres a year since 1900 (as illustrated in Figure 2.3). However, there is great uncertainty about the future rate. One certain fact is that global temperatures are rising and this is leading to the thermal expansion of water and the melting of land ice. Combined, these two effects are likely to lead to an increasing rise in global sea levels. Rates of sea level rise along the north Norfolk coast are uncertain, but it is essential that this SMP takes into account the possibility of increasing sea level, regardless of the cause. This is known as applying the precautionary principle.

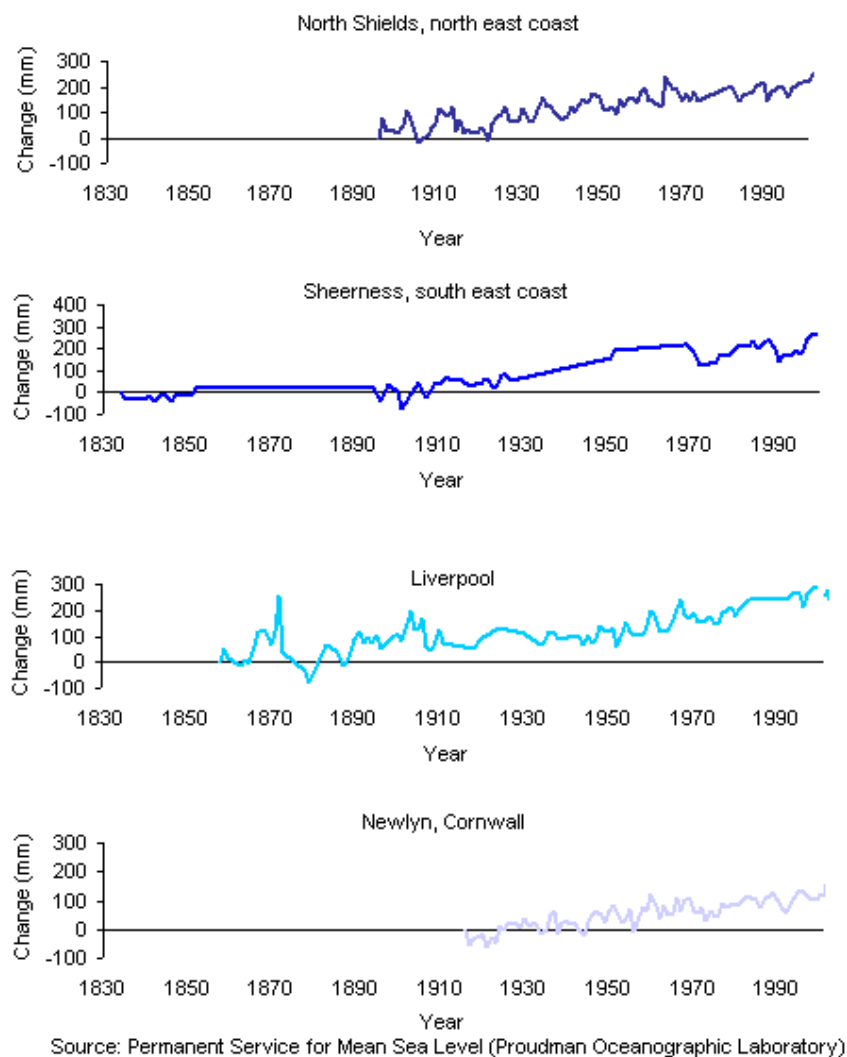


Figure 2.3: Recorded sea level rise

Defra guidance provides values for sea level rise up to 2105. These are the values that have been used for all SMPs in assessing future shoreline response. The Defra guidance values are in Table 2.1 and illustrated in Figure 2.4. The values suggest a total sea level rise of 1.1 metres by the end of epoch 3 (2105).

Table 2.1 Defra (2006) sea level rise guidance

Time period	Net sea level rise (mmyr ⁻¹)	Total sea level rise (mm)	Cumulative sea level rise (mm)
Epoch 1 (2009 to 2025)	4.0	64	64
Epoch 2 (2025 to 2055)	8.5	255	319
Epoch 3a (2055 to 2085)	12.0	360	679
Epoch 3b (2085 to 2105)	15.0	450	1,129

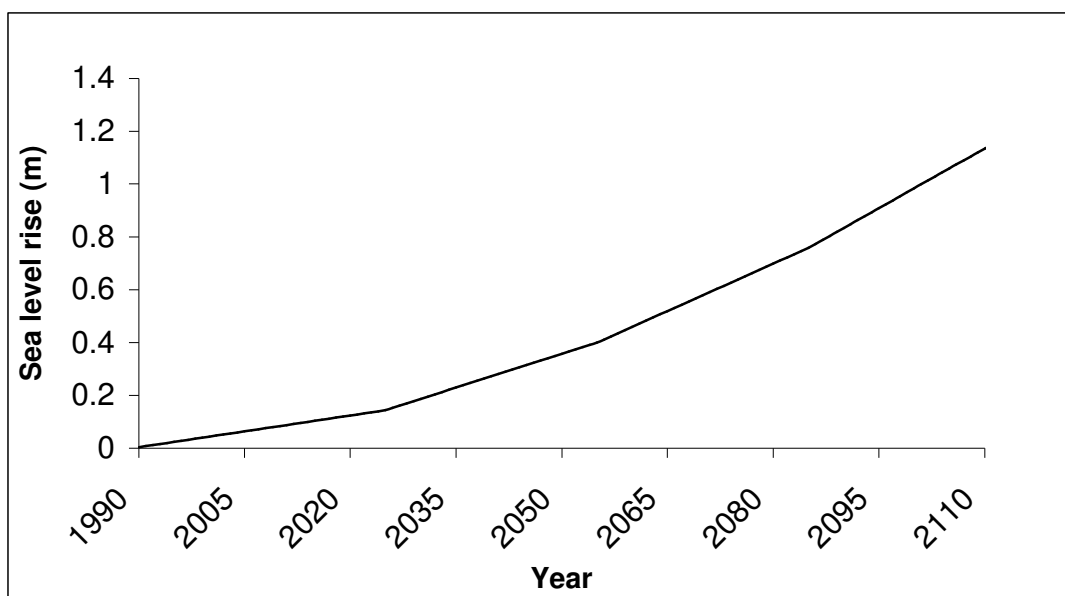


Figure 2.4: Expected sea level rise over the period 1990-2115 for the East of England

In addition to sea level rise, there is the possibility that climate change will bring about increased storminess. In general, this would lead to greater wave heights and a potential threat of greater flooding of the foreshore. These greater wave heights may lead to increased rollback of the dune systems and the shingle ridge. They may also drive more sediment into the backshore areas due to waves holding more energy and being able to carry more sediment.

The key to taking into account the effects of sea level rise, and the great uncertainties associated with the values, will be to establish 'no regret' decisions for the shorter term, but at the same time emphasising the need to start preparing for change.

With the increasing drive for renewable energy, and the current construction of large wind farms, it is also important to consider the potential effect of

those developments on the geomorphology and overall coastal processes functioning of the north Norfolk shoreline. Recent research has shown that effects of the construction of wind farms occur only around the foundations of the structures with some temporary effects during actual building and the laying of cables. There are no known cumulative effects with regard to the coastal or seabed processes. For offshore dredging, before a license can be given, the effects are assessed in terms of sediment processes, hydrodynamics and water quality. If any effects were to be felt along the coastline, dredging would not be able to take place.

2.2 Land use and environment

2.2.1 Introduction

This section is based on the three super-frontages introduced in section 2.1.1.

Land use and environment are described for both the coastal strip and hinterland. The coastal strip is defined as the area directly at risk from erosion or flooding. The hinterland generally refers to the area inland of the coastal strip, but the SMP only considers features that are affected by shoreline management.

The text is illustrated by cross-sections. These cross-sections are intended to provide clarity when looking at each super-frontage. As can be seen by the text, the coast is a complex area with multiple layers of physical, ecological, social and economical values. The interaction between communities/society and these values can be extremely intricate and the cross-sections aim to provide an insight into these relationships. They are not intended as 'dumbed down' representations of the area but should be viewed with the corresponding text.

The full theme review, on which this section is based, is in **Appendix D**. The theme review identified features relevant to the SMP, as well as benefits and issues associated with them so for that feature specific objectives could be determined.

2.2.2 Super-frontage 1 - Old Hunstanton to Thornham

This super-frontage is characterised by reclaimed marshland fronted by a sand dune system running from Old Hunstanton through to Holme-next-the-Sea.

The coastal strip is defined by the tidal flood zone. This includes parts of the settlements of Old Hunstanton, Holme next-the-Sea and Thornham and the A149 near Old Hunstanton.

Coastal strip

Super-frontage 1 includes the small settlements of Old Hunstanton village, Holme-next-the-Sea and Thornham. These are located between the A149 coast road and the coast. There are some houses at risk of coastal flooding. The golf course at Old Hunstanton is behind the sand dune system. The settlement of Holme-next-the-Sea is situated behind dune systems on low-lying land and the properties at Thornham are fronted by an intertidal area of saltmarsh. The North Norfolk coastal path runs along this frontage. Surrounding the settlements is grade 2 and 3 agricultural land and rural countryside.

Holme dunes and parts of Holme marshes are included in the North Norfolk and Wash Ramsar sites, Wash and North Norfolk Special Protection Areas (SPA), Wash and North Norfolk Coast Special Areas of Conservation (SAC), the Wash and North Norfolk Sites of Special Scientific Interest (SSSI) and the Holme Dunes National Nature Reserve. The area has several classes of UKBAP habitat. Moving into the Holme coastal strip, there are coastal saline lagoons behind the sand dunes of the intertidal area. The saline lagoons and grey dunes (colonised dune systems) are European Annex I priority habitats, a list of European habitats of key importance and limited distribution based on bio-geographical regions. These back onto the River Hun tidal delta that runs through the land behind Holme dunes and outfalls into Thornham harbour channel.



River Hun outfall

This section of coast also has a small campsite area in front of the A149. The Norfolk Wildlife Trust nature reserve is in Holme dunes at Gore Point and has a recreational and tourism function. The beaches between Gore Point and

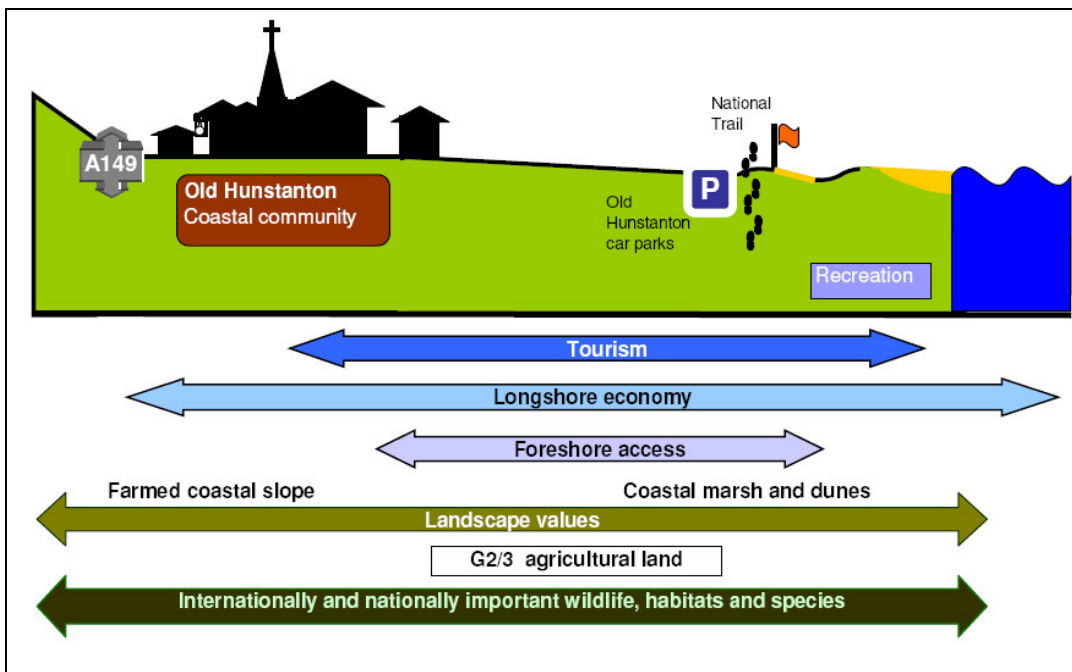
Old Hunstanton, and the access to them, are also important for recreation and tourism.

Hinterland

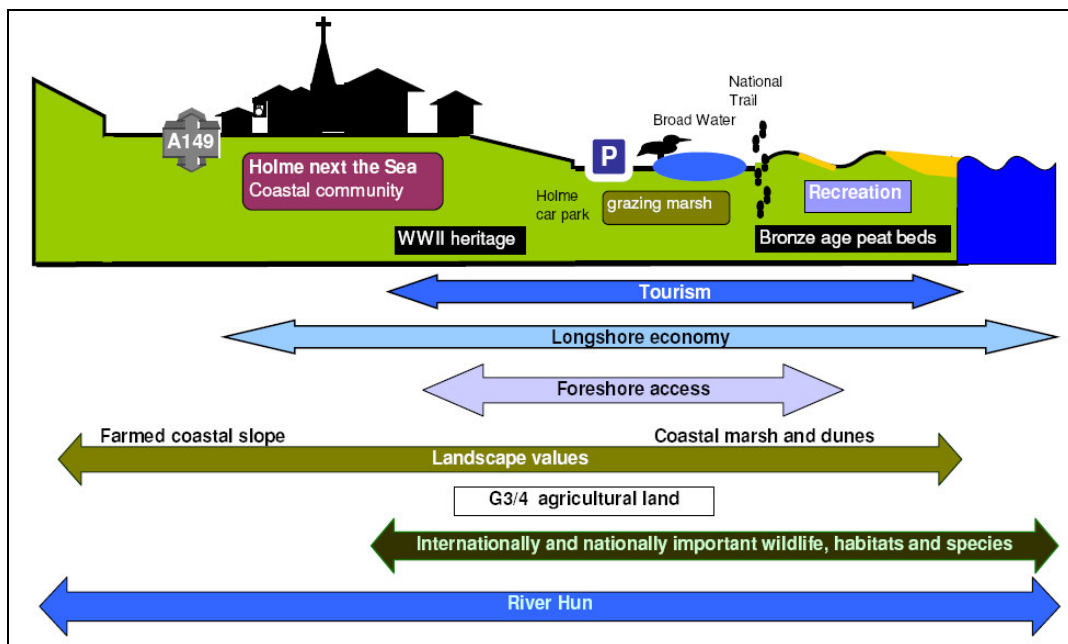
The hinterland of this super-frontage is higher ground that is used mainly as parkland, woodland and arable agricultural land. The area contains several historic features including numerous listed buildings and Hunstanton Hall registered park and garden.

Cross-sections

Old Hunstanton to Hunstanton golf course



Hunstanton golf course to Thornham harbour channel



Future external development

For this super-frontage there are no major land use developments planned that will be relevant for shoreline management.

2.2.3 Super-frontage 2 - Thornham to Stiffkey

The largest super-frontage of the SMP, this frontage includes Scolt Head Island and areas to the west and east for which Scolt Head Island determines the coastal processes. The landscape is dominated by intertidal saltmarsh and mudflats. There are long stretches of sand dunes at Brancaster and Holkham.

The coastal strip is defined by the tidal flood zone. This includes parts of the settlements of Brancaster, Brancaster Staithe, Burnham Norton, Burnham Overy Staithe, Holkham and Wells-next-the-Sea and the A149 at several locations.

Coastal strip

This super-frontage has a wide variety of different land uses and environmental areas. With the exception of Norton marshes and Holkham marshes, the entire super-frontage is part of the North Norfolk Ramsar site, North Norfolk SPA, North Norfolk SAC, North Norfolk SSSI and it contains several classes of UKBAP habitat. The landward boundary of the designation roughly coincides with the tidal flood zone boundary, apart from the low-lying defended area east of Wells, which is not designated. The sites are designated partly for intertidal interests (dunes, saltmarsh, mudflat) and partly

for freshwater or brackish interests (grazing marshes and saline lagoons). A feature of the environmental use with an important socio-economic element is the RSPB reserve at Titchwell, for which the defences are expected to be realigned in the second half of 2009. The intertidal zone consists of sand dunes at Brancaster and Holkham and saltmarsh in the areas of Titchwell, Scolt Head Island and Stiffkey. There is an expanse of mudflat and saltmarsh interlaced with channels behind Scolt Head Island.

The settlements of Brancaster, Burnham Overy and Wells-next-the-Sea include some houses at risk of coastal flooding. However, most of the houses are on higher ground. Many of the settlements and reclaimed grazing marsh along this super-frontage are protected by vegetated earth embankments. East of Wells-next-the-Sea there is an area of low-lying protected land that is currently used for agriculture and not designated for its habitats.

There are two small harbours behind Scolt Head Island at Brancaster and Burnham Overy Staithe where the River Burn outfalls. Both are used for recreation and commercial fishing. Wells harbour is the largest harbour in the SMP area. It is used as a base for commercial and recreational navigation. The North Norfolk coastal path follows the crest of the earth embankments in many places.



Burnham Overy Staithe

In terms of tourism land uses of the coastal strip, there are several car parks at beach access points along the coast. The Holkham estate has a large camping and caravanning area to the eastern edge of the estate. Titchwell RSPB reserve has a popular visitor centre and there are many amenities providing food and recreational activities along the coastline. The Royal West Norfolk golf course at Brancaster is an important recreational asset.

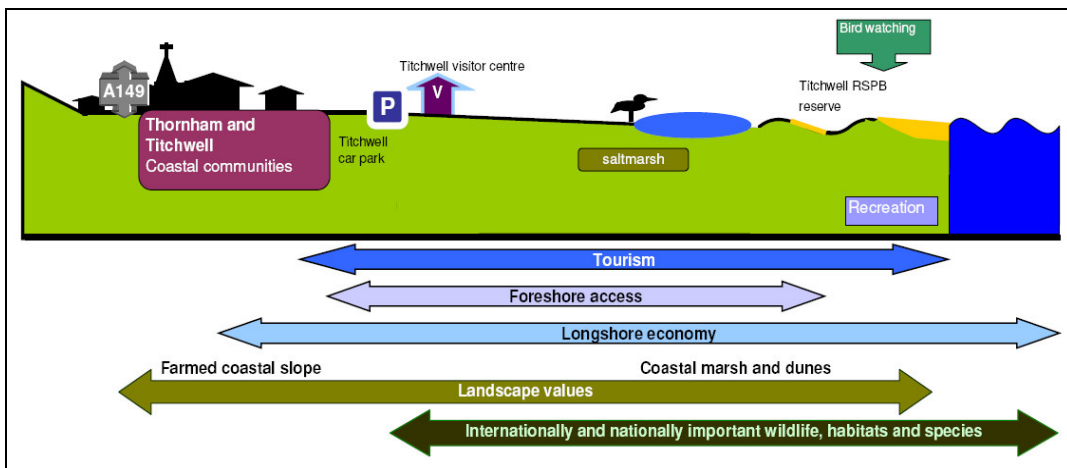
Other important activities include wildfowling on common rights land and bird watching.

Hinterland

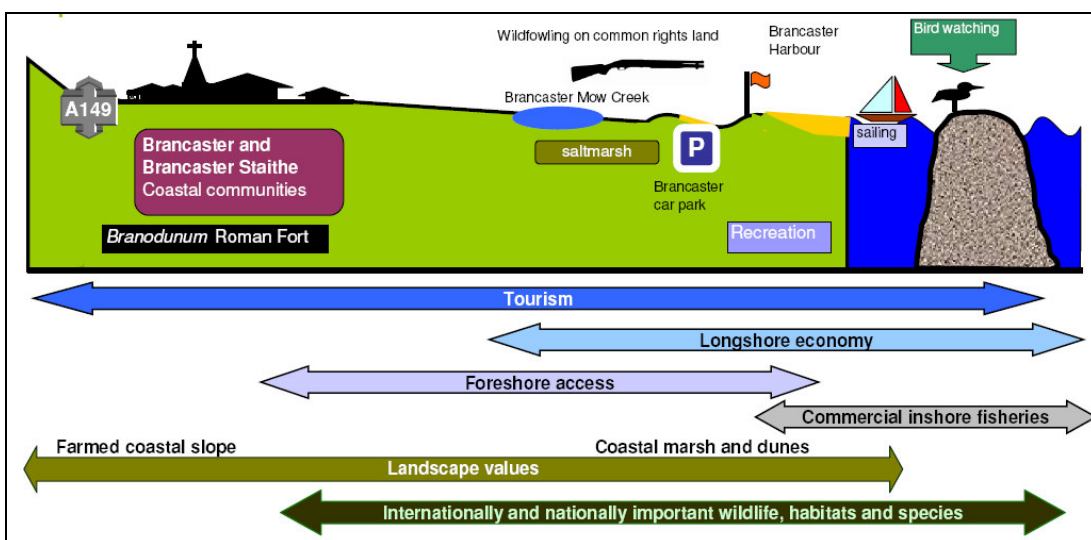
The hinterland contains several small settlements surrounded by parkland, woodland and agricultural land. Holkham Hall and its park back onto Holkham bay consisting of parkland, woodland and orchards. There are various historic sites including a Roman fort scheduled monument (SM) and remains of churches. The light railway runs from Wells inland to Walsingham.

Cross-sections

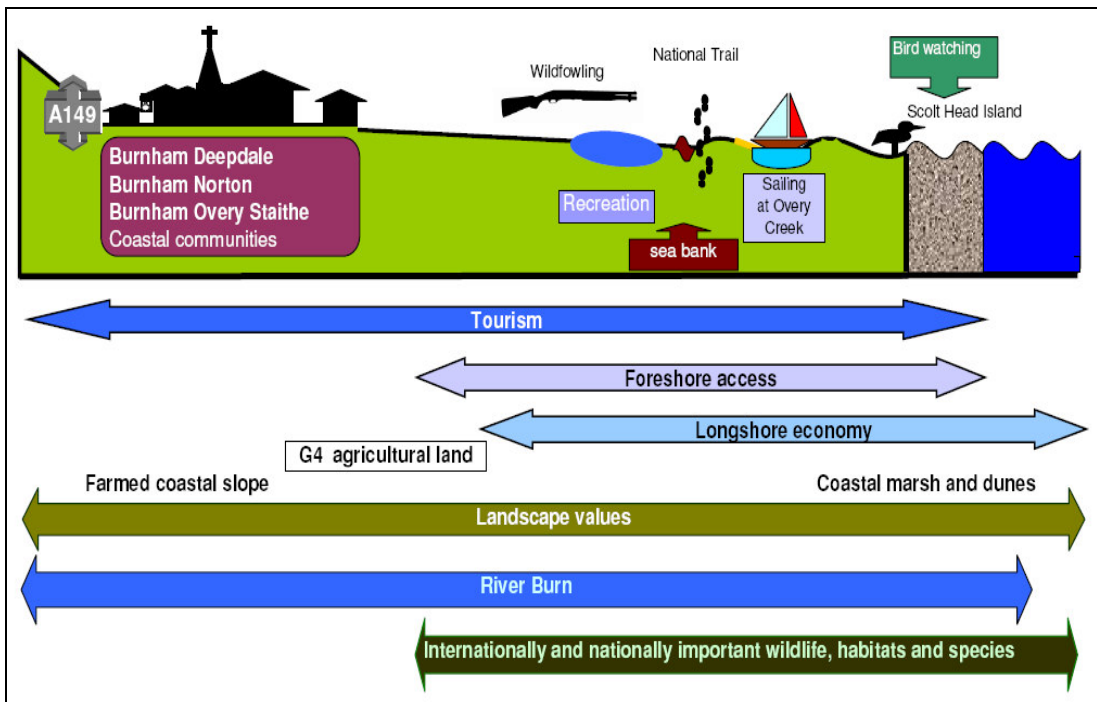
Thornham and Titchwell



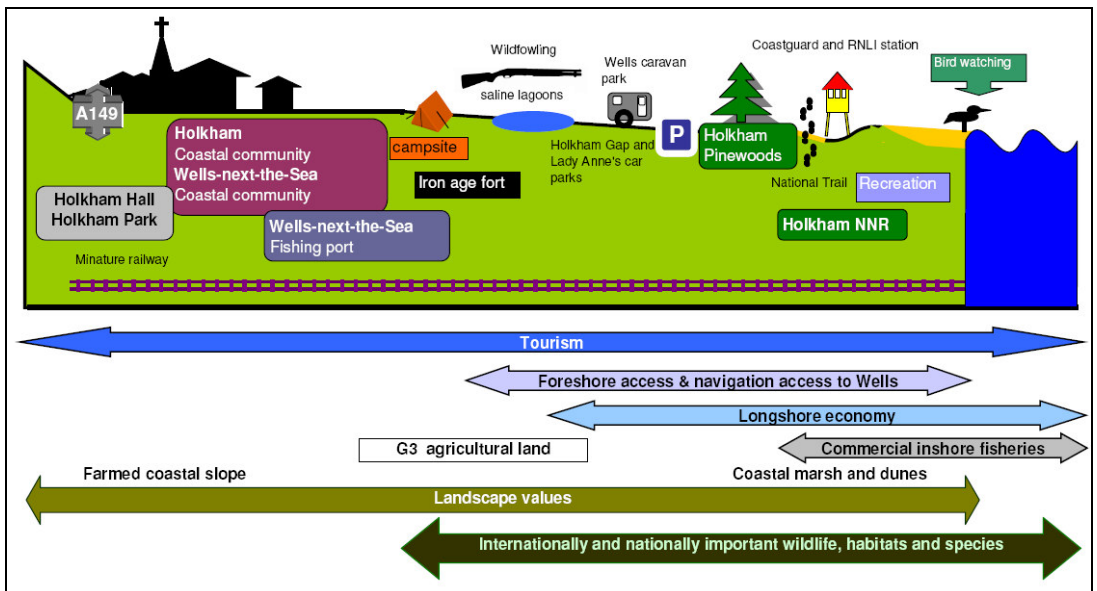
Brancaster to Brancaster Staithe



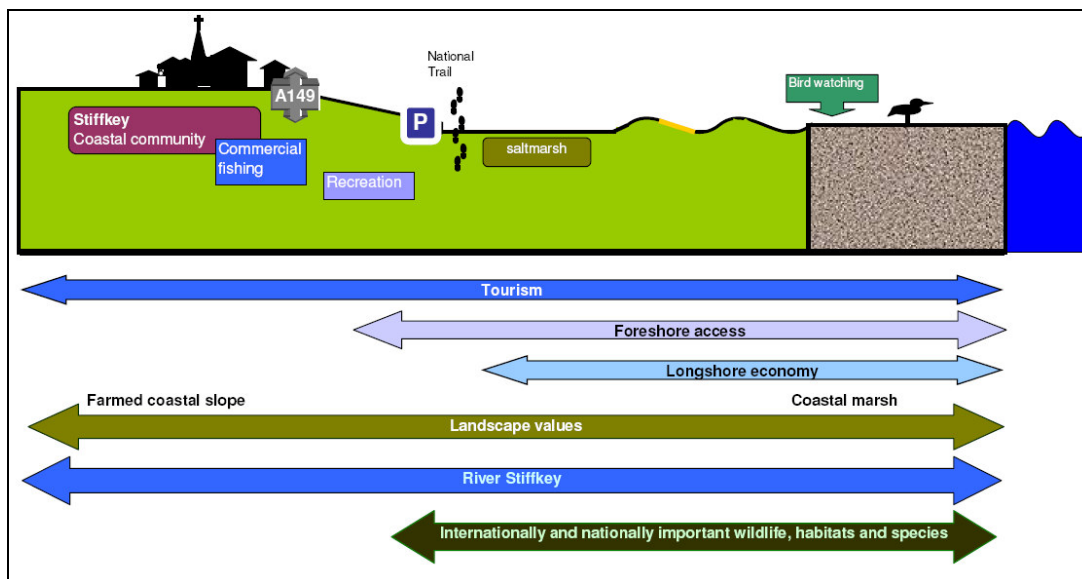
Scolt Head Island



Holkham bay and Wells harbour



Stiffkey and Warham marshes



Future external development

There are a number of expected or planned future developments that are relevant for shoreline management.

The embankments of the RSPB reserve at Titchwell are likely to be moved in the short term. The present realignment options are the breach of the northern wall following the building of a new defence line behind. The west wall is likely to be maintained as access to the bird hide. The RSPB has, at present, designed the planned realignment for a 50-year period, after which they expect further landward realignment will be needed in response to coastal processes.

As a result of local wind farm developments, the increased use of Wells harbour for access is currently being assessed under an Environmental Impact Assessment. If this is accepted, this is likely to start sometime during 2010.

2.2.4 Super-frontage 3 - Stiffkey to Kelling Hard

This frontage consists of Blakeney spit and the Cley and Salthouse shingle ridge.

The coastal strip is defined by the tidal flood zone. This includes parts of the settlements of Stiffkey, Morston, Blakeney, Cley-next-the-Sea, Wiveton and Salthouse and the A149 at several locations.

Coastal strip

Blakeney spit provides shelter to the settlements of Morston, Blakeney and Cley-next-the-Sea. These are small harbours, Blakeney being slightly larger

than the other two. They are used for recreation, boat trips and fishing which are the main social and economic activities in the settlements. Siltation of the creeks that provide access to the harbours is becoming an important issue.

There is access to the intertidal area from the car parks at Morston and Blakeney. There is a visitor centre for Blakeney spit at Morston. The North Norfolk coastal path follows the crest of the earth embankments in many places and the Cley-Salthouse shingle ridge. A visitor centre is situated along the A149 at Cley and bird watching is an important recreational activity across this frontage.



Blakeney spit beach

The shoreline of the spit to the east is fronted by a shingle ridge and backed by grazing marshland. Also there are saline lagoons behind the shingle ridge that are of high environmental value and are actively managed to keep them in good condition.

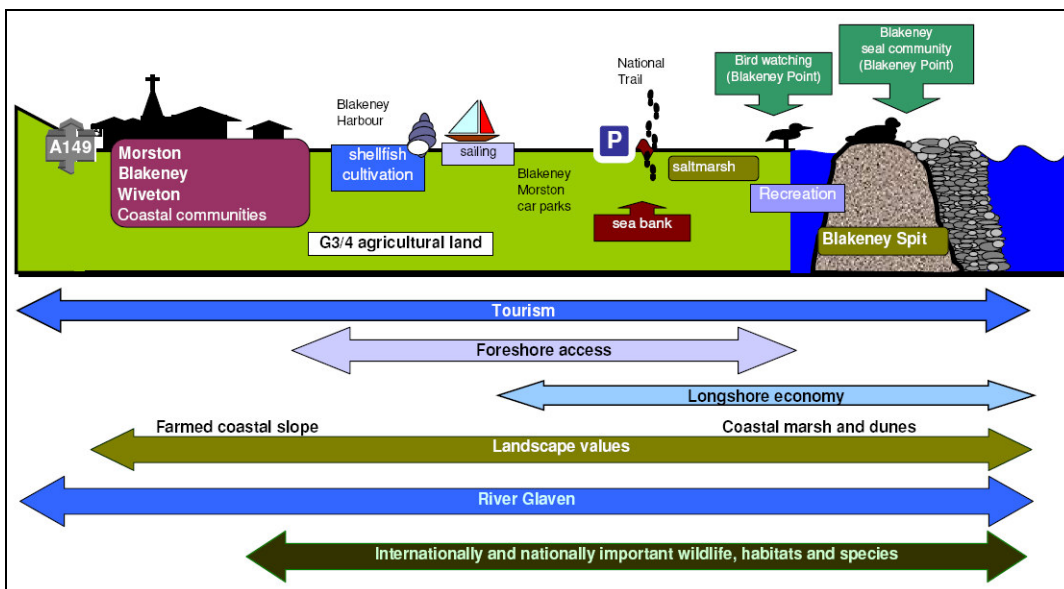
All of this area is part of the North Norfolk Ramsar site, North Norfolk SPA, North Norfolk SAC and North Norfolk SSSI and it has several classes of UKBAP habitat. The landward boundary of this area roughly coincides with the tidal flood zone. Blakeney spit has 'grey' dunes and is designated as Blakeney National Nature Reserve from Cley Eye through to beyond the end of the spit. Some of the reclaimed area is used for arable agriculture and grazing marsh. East of Morston there is an area of low-lying protected land that is currently used for agriculture and not designated for its habitats.

Hinterland

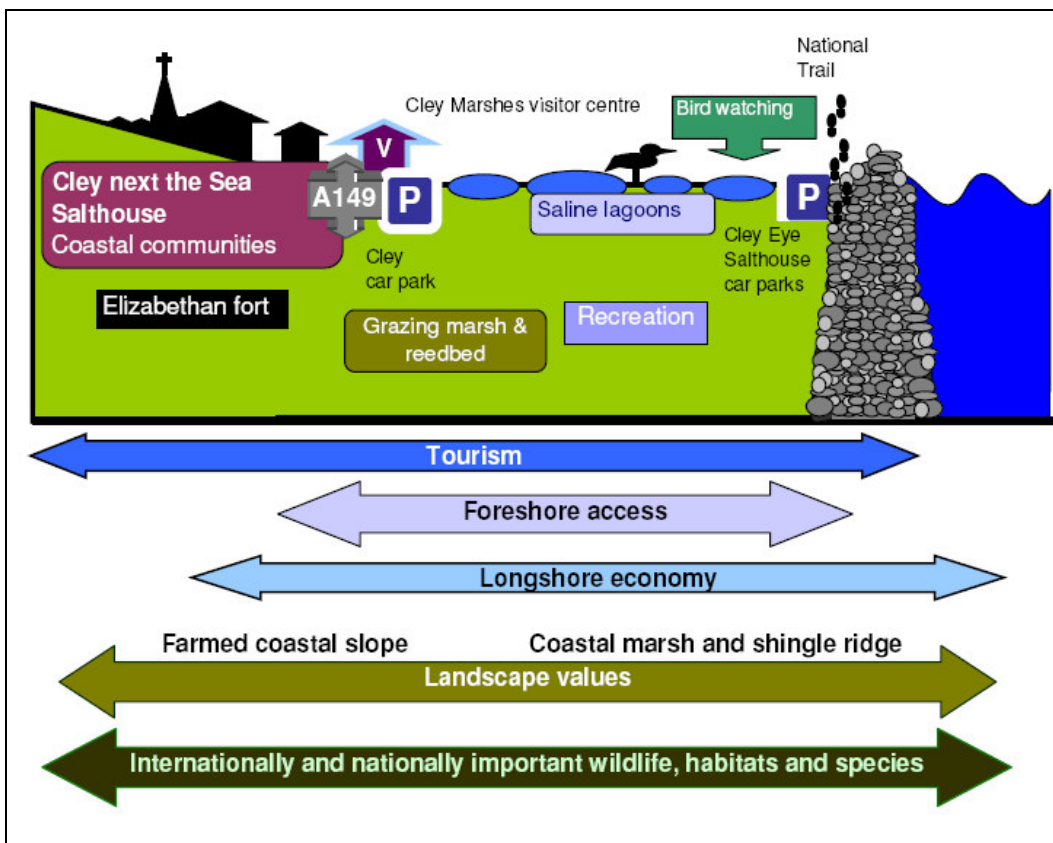
Several small settlements make up the hinterland of super-frontage 3 and there is a large area of arable agriculture. Further back on higher land there is a disused airfield from World War 2. This is in addition to several assets of local historic value, such as listed buildings.

Cross-sections

Blakeney spit



Cley and Salthouse



Future external development

The function of Cley marshes is likely to modify over time due to the effects of climate change. The marshes are currently used as grazing marsh. There is the possibility that the salinity of the marsh will increase, making it unsuitable for grazing. The main use would be a flood defence function for properties at Cley-next-the-Sea and Salhouse and sections of the A149.

2.3 Role of shoreline management

2.3.1 Introduction

This section aims to illustrate how shoreline management can influence the position and nature of the north Norfolk shoreline, and the activities and values around it. This is done by setting out two extreme possibilities for shoreline management and assessing the effects of these scenarios on the shoreline in terms of the development of the land and level of flood risk. These two extreme scenarios are 'no active intervention' (NAI) and 'with present management' (WPM). The NAI scenario assumes that the defences are no longer maintained and will therefore fail gradually over time. NAI does not, however, involve actively removing the existing defences so for a time, the defences will provide some residual protection while they are failing. The other extreme scenario is WPM which assumes that all current frontline defences are maintained to provide the same level of protection as they currently do. This includes keeping up with the effects of climate change.

As with section 2.2, the role of shoreline management will be discussed for each super-frontage. More detail is provided in **Appendix F**, including the baseline scenario statement tables for the NAI and WPM scenarios for the three super-frontages.

It is essential to make clear that there is an element of uncertainty in all aspects of the analysis. Specific gaps in knowledge are highlighted in the text because they need to be addressed in developing the plan.

2.3.2 Super-frontage 1 - Old Hunstanton to Thornham

With present management

Development of the shoreline in the short-term (epoch 1) under a scenario of WPM will be the same as NAI as the residual defence line is expected to remain. Accretion is likely to continue on the foreshore and the dune system will remain in a similar position. This is in contrast to the shoreline for Thornham sea bank where it would be free to realign. The foreshore would experience continued erosion. As a result, the shoreline would begin to lose its shape and become unaligned with Old Hunstanton and the dune system.

Greater pressure would be put on the eastern end of the frontage at Gore Point.

Sea level rise may cause some changes in the medium-term. The epoch 1 pattern of accretion would be outpaced by sea level rise and result in erosion of the foreshore. A continued process of dune rollback would mean some of the dune line would need to be reinforced with a harder defence line. The existing sea bank would need increased maintenance to continue providing its current standard. The River Hun tidal delta is likely to move towards land and westward and may create a new headland.

In the longer term (epoch 3) there is a lot of uncertainty as to what will happen. Increased sea levels would result in increased erosion of the foreshore and a reduction in beach level. Defences would need further strengthening to sustain the standard of protection under higher water levels and waves. If the Thornham harbour channel experiences increased siltation, the foreshore may become higher and therefore reduce the pressure on the defences.

No active intervention

Short-term development for the shoreline under a scenario of NAI is similar to WPM. Accretion is likely to continue on the foreshore and the natural coast will remain in a similar position. It is likely that most of the earth embankments and the River Hun tidal outfall would fail in the short-term. There would be continued erosion along the frontage with the dunes being overtopped and rolling back. The previously-reclaimed areas would be flooded, which would affect sections of the A149 and a number of properties in Old Hunstanton and Holme-next-the-Sea. Due to dune rollback, the beach huts at Old Hunstanton would be at risk from coastal erosion during epoch 1.

In the medium-term (epoch 2) coastal response is dominated by the changes caused by sea level rise together with the expected failure of Thornham sea bank. The associated increase in tidal prism would strengthen the outer estuary which would in turn reduce pressure on Gore Point. Unconstrained, the River Hun tidal delta would move westwards and the river would naturally meander towards the sea. This would lead to natural saltmarsh developing on the backshore areas near Thornham. The natural dunes at Holme would continue to roll back. There would be gradual realignment of the dune system at Old Hunstanton. The dunes would still provide some flood protection, but there would be increased risk of overtopping during extreme events which would affect the settlements of Holme-next-the-Sea, Old Hunstanton and even Thornham. At Holme, around 20 properties could be affected in epoch 2, including the village church and public house. In Thornham, about 10 properties would be affected. The Broadwater Road approaching Holme Nature Reserve would be at risk from erosion during epoch 2.

Epoch 3 would experience similar coastal responses to epoch 2 with dune rollback, increased flooding of the backshore up to the higher ground and a greater risk of erosion. There would be erosion risk for some properties along the Golf Club Road and the clubhouse at Old Hunstanton. As mentioned in epoch 2, Broadwater Road is likely to be cut off in epoch 3, restricting access to The Firs. There would also be sections of the coastal footpath cut off by coastal erosion. The River Hun would continue to meander towards the sea and migrate towards the west over the formerly-reclaimed areas.

Summary

The key differences between the two baseline scenarios (and therefore the potential drivers for SMP policy decisions) are:

- WPM would continue to defend settlements and isolated properties, the A149 and the agricultural land. NAI would lead to an uncontrolled increase in flood risk and ultimately these features would become undefended, mainly during epoch 1.
- WPM would initially protect the status of the saline lagoons and freshwater habitats, while NAI wouldn't. Conversely, the increase in tidal prism under NAI is likely to strengthen the outer estuary of River Hun which would reduce pressure on the grey dunes at Gore Point and possibly also on the dunes at Old Hunstanton. NAI would also lead to creation of intertidal habitat locally.
- WPM would not allow natural development of Holme and Old Hunstanton dunes, while NAI would. More natural dunes may still provide flood protection in the long-term, but this is uncertain.
- The increase in tidal prism under NAI could strengthen the channel to Thornham, although a fully natural development is likely to limit the benefits for navigation.
- WPM would continue to protect the golf course in Old Hunstanton dunes and the beach huts, but in the medium-term the beach is likely to erode. Conversely, NAI would be likely to require the golf course and the beach huts to adapt, but is more likely to sustain the beach.

2.3.3 Super-frontage 2 - Thornham to Stiffkey

With present management

The short-term situation during epoch 1 under a scenario of WPM is expected to continue the processes occurring now. For Scolt Head Island, sediment will continue to build up behind the island as it moves towards the west and south. This would cause a reduction in the flow of the tidal delta at Brancaster harbour channel and reduce the sediment pushing to the westward end of Scolt Head. There would be continued rollback of the dune system at Brancaster and accretion across the foreshore. The dune system

at Holkham would also roll back in the short-term with some erosion of the beach profile. This pattern of erosion would continue to the east with erosion of lower sandflats at Stiffkey but with accretion of the upper saltmarsh and mudflats as sea levels continue to rise. The defences remaining would ensure that all defended frontages are protected from flood events and erosion.



Low tide at Holkham Gap

In the medium-term, increased management would be needed in response to rising sea levels. undefended areas of the coastline around Brancaster would continue to roll back. Scolt Head Island would move further towards land and begin to squeeze the sheltered areas leading to siltation of Norton Creek. Exposed defences may need improving to sustain their existing standard of defence against the effects of climate change. However, in the sheltered areas, siltation would increase the foreshore area and could counteract the effects of climate change. Holkham dunes may need intervention to reduce flood risk with increased erosion, especially of the western bay. Wells harbour channel would need maintenance dredging to sustain the navigability of the channel. The accretion of saltmarsh and mudflat at Stiffkey in epoch 1 would switch to erosion as the system rolls back.

The long term (epoch 3) effects are uncertain. There are two possible large-scale developments in the long term. Either Scolt Head Island continues to roll back and attaches to the land or the increased rate of sea level rise reverses the current process which will cause Scolt Head to remain detached. This is uncertain, but under the WPM scenario, the continued limitation in tidal prism increases the likelihood of the spit attaching to the land.

If the rollback continues, the current role of Scolt Head as a control for both Brancaster bay and Holkham bay would end. Towards the west, the golf club would become exposed and could develop into a headland that acts as a control point for Brancaster bay and limit the increase of pressure on the RSPB reserve's defences at Titchwell. Towards the east, the rollback of Scolt Head Island would increase pressure on Holkham dunes. Locally, the creeks behind Scolt Head would further silt up.

However, if Scolt Head Island were not to reattach, it would continue to be the main control point for the frontage. It would continue to control the shape of both Brancaster bay and Holkham bay, limiting the increase of pressure on the golf club and Titchwell RSPB reserve and on Holkham dunes.

No active intervention

In the short-term under a scenario of NAI the defences would gradually decline. It is likely that most of the defences would fail by the end of epoch 1. The creeks would continue to silt up. Epoch 1 would see an increase in saltmarsh and mudflat development. Sand dune systems would roll back at present rates. As a result of the weakening of defences, flood risk would increase for properties at Brancaster Staithe and Stiffkey and for sections of the A149 at Burnham Overy Staithe, Holkham, Wells and Stiffkey. There will be increased erosion risk for Wells coastguard lookout, the RNLI lifeboat house and Wells beach huts (east of Holkham bay).

During the medium-term, there are some key physical features that could modify the way in which the coastline responds. All the defences would have failed during this epoch. The shoreline at Brancaster and Titchwell would have realigned towards its natural position. Following failure of the defences of Brancaster grazing marsh, the tidal prism at Mow Creek would increase resulting in improved navigability of Brancaster harbour. Defence failure would affect several properties at both Brancaster and Brancaster Staithe and the Royal West Norfolk golf club would be at risk from erosion as the dunes continue to roll back. Failure of defences behind Scolt Head would increase the tidal prism and support the Brancaster and Burnham harbour channels. An unmanaged approach would allow the River Burn to develop a natural migration across the marshes. However, this would result in greater tidal flood risk at Burnham Norton and Burnham Market. Scolt Head itself could migrate westward and landward, which would increase pressure on the golf course and also on the RSPB reserve at Titchwell. The extent and timing of Scolt Head's migration is uncertain.



High tide at Holkham Gap

The Holkham Meals could become a barrier island with an intertidal area behind the dunes. The Burnham channel would be able to take a meandering route out to sea and cause the tidal delta to move in a westward direction. The new tidal prism developed by the failure of defences would significantly increase the pressure acting on Burnham. Along at Wells, total defence failure would lead to flooding of the backshore to the east of Wells and to the area behind the Wells flood embankment. There would be up to 50 properties at risk from flooding in Wells, including the Wells community church. The River Stiffkey outfall to the east would also be able to meander in a natural course out to sea. Properties in Stiffkey would become undefended. Locally, there would be erosion of lower sandflats with some remaining vertical accretion of upper saltmarsh during the landward retreat of the shoreline.

Long-term (epoch 3) changes are uncertain for this scenario as well. The NAI scenario could still lead to the same two large-scale developments. Either Scolt Head attaches to the mainland or it could remain detached. The effects of both possible developments are described above for the WPM scenario. However, the increase in tidal prism as a result of the failure of defences under NAI increases the likelihood that Scolt Head will remain detached, with the associated reduction of pressure on the neighbouring bays and increased likelihood of the channels remaining functional.

Further to the east in Holkham bay, the epoch 2 scenario may progress with the Holkham Meals possibly disappearing due to this increased pressure resulting from Scolt Head potentially reattaching, although there would be sedimentation behind the old line and saltmarsh formation. This would be associated with the loss of Holkham Gap car park, Wells boating lake and Wells Beach Road car park and caravan site. Wells-next-the-Sea would

have a flood risk similar to epoch 2 as much of the town is naturally higher than the tidal flood zone. The marshes beyond Holkham bay would be swamped by a normal tide with saltmarsh erosion through coastal squeeze against the old cliff line and rising sea levels.

Summary

The key differences between the two baseline scenarios (and therefore the potential drivers for SMP policy decisions) are:

- WPM would continue to defend settlements and isolated properties, the A149, the recreational features and the agricultural land. NAI would lead to an uncontrolled increase in flood risk and ultimately these features would become undefended, mainly during epoch 1.
- WPM would initially protect the status of the freshwater habitats, while NAI wouldn't. Conversely, the increase in tidal prism under NAI would increase the likelihood that Scolt Head Island would remain detached from the land, with the associated local benefits for navigation and habitats, and the benefits along the shoreline of limiting pressure on the shoreline in Brancaster bay and Holkham bay. NAI would also lead to creation of intertidal habitat locally.
- WPM would not allow natural development of Holkham dunes, while NAI would. More natural dunes may still provide flood protection, but this is uncertain.

2.3.4 Super-frontage 3 - Stiffkey to Kelling Hard

With present management

The short-term for this super-frontage under the scenario of WPM is not very different from the present situation. Blakeney spit would see continued rollback at the western end of the spit with rates of about one metre a year. There may be less rollback due to the positioning of an underwater ridge offshore that could give some protection to the shoreline from wave attack. The rollback would be accompanied by westward growth leading to a more narrow mouth of the Blakeney channel. The Cley and Salthouse shingle ridge would also continue to roll back at the same rate as Blakeney spit. There would be some increase of overtopping and flooding of the marshes during extreme events but the drainage system would keep removing saline floodwater.

The coastal response for the medium-term (epoch 2) would be similar to the short-term. The western end of the spit would continue to roll back and move towards the west. The smaller area behind Blakeney spit together with sea level rise would lead to a reduced tidal prism and therefore a reduced flow. Increased protection along the embankments and improvements to the drainage system would be needed to keep providing the same standard despite climate change.

As for the area behind Scott Head Island, there are two possible large-scale developments in the long term. Either Blakeney spit continues to roll back and attaches to the land or the increased rate of sea level rise reverses the current process which will cause the spit to stay detached. This is uncertain, but under the WPM scenario, the continued limitation of tidal prism increases the likelihood of the spit attaching to the land. One thing that adds to the long-term development of the spit is the complex behaviour of the mouth of the channel and the western end of the spit. A cyclic progression has been identified in the gradual growth towards the west and retraction to the east during storm events that may occur about every 40 years.

If the rollback of Blakeney spit continues, the River Glaven and Blakeney channel are likely to silt up. The effects on the area behind the shingle ridge would continue from epoch 2 with movement towards the land. Siltation of the area behind the spit could limit the increasing pressure on the defences due to sea level rise. Also, the role of Blakeney spit as a control for Stiffkey bay would reduce, leading to increased pressure on the shoreline.

However, if Blakeney spit were not to reattach it would continue to be the main control point for the neighbouring frontage, and the existing system of creeks and intertidal areas would continue.

No active intervention

For the short-term the situation would be similar to that of the WPM scenario because the defences would continue to function during epoch 1. The main difference is that under NAI, the drainage system for Cley marshes is likely to fail, leading to increased salinity.



Overtopping at Salhouse (April 2007)

Increased flooding of the previously-reclaimed areas after the defences have failed in the medium-term (epoch 2) would increase the tidal exchange behind the spit. This flooding would begin the process of saltmarsh

development. There would be further rollback of the shingle ridge. Following the loss of Salthouse car park, the amenities at Cley (coastguard lookout and the Cley Eye Nature Reserve) would be at risk during epoch 2.

Long-term (epoch 3) changes are uncertain for this scenario as well. The NAI scenario could still lead to the same two large-scale developments. Either Blakeney spit attaches to the mainland or it could remain detached. The effects of both possible developments are described above for the WPM scenario. However, the increase in tidal prism because the defences would have failed under NAI increases the likelihood that Blakeney spit will remain detached, with the associated increased likelihood of the channels remaining functional.

Summary

The key differences between the two baseline scenarios (and therefore the potential drivers for SMP policy decisions) are:

- WPM would continue to defend settlements and isolated properties, the A149 and the agricultural land. NAI would lead to an uncontrolled increase in flood risk and ultimately these features would become undefended, mainly during epoch 1.
- WPM would initially protect the status of the freshwater habitats, while NAI wouldn't. Conversely, the increase in tidal prism under NAI would increase the likelihood that Blakeney spit would remain detached from the land, with the associated local benefits for navigation and habitats, and the benefits of limiting pressure on the shoreline in Stiffkey bay. NAI would also lead to creation of intertidal habitat locally.

2.4 Sustainable shoreline management: finding the right balance

2.4.1 The 'big decisions' for North Norfolk Shoreline Management Plan

The preceding sections show that the north Norfolk coast has a unique and complex set of values and land uses. Of those, many are directly related to the shoreline and how it is managed. Particular ways of managing the shoreline may benefit some of these values and land uses but damage others. The aim of this shoreline management plan is to develop a plan that achieves the right balance between all these values. This is reflected in the set of principles that was agreed among all organisations involved in developing this SMP (see section 1.4).

Section 2.3 identifies for each super-frontage the values and land uses that can be influenced by shoreline management. These findings illustrate the 'big decisions' that the shoreline management plan has to make. The two scenarios from section 2.3 are extremes, so in reality there is often an opportunity to develop a win-win plan that does benefit all values and land uses. However, there are also cases where hard decisions have to be made because the interests are conflicting. For such cases, it is essential that the

plan aims to provide enough time for people, businesses, other organisations and the environment to adapt.

For the north Norfolk coast, the ‘big decisions’ for shoreline management can be summed up by the following four questions:

1. Continuing to defend reclaimed land can have significant benefits for the **communities** along the north Norfolk coast. However, the analysis of coastal processes suggests that an increase in tidal exchange behind the barrier islands and spits would help sustain the channels and so support navigation and its use for tourism and the economy. What is the right balance between land use behind defences and activities in the tidal areas, and how can shoreline management support this?

2. How do we prefer to see **the natural environment** developing over the next 100 years, including its response and adaptation to sea level rise and natural processes, and how can shoreline management support this? In particular, what is the right balance between defended brackish and freshwater habitats and undefended (inter)tidal habitats?

3. Can we increase the role of **natural processes** and reduce the dependence of the north Norfolk coast on man-made intervention?

4. The north Norfolk coast is a complex area that is sensitive to a number of **uncertainties**, especially the response of the shoreline to sea level rise and to any change in how it is managed. How do we make sure that the plan is both robust and flexible in the face of these uncertainties and is based on measures that don’t have large negative effects, for all realistic future scenarios (‘no-regret’ measures)?

2.4.2 Moving forward to solutions

The first three questions indicate that, at a high level, there is a choice between two possible futures for the north Norfolk coast:

- continue to maintain all defences where they are now. This will support current use of the defended land but may lead to an unsustainable situation in the course of the next 100 years
- change the way in which we manage the defences in some areas. This will increase natural processes and is likely to support navigation and potentially make coastal habitats more resilient to sea level rise. This will mean that currently-defended land must adapt.

A significant increase in managing the defence line by building new defences and reclaiming new land is not seen as a realistic option. The benefits for the north Norfolk coast would be limited and it could have a large negative effect on the coastal processes. This means that ‘advance the line’ (one of the four

policies introduced in section 1.1) is not a realistic option for the whole of the area. It also means that for those frontages that are not currently defended, the plan is that this will continue into the future

For the frontages that are currently defended, the scenarios of 'with present management' and 'no active intervention' described in section 2.3 give some indication of the effects of these two potential futures. However, as a whole, these scenarios are not a realistic plan for a few reasons:

- in reality, the plan will not consist of a 'blanket' choice for one extreme or the other. Based on assessing local values and specific interactions along the shoreline, the plan should provide the best solution for each frontage, while taking account of its interaction with neighbouring frontages
- in reality, any change in management from the current approach would have to happen gradually. First of all this is because people, businesses, organisations and the environment will need time to adapt to any change. Secondly, an abrupt change of management would not be justified in the light of the large uncertainties about shoreline response. This means that any change of management with large negative effects can only happen in the medium or long term and needs to be preceded by a managed process of adaptation, and in some cases by monitoring or study.
- the no active intervention scenario is often not realistic for frontages with flood defences because it leads to an unmanaged situation. Along the north Norfolk coast, where there are clear positive drivers but also disadvantages to making changes, a managed approach through managed realignment is much more realistic. This also allows continued flood protection for all settlements while still working with natural processes.

These considerations have steered the development of the Shoreline Management Plan. At the scale of the three super-frontages, options to sustain the use of currently-defended land have been compared with options to gradually increase natural processes while continuing to protect settlements and provide time for adaptation.

Within these overall options for each super-frontage, some frontages also need a specific decision for that location. For dunes and shingle ridges with a flood defence function, this is about the desired level of management to sustain this function. For embankments that protect a narrow strip of land and for quaysides, there is only a limited effect along the shoreline, so the SMP needs to decide whether continued defence management is sustainable.

The draft Shoreline Management Plan suggests policies based on a full appraisal of these options against a wide range of criteria that are directly related to the principles listed in section 1.4.

The full process of developing and appraising options is described in appendix A, with references to more details in the other appendices. This main SMP report focuses on the draft plan. Section 3 describes the draft plan and what it means, while section 4 describes the specifics of the plan for each policy development zone (PDZ). PDZs are 'decision making units'. Their size varies depending on the scale of the issues that shoreline management needs to take into account.

3 Draft plan

3.1 Overview of the plan

The overall plan for the north Norfolk coast is to move to more sustainable shoreline management by gradually increasing the role of natural processes, while continuing to sustain flood defence to all existing low-lying houses and important infrastructure. The intended gradual increase in natural processes will be achieved by managed realignment of some of the previously-reclaimed areas, making sure that the plan provides time to adapt to these local changes of management and for generation of knowledge to confirm the plan for the medium and long term. The SMP's action plan will contain a specific programme of actions (monitoring, consultation and studies) that are needed to confirm this.

For a number of the reclaimed areas along the north Norfolk coast, the value of the defended features outweighs the benefits that realignment would have and the costs of continuing to defend. For those areas the plan is to sustain current land use by continuing to hold the line. This is the case for all the river outfalls (River Hun, River Burn, River Stiffkey and River Glaven), Titchwell RSPB reserve, Brancaster golf club and the tourism facilities and beach access at Holkham and Wells-next-the-Sea.

For all embankments that protect narrow strips of land and for all quaysides, the plan is to sustain current land use by continuing to hold the line. The only exception is the sea bank in front of Thornham that only protects a small area of agricultural land, so further management as a flood defence is not justifiable.

For the dunes with a flood defence function, the plan is to sustain their flood defence function with the minimum amount of intervention necessary, aiming to increase the role of natural processes. This applies to Old Hunstanton dunes, Holme dunes and Holkham dunes.

For the shingle ridge at Cley and Salthouse, the plan is to continue the management approach that has recently been agreed. The intent is to allow the shingle ridge to continue to develop naturally, while defining specific triggers for flood risk management intervention.

For the remaining reclaimed areas, the plan is to carry out managed realignment in the short-term and, if confirmed, also in the medium or long term. The realignments will strengthen the outer estuaries which will reduce pressure on the shoreline in neighbouring frontages and strengthen the natural flood protection role of the dunes. They will also improve navigability of the channels up to the harbours, create more intertidal habitat and move flood defences to more sustainable sheltered alignments. However, this will

come partly at the expense of current freshwater habitats and agricultural land use, and there are other potential negative effects.

The extent of the realignments will make sure that all houses remain protected and that all important infrastructure continues to provide its service. The timing of the realignments aims to ensure two things:

- enough time needs to be available for people, businesses, organisations and the environment to adapt
- managed realignments in the short-term need to be limited to frontages where the negative effects are limited and manageable. In addition to their direct positive effects on natural processes and channel development, these realignments will be used as pilot projects to generate the knowledge needed to confirm the intent for further realignments in the medium and long-term.

The policy statement in section 4 for PDZ 3A (reclaimed areas behind Blakeney spit) shows how the draft plan aims to balance these issues while explicitly taking into the account the uncertainties.

In the short-term (up to 2025), realignments are planned for two places: Wells east bank and east of Morston. For the medium-term (2026 to 2055), the potential realignments are at Thornham sea bank (Holme marshes), Brancaster grazing marsh, Deepdale and Norton marshes and Blakeney Freshes. In the long-term (up to 2105), further potential realignments are at Overy marshes and Cley marshes. All these realignments include continued flood protection for all houses and provisions for continued functioning of all important infrastructure. The realignments for the medium and long term are intended but need to be confirmed by increased knowledge of shoreline response in the coming years.

3.2 Implications of the plan

The plan mainly describes how the shoreline will be managed. This has been driven by, and will have implications for, a range of functions, features and values. The overview of the plan in section 3.1 touches on the most relevant implications. This section describes the implications for each aspect.

The Strategic Environmental Assessment (SEA) process that accompanies and supports the SMP intends to make sure that environmental and social/economic issues relating to the coast are central to developing and evaluating policy. The SEA therefore provides the mechanism to support a structured evaluation of the key environmental and social/economic implications of the draft plan for the north Norfolk coast. The SEA report evaluates the effects on an established suite of receptors in a targeted and specific manner. The evaluation in this section is consistent with the SEA but uses the categories identified in the SMP guidance.

Property and infrastructure

The plan provides continued flood defence for all houses that are currently at risk of flooding. The number of properties at risk is limited and they mainly concern the lower-lying fringes of settlements that were established on the edge of the higher ground. At present, there are about 800 properties in the tidal flood zone and this is predicted to rise to about 1,500 by 2105 due to sea level rise. This is illustrated in Figure 3.1. Appendix F contains more detailed maps. The way in which continued flood defence will be provided depends on the type of defence and the geography. Along the frontages with managed realignments, this will usually mean building new flood defences in a more sustainable place further inland, typically on higher ground, with a much wider foreshore to reduce wave attack. Most of the realigned defences are also shorter than the existing alignments. In doing this, any increase in flood risk because defences are closer to houses needs to be taken into account. For dunes with a flood defence function, the intent is to maximise the role of the natural defences, while ensuring appropriate defence levels. Some research is needed to confirm this.

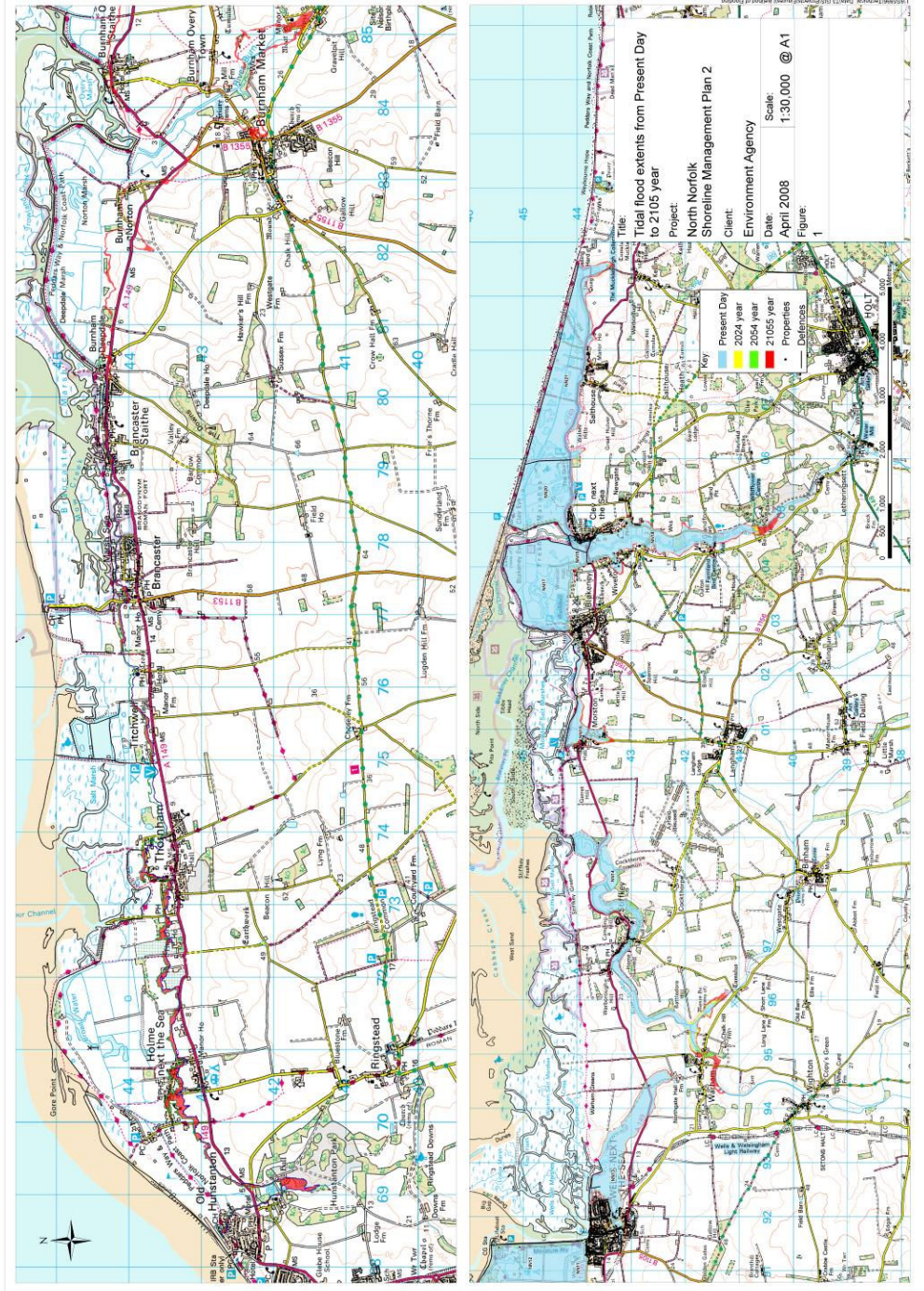


Figure 3.1: Predicted change of flood risk area in epochs 1, 2 and 3

It is expected that the land use planning system will not allow further development of houses in the area at risk of tidal flooding, either now or in the future. This is an important starting point of the plan.

The main infrastructure in the area is the A149 which connects Hunstanton with Cromer by way of the string of settlements along the north Norfolk coast. It is very important that the transport function of the A149 is sustained throughout the plan period. In most cases the plan will provide continued protection to the A149 where it is now. However, some of the intended realignments could affect the road and in those cases the plan needs to include the provision either to move the road or build a local defence. The best solution needs to be developed through more detailed study. This potentially concerns stretches of the A149 near Old Hunstanton, Burnham Norton, Holkham, Wells east, Morston, Cley and Salhouse.

Communities and local economy

The plan provides continued flood defence for all settlements, but a community is much more than a collection of buildings. The communities along the north Norfolk coast owe their unique character to a rich mixture of values and features that strongly depend on the link with the intertidal areas and the sea. The plan aims to keep this link by increasing the role of natural processes. Current understanding of shoreline behaviour shows that this is likely to sustain the existing pattern of saltmarsh and creeks against the pressure of roll-back and siltation caused by historic reclamation together with sea level rise. The plan provides continued protection for some of the specific features that drive the tourism economy of the north Norfolk coast: the RSPB reserve, the Royal West Norfolk golf course, the facilities at Holkham and Wells-next-the-Sea and the access to the beach (roads and car parks).



Wells-next-the-Sea

Several of the communities derive direct economic benefit from the coastal habitats, with the north-east Wash (around Old Hunstanton and Holme-next-the-Sea) and Blakeney being designated shellfish waters (under the Shellfish Waters directive). By maintaining the channels and intertidal habitats, the plan is therefore supporting this industry. The plan may lead to changes in the shape of the north Norfolk coastline, including the loss of freshwater habitats (which currently support bird species such as bittern that are of ornithological importance). However, it is likely that the increased intertidal area will support a greater number of species, including the dark-bellied Brent goose and Eurasian wigeon, which need intertidal habitats for feeding and which currently attract ornithologists and wildfowlers.

Land use

For the north Norfolk coast, the implications for land use concern both defended and undefended areas. The intent to increase the role of natural processes will come at the expense of some agricultural land use, where realignments will convert reclaimed land back to intertidal area. However, the extent is limited and the affected land is usually grade 3 agricultural land, which there is a lot of in the area and nationally.

The plan actively aims to sustain and support the use of the intertidal area for both navigation and fisheries.

Wildlife and geology

Most of the north Norfolk coast is currently protected by national and international designations, both for its intertidal habitats and species, for its freshwater and brackish habitats and species and for its geological features. Current understanding of shoreline behaviour and its response to climate change indicates that over the long-term it is probably not possible to sustain the existing combination of intertidal and freshwater features. Over the long-term, natural processes and sea level rise are likely to reduce tidal dynamics behind the barrier island and spit. Also, where freshwater and brackish habitats are directly protected by natural defences (dunes and shingle ridge), increased levels of management will be needed to sustain the habitats.

There is only one specifically geological site in the North Norfolk SMP area - Morston Cliff SSSI. This is located in a frontage where the current and draft policy is no active intervention.

The plan will create more intertidal habitat. This will partly be on land that currently does not have environmental designations (for example both short-term realignments at Morston and Wells east). For some of the potential realignments intended for the medium and long-term, creating intertidal habitat will come at the expense of currently-designated freshwater or brackish habitat (Holme marshes, Brancaster grazing marsh, Norton Marsh, Overy marshes, Blakeney Freshes and Cley marshes). It is the intention of the plan to carry out monitoring and research to improve knowledge of shoreline response, not only in terms of navigation but also in terms of the

effect on habitats. This improved knowledge is needed to confirm the intended realignments in the medium and long-term.

The Appropriate Assessment and the Strategic Environmental Assessment contain a comprehensive assessment of the effects of the draft plan on environmental features. Section 1.5 explains how these stand-alone documents relate to the SMP.

Landscape

The landscape of the north Norfolk coast is closely connected to the mix of values and features related to the intertidal area and the sea that gives the area its unique character, as reflected in its designation as an Area of Outstanding Natural Beauty. The plan intends to support these links by increasing the role of natural processes, which will generally enhance the character of the landscape.

The north Norfolk coast is also well-known for its naturally wild and dynamic nature. The plan aims to promote this character by making sure that the coast can develop in a sustainable manner with the minimum of hard-engineering options. In doing so, the plan complements the AONB Management Plan which promotes the natural and dynamic nature of the north Norfolk coast.

Historic environment

Most features of historic interest along the north Norfolk coast are located within settlements and will therefore remain protected. There are a number of scheduled monuments at risk of flooding outside the settlements, including Branodunum fort near Brancaster, the iron age fort in Overy marshes near Holkham, and a number of monuments in the tidal range of the river valleys. The plan provides continued flood defence for all these features, which safeguards their value for the heritage, culture and economy of the area.

Amenity and recreation

Most amenity and recreation features are covered by the other aspects such as navigation, specific tourist draws, historic environment and landscape.

A particular element of amenity and recreation concerns the access to the shoreline. As far as access by car is concerned, the plan will sustain all access roads. The intended medium-term realignment of Brancaster grazing marsh will involve a breach on its east side, requiring the tidal flow to cross the road. This will need structural works as part of the plan. A similar solution may be needed for the intended long-term realignment of Cley west bank. The plan does not directly affect the shoreline car parks, but where these are behind dunes or the shingle ridge, they may need adaptation to the natural development.

The intended realignments will have an effect on the footpaths. They will be implemented by local breaches of the existing defences which will cut the

Peddars Way and Norfolk coast path where it runs on top of the embankments. The footpaths are an important feature of the area and will need to be sustained, either through re-routing or building the means to cross the breaches. The best solution needs to be determined as part of the plan's implementation.

4 Policy statements

4.1 Introduction











The policy statements in this section outline the draft policies for each policy development zone. They are illustrated by the policy maps and accompanied by additional information that was used to appraise, select and confirm these policies.

There is one policy statement for each policy development zone. However, due to the nature of the north Norfolk coast, many of the policy decisions have included larger-scale considerations. The policy statements are therefore organised by super-frontage, as introduced in section 2.1.1. Each of these starts with an overall description of the plan for the super-frontage illustrated by the policy maps. This is then followed by the specific statements for each policy development zone, consisting of:

- overall summary of the plan
- description of the plan in the three epochs
- summary of the draft policies
- description of changes compared to present shoreline management
- graphical overview of key features and values
- graphical overview of effects related to the principles

The results of the policy appraisal process are illustrated in the policy statements by schematic diagrams. A symbol was assigned to each of the principles as shown below and then shaded in green, amber or red to visualise how the draft plan performs against that principle. The colours have the following meaning:

- green: the plan has a positive effect on the principle
- amber: the plan has a neutral effect on the principle
- red: the plan has a negative effect on the principle
- grey: the principle does not apply to the PDZ (for example, the infrastructure symbol is grey for PDZs where there are no roads or utilities that can be affected by shoreline management).

Principle:			
	Reliance on defences		Allowing planning system to respond to changes in shoreline management
	Ensure local policies do not affect wider coastal processes		Maintaining protected sites and species
	Allowing adaptation of communities to coastal change and the impact of coastal change on local industry		Maintaining and enhancing coastal biodiversity
	Allowing adaptation of communities to coastal change		Maintaining and enhancing the coastal landscape
	Value of north Norfolk to wider society		Historic environment, heritage and culture

The economic viability of the draft policy is reported at the level of super-frontages. The viability is expressed through the benefit cost ratio (B-C ratio), which is the ratio of the economic benefits over the costs of the policy. These benefits are the flood damages prevented by shoreline management (calculated for residential and commercial properties only). The costs include building and maintenance of defences. Both the benefits and the costs are discounted to the present day, giving their present value (PV), which allows comparison of amounts that will occur at different times in the future. Appendix H contains detailed background information.

The main aim of the Shoreline Management Plan is to develop an ‘intent of management’ for the shoreline that achieves the best possible and achievable balance of all the values and features around the shoreline for the coming 100 years. This intent of management constitutes the actual plan. It is described in a narrative and illustrated in the maps. For all SMPs nationally, the plan for each section of shoreline is then translated into one of four policy labels:

- **Hold the line (HtL)** –hold the defence where it is now.
- **Advance the line (AtL)** –build new defences seaward of the existing defence line.
- **Managed realignment (MR)** –allow the shoreline to move seaward or landward, with associated management to control or limit the effects on land use and environment. This can take various forms depending on the intent of management to be achieved. All are characterised by managing change, not only technically (by breaching and building defences) but also to land use and environment (by facilitating or ensuring adaptation).
- **No active intervention (NAI)** –no further investment in coastal defences or operations.

There can be various types of managed realignment, and this is also the case for the North Norfolk SMP. This is explained for each PDZ in the intent of management but, to prevent any confusion, this SMP uses policy labels that identify various sub-types of the managed realignment policy, as follows:

Policy label	Intent of management
MR1	Sustain the flood defence function of a natural defence with minimum intervention, allowing maximum natural development
MR2	Breach of the frontline defence after building a new landward defence line
MR3	Breach of the frontline defence, no new landward defence line

Text box 4.1: Intent of management and policy labels

4.2 Super-frontage 1: Old Hunstanton to Thornham

The overall plan for the frontage from Old Hunstanton to Thornham is to move to more sustainable shoreline management by increasing the role of natural processes while continuing to sustain flood defence to all existing low-lying houses and important infrastructure.

In the medium and long-term, the draft plan is expected to strengthen the natural flood protection role of the dunes, improve navigability of Thornham Harbour, create more intertidal habitat and move defences to more sustainable sheltered alignments. However, this will come partly at the expense of current freshwater habitats and limited agricultural land use and may have other negative local effects.

Despite this intent, the SMP has identified that the potential disadvantages of the plan are significant. More knowledge therefore needs to be generated in the short-term to confirm the changes proposed for the medium and long-term.

The sea bank in front of Thornham needs a separate decision. It only protects a small area of agricultural land so further management as a flood defence is not justifiable.

For super-frontage 1, the total economic benefits of the draft policy are estimated to exceed the costs, although not by a wide margin. Because the calculation method is conservative (generally resulting in high costs and low benefits), the draft policy is confirmed to be economically viable.

Location reference:	Old Hunstanton dunes
Policy development zone:	PDZ 1A

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain the flood defence function of the dunes, which protect properties in Old Hunstanton, Holme-next-the-Sea and Thornham, the A149 and other features in the tidal flood zone. The intent is also to allow the dune system to develop as naturally as possible. The SMP has identified that more knowledge is needed to confirm the intent to increase natural dune development. If this is confirmed, management would be changed in the medium-term and land use within the dunes would probably need to adapt.

SUMMARY OF SPECIFIC POLICIES

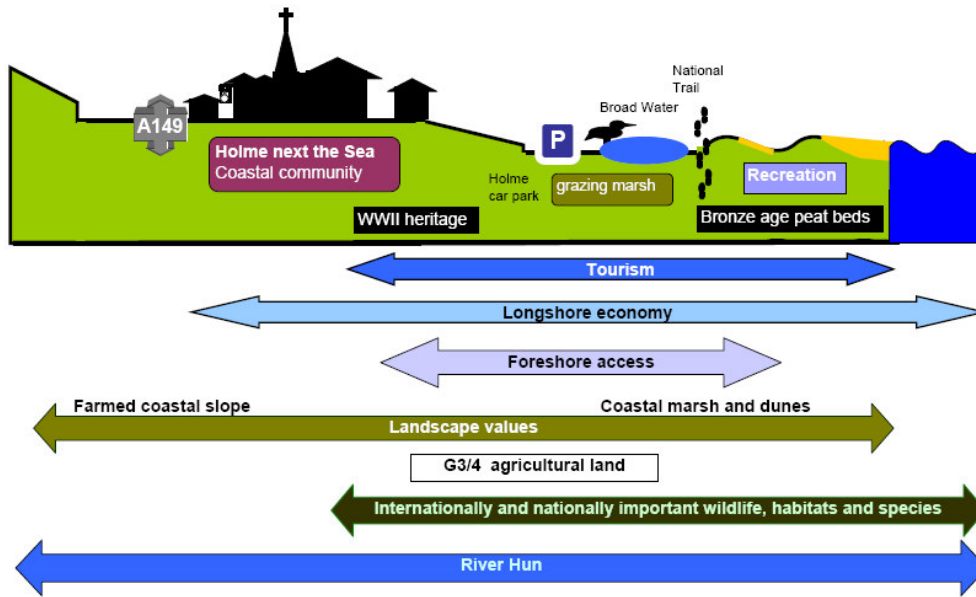
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Managed realignment (MR1)	Managed realignment (MR1)	The change of policy from epoch 2 needs confirmation based on better knowledge to be generated in the course of epoch 1. If confirmed, some form of intervention is likely to be required in later epochs to sustain the flood defence function of the dunes.
Local management policy	Continue to hold the dunes where they are now and sustain their flood defence function.	If confirmed, the dunes will be allowed to develop naturally. If their flood defence function is reduced, work will be undertaken to restore it.	If confirmed, the dunes will be allowed to develop naturally. If their flood defence function is reduced, work will be undertaken to restore it.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

In epoch 1 there is no change from the current policy. However, from epoch 2 onwards, a significant change in approach is intended as defences are removed and the sand dunes are allowed to develop naturally. SMP1 suggested that a policy of managed realignment of this frontage may be suitable if the dunes provide their flood defence function. So the draft policy is compatible with SMP1's intent of management for the longer term.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference:	Holme dunes
Policy development zone:	PDZ 1B

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain the flood defence function of the dunes that protect properties in Old Hunstanton and Holme-next-the-Sea, the A149 and other features in the tidal flood zone. The intent is to do so through minimum intervention in the natural development of the dunes, which continues the current approach. The medium-term plan to realign Thornham sea bank would reduce the need for flood protection from the dunes.

SUMMARY OF SPECIFIC POLICIES

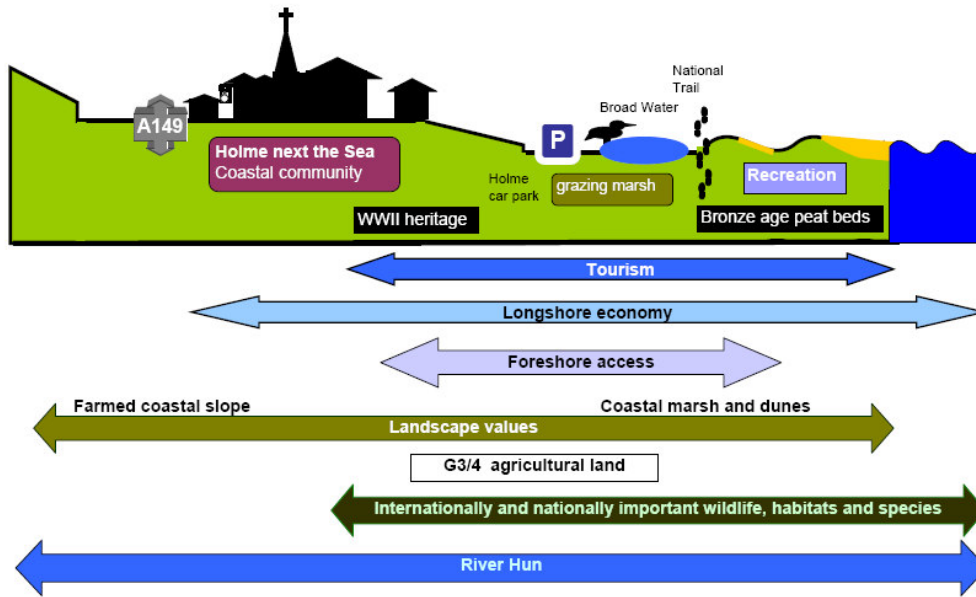
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Managed realignment (MR1)	Managed realignment (MR1)	Managed realignment (MR1)	The flood defence function will be sustained through the minimum amount of intervention allowing the dune system to develop as naturally as possible.
Local management policy	The dunes will be allowed to develop naturally. If their flood defence function is reduced, work will be undertaken to restore it.	The dunes will be allowed to develop naturally. If their flood defence function is reduced, work will be undertaken to restore it.	The dunes will be allowed to develop naturally. If their flood defence function is reduced, work will be undertaken to restore it.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

The draft plan continues present management. The SMP1 policy for the longer-term was managed realignment if Holme dunes were receding. This is compatible with the draft SMP2 plan.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference:	Thornham sea bank
Policy development zone:	PDZ 1C

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain flood defence to all houses and infrastructure together with increasing the tidal exchange in Thornham harbour channel by realigning Thornham sea bank, if confirmed during epoch 1.

This increase in tidal exchange is likely to support navigation in the harbour channel which will create social and economic benefits. Also, by enhancing the outer estuary, the increase in tidal prism is likely to reduce pressure on Holme dunes and Hunstanton dunes and support their role as a habitat and as a natural flood defence. The realignment will move the defences to a more sustainable sheltered position, which will reduce the risk of flooding to the people of Old Hunstanton, Holme-next-the-Sea and Thornham. Also, the realignments will create intertidal habitat and are likely to benefit the ecological integrity of the area by sustaining the channels and supporting Holme dunes.

There are, however, also potential negative effects. Firstly, the realignments come at the expense of partly-designated freshwater habitats and current agricultural land use. The footpaths on top of the existing sea banks will need to be realigned. Finally, the increased channel flows may have local negative effects on structures.

The SMP has identified that more knowledge is needed to assess the effects of this realignment and confirm the intent to realign. The SMP's action plan will therefore contain a specific programme of actions (monitoring, consultation and studies, including pilot realignments elsewhere in this SMP area) to investigate the potential positive and negative effects described above. If this confirms the intent to realign, then management would change in the medium-term and land use in the currently-reclaimed area would probably need to adapt.

SUMMARY OF SPECIFIC POLICIES

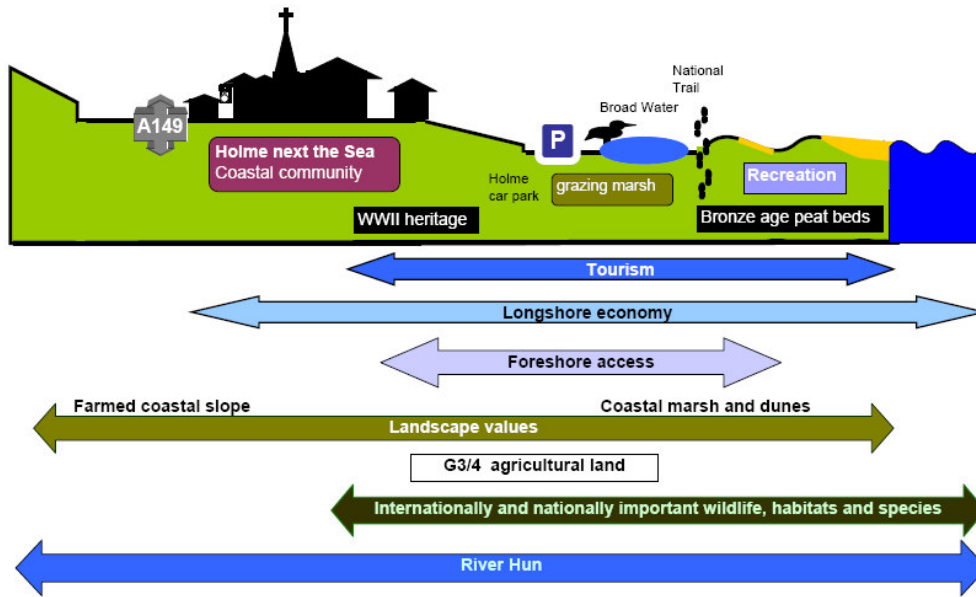
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Managed realignment (MR2) or hold the line	Hold the line	The policy for epoch 2 is conditional. It depends on the results of monitoring and research into the effects of realignment to be carried out during epoch 1.
Local management policy	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future	If confirmed, build new defences to ensure that properties and infrastructure remain protected. Then partly remove existing defences to increase tidal exchange	Hold the new line of defence	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

In epoch 1 there is no substantial change from the existing policy of hold the line. However, from epoch 2 onwards, there may be a significant change if the frontage were substantially realigned. SMP1 did not distinguish the sea bank in its policy decisions. It suggested that a policy of managed realignment may be suitable for the whole of this super-frontage if the dunes provide their flood defence function. Therefore the draft policy can be considered compatible with SMP1's intent of management for the longer-term.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference: Thornham Policy Development PDZ 1D Zone:
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SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To stop maintaining the existing bank as a flood defence because it does not protect any properties. This would gradually convert the currently-defended land (which is relatively high) to intertidal habitat.

In time, a small number of properties may become at risk of flooding due to climate change. These may then need adapting or local defence. The effects of the draft plan on the function of the existing bank as a footpath needs to be managed.

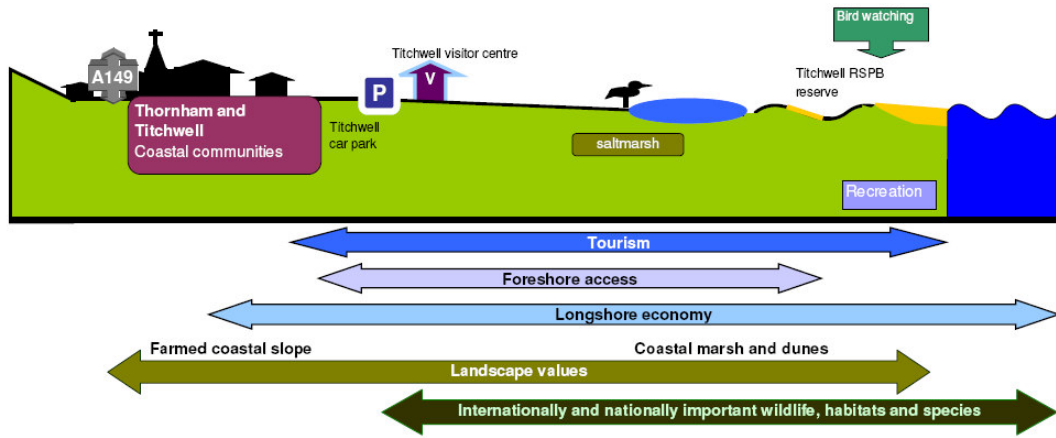
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	No active intervention	No active intervention	No active intervention	The effects on the footpath need to be managed. In epoch 3, adaptation or local defence may be needed for a small number of properties.
Local management policy	Stop maintaining existing sea bank but sustain footpath	Continue to allow natural development but sustain footpath	Continue to allow natural development but sustain footpath. Possible need for local adaptation or defence	

CHANGES FROM PRESENT MANAGEMENT

This policy is a change from the current policy of holding the line.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

4.3 Super-frontage 2 (west): Thornham to Holkham bay

The policy statements for this area are presented separately from the area around Wells-next-the-Sea. Both areas are part of super-frontage 2 because they are within the zone of influence of Scolt Head Island. They are discussed separately in this document to allow more focused consultation, because super-frontage 2 is so big.

The overall plan for the frontage from Thornham to Holkham bay is to move to more sustainable shoreline management by increasing the role of natural processes, while continuing to sustain flood defence to all existing low-lying houses and important infrastructure.

The plan should sustain the role of Scolt Head Island as a control for Brancaster bay to its west and Holkham bay to its east. This will reduce pressure on the defences in the bays and allow current diverse and socio-economically important land use to continue. The plan will improve navigability of the channels behind Scolt Head, create more intertidal habitat and move defences to more sustainable sheltered positions. However, this will come partly at the expense of current freshwater habitats and limited agricultural land use and may have other negative local effects.

Despite this intent, the SMP has identified that the potential disadvantages of the plan are significant so more knowledge needs to be generated in the short-term to confirm the changes proposed for the medium and long-term.

For super-frontage 2, the total economic benefits of the draft policy are estimated to exceed the costs, although not by a wide margin. Because the calculation method is conservative (generally resulting in high costs and low benefits), the draft policy is confirmed to be economically viable.

Location reference:	Thornham to Titchwell
Policy development zone:	PDZ 2A

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To continue the current situation where the frontage is allowed to develop naturally. Currently it is not defended and it is unlikely that there will be any drivers for introducing defences in the future.

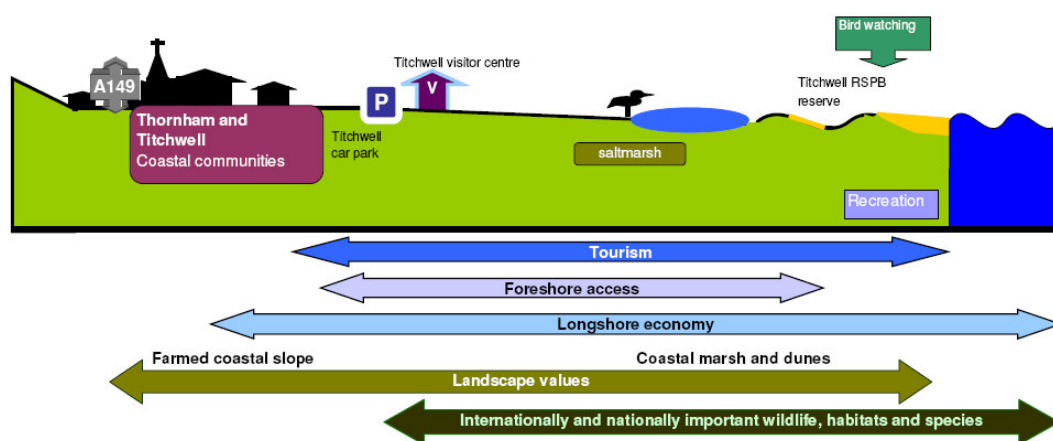
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	No active intervention	No active intervention	No active intervention	No change from current policy of allowing the coast to develop naturally
Local management policy	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Titchwell RSPB reserve
Policy development zone:	PDZ 2B

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To allow the scheme of managed realignment currently underway to be completed and then to allow the current private undertaker to sustain the new defence line. The defences are being privately funded and there are no perceived negative effects from this policy.

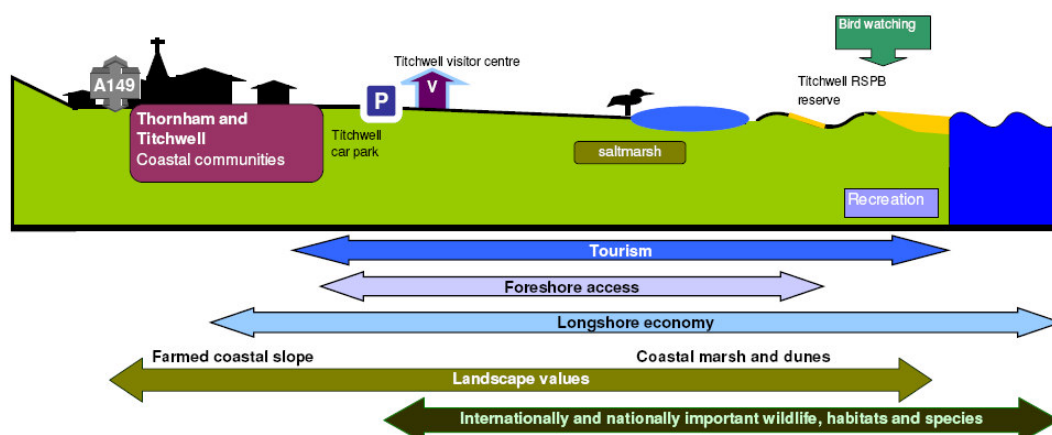
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Allow the current private undertaker to hold the line following completion of the realignment scheme.
Local management policy	Allow private undertaker to sustain the defences at their new realigned position.	Allow private undertaker to sustain the defences at their new realigned position.	Allow private undertaker to sustain the defences at their new realigned position.	































CHANGES FROM PRESENT MANAGEMENT

No substantial change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Titchwell village
Policy development zone:	PDZ 2C

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To maintain the current situation where the frontage is allowed to develop naturally. Currently it is not defended and it is unlikely that there will be any reasons for introducing defences in the future.

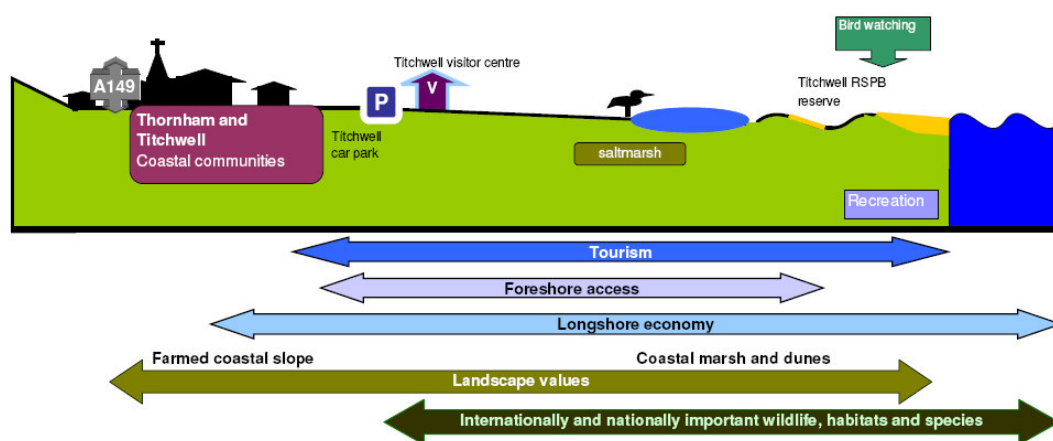
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	No active intervention	No active intervention	No active intervention	No change from current policy of allowing the coast to develop naturally
Local management policy	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Reclaimed grazing marsh at Brancaster
Policy development zone:	PDZ 2D

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To increase the tidal exchange in Mow Creek by realigning the defence of the grazing marsh if confirmed during epoch 1.

This increase in tidal exchange is likely to support navigation in Mow Creek which will create social and economic benefits. Also, by enhancing the outer estuary of Brancaster harbour, the increase in tidal prism is likely to reduce pressure on defences towards the west. Also, the realignments will create intertidal habitat and are likely to benefit the ecological integrity of the area by sustaining the channels and supporting the dunes.

There are, however, also potential negative effects. Firstly, the realignment comes at the expense of designated freshwater habitats and current agricultural land use. Access to the beach and the golf course will have to be maintained and the footpaths on top of the existing sea banks will need to be moved. Finally, the increased channel flows may have local negative effects on structures.

The SMP has identified that more knowledge is needed to assess the effects of this realignment and confirm the intent to realign. The SMP's action plan will therefore contain a specific programme of actions (monitoring, consultation and studies, including pilot realignments elsewhere in the SMP area) to investigate the potential positive and negative effects described above. If this confirms the intent to realign, management would change in the medium-term (including works to maintain access to the beach and golf course) and land use of the grazing marsh would probably need to adapt.

SUMMARY OF SPECIFIC POLICIES

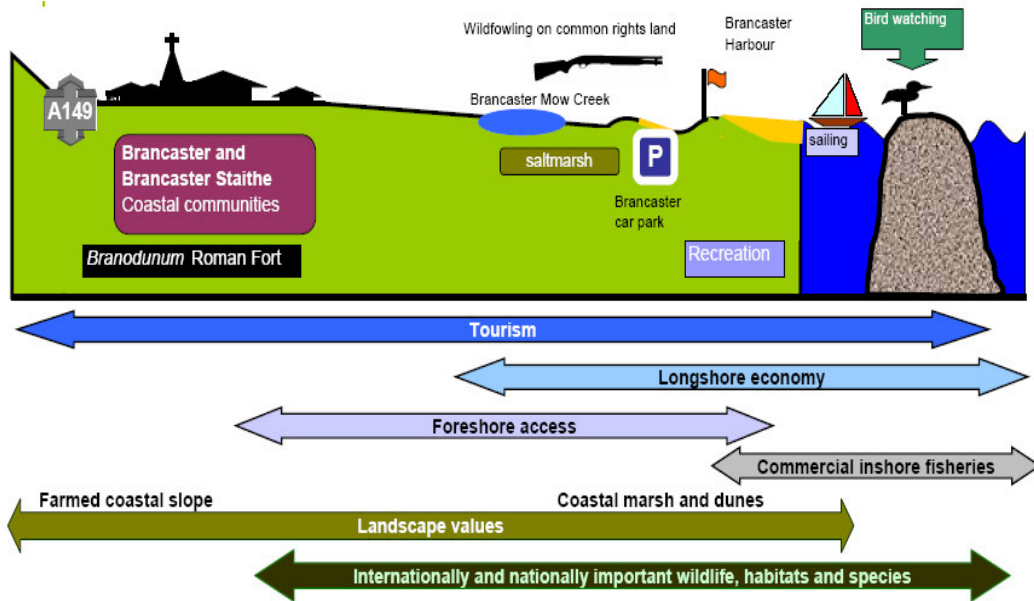
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Managed realignment (MR3) or hold the line	No active intervention	The policy for epoch 2 is conditional. It depends on the results of monitoring and research into the effects of realignment to be carried out during epoch 1.
Local management policy	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	If confirmed, partly remove existing defences to increase tidal exchange, including provisions to maintain access to the beach and golf club.	Allow the frontage to develop naturally, including provisions to maintain access to the beach and golf club.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

In epoch 1 there is no substantial change from existing policy. However, from epoch 2 onwards, the whole frontage may be realigned. The SMP1 policy was realignment in the longer term so the draft SMP2 policy is compatible with this.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference:	Royal West Norfolk golf club
Policy development zone:	PDZ 2E

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To allow the current private undertaker to sustain the existing defences of the clubhouse and golf course. The defences are being privately funded and there are no significant negative effects from this policy. Over the longer term, it is possible that the defences will become less sheltered by Scott Head Island, at which time they may start having a positive effect along the shoreline by reducing pressure on areas to the west.

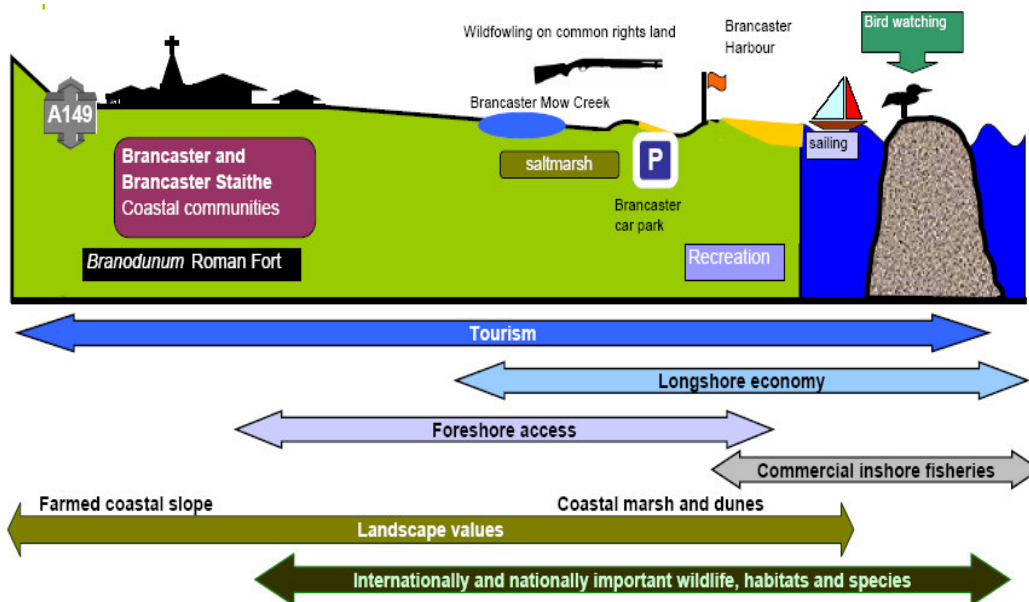
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Allow the current private undertaker to hold the line.
Local management policy	Allow private undertaker to sustain their existing defences.	Allow private undertaker to sustain their existing defences.	Allow private undertaker to sustain their existing defences.	

CHANGES FROM PRESENT MANAGEMENT

No change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference:	Brancaster and Brancaster Staithe
Policy development zone:	PDZ 2F

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To maintain the defences where they are now to sustain the communities of Brancaster and Brancaster Staithe.

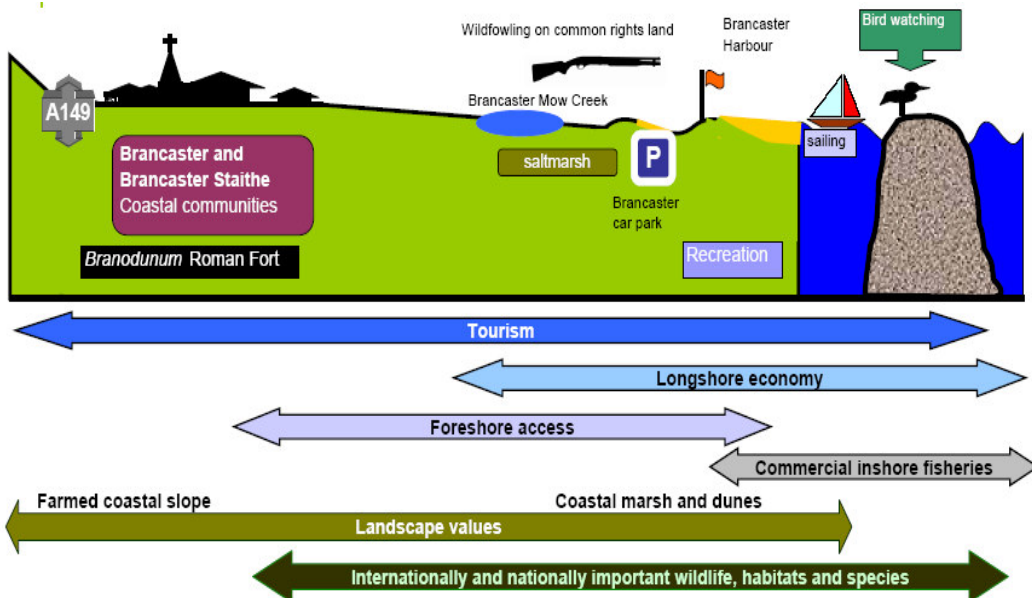
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to sustain the communities of Brancaster and Brancaster Staithe.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Reclaimed areas behind Scolt Head Island
Policy development zone:	PDZ 2G

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain flood defence to all houses and infrastructure together with gradually increasing tidal exchange by realigning the reclaimed Deepdale, Norton and Overy marshes, if confirmed during epoch 1.

This increase in tidal exchange is likely to support navigation in the tidal channels and the outer estuaries, which will create social and economic benefits. Also, by enhancing the outer estuaries, the increase in tidal prism is likely to strengthen the role of Scolt Head Island as a control point for Brancaster bay and Holkham bay and support the role of the dunes and saltmarshes as a habitat and as a natural flood defence. The realignments will move the defences to more sustainable sheltered positions, which will reduce the risk of flooding to the people of Burnham. Also, the realignments will create intertidal habitat and are likely to benefit the ecological integrity of the area by sustaining the channels and supporting the dunes in the neighbouring bays.

There are, however, also potential negative effects. Firstly, the realignments come at the expense of partly-designated freshwater habitats and current agricultural land use. The footpaths on top of the existing sea banks will need to be realigned. Finally, the increased channel flows may have local negative effects on structures.

The SMP has identified that more knowledge is needed to assess the effects of these realignments and confirm the intent to realign. The SMP's action plan will contain a specific programme of actions (monitoring, consultation and studies, including pilot realignments elsewhere in the SMP area) to investigate the potential positive and negative effects described above. If this confirms the intent to realign, then management would be changed in the medium and long-term and land use of the currently-reclaimed area would probably need to adapt.

The intent is to sustain the tidal flood defence function of the River Burn outfall.

SUMMARY OF SPECIFIC POLICIES

PDZ2G.1 – Deepdale and Norton marshes

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Managed realignment (MR2) or hold the line	Hold the line	The policy for epoch 2 is conditional. It depends on the results of monitoring and research into the effects of realignment, to be carried during epoch 1.
Local management policy	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	If confirmed, build new defences to protect properties and infrastructure. Then partly remove existing defences to increase tidal exchange.	Hold the new line of defence	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

PDZ2G.2 – River Burn outfall

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to sustain the communities in River Burn valley.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	

PDZ2G.3 – Overy marshes

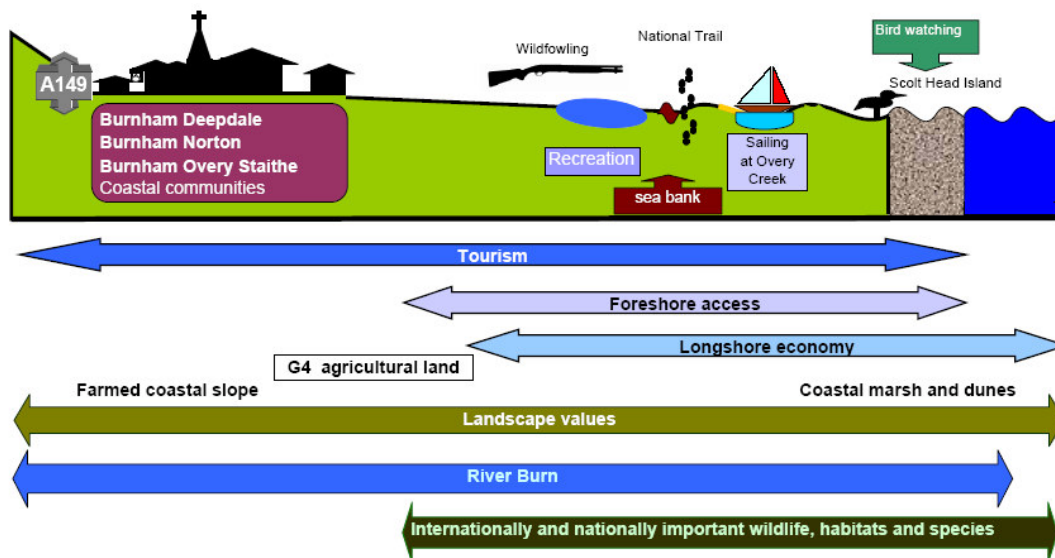
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Managed realignment (MR2) or hold the line	The policy for epoch 3 is conditional. It depends on the results of monitoring and research into the effects of realignment to be carried out during epoch 2.
Local management policy	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	If confirmed, build new defences to protect properties and infrastructure. Then partly remove existing defences to increase tidal exchange.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

In epoch 1 there is no substantial change from the existing hold the line policy. However, from epoch 2 onwards, there may be a significant change if the frontage were substantially realigned. For Deepdale and Norton marshes, the draft policy is compatible with SMP1’s long-term policy of managed realignment. For Overy marshes, the draft policy is a significant change from SMP1’s policy of hold the line for all epochs. For the River Burn outfall there is no change.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference:	Burnham Overy Staithe
Policy development zone:	PDZ 2H

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN To maintain the defences where they are now to sustain the community of Burnham Overy Staithe.

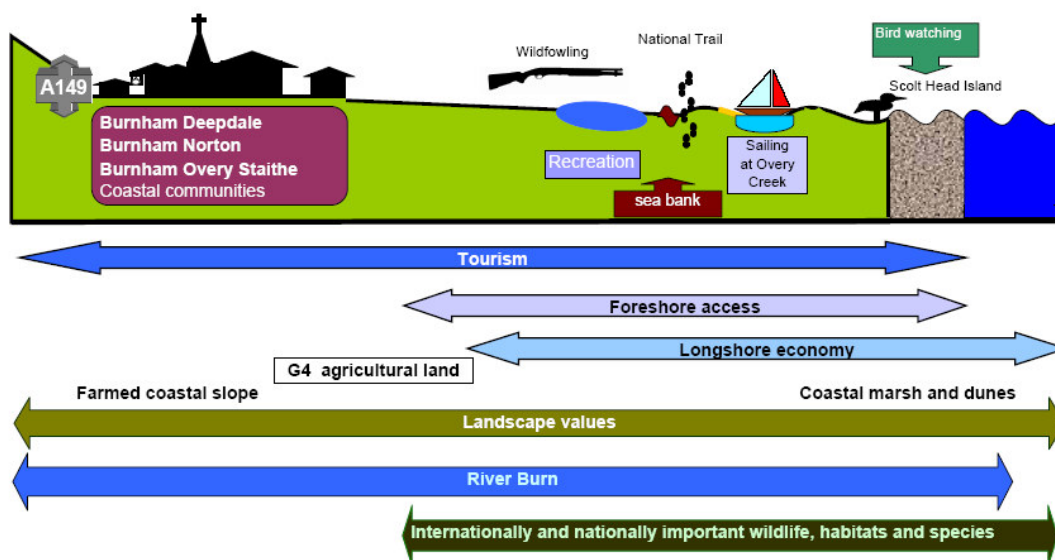
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to sustain the community of Burnham Overy Staithe.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Holkham dunes
Policy development zone:	PDZ 2I

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain the flood defence function of the dunes that protect properties in Holkham and Wells-next-the-Sea, the A149 and other features in the tidal flood zone. The intent is to do this through minimum intervention in the natural development of the dunes, which continues the current approach. The long-term intent to realign part of Overy marshes (see PDZ 2G) would reduce the need for flood protection from the dunes.

SUMMARY OF SPECIFIC POLICIES

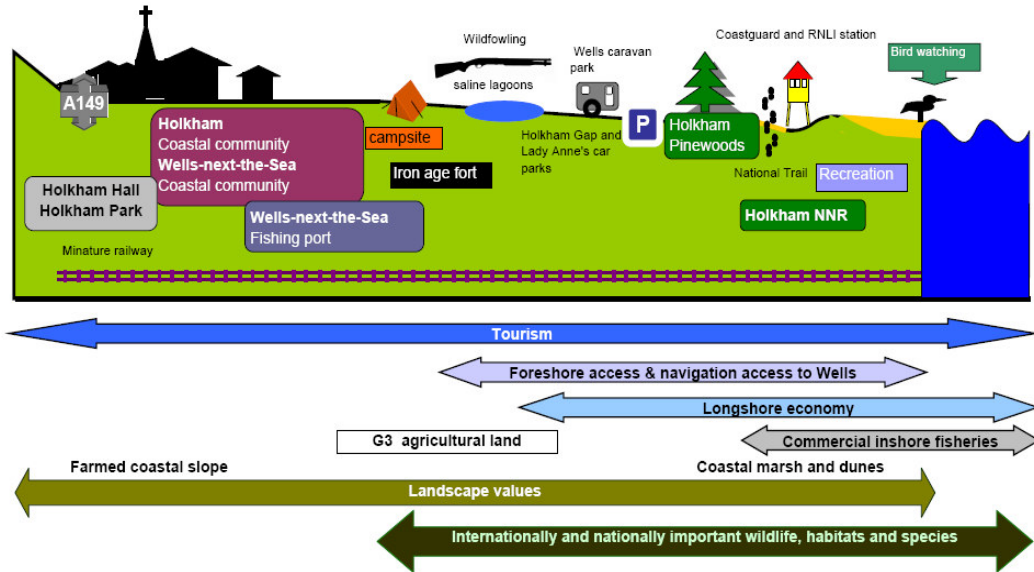
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Managed realignment (MR1)	Managed realignment (MR1)	Managed realignment (MR1)	The flood defence function will be sustained through the minimum amount of intervention allowing the dune system to evolve as naturally as possible. Intervention may be necessary to sustain the flood defence function of dunes. The existing groyne field and revetment protecting significant socio-economic assets will be sustained.
Local management policy	Allow the dunes to develop naturally. If their flood defence function reduces, work will be undertaken to sustain it (including maintaining the existing groynes and revetment).	Allow the dunes to develop naturally. If their flood defence function reduces, work will be undertaken to sustain it (including maintaining the existing groynes and revetment).	Allow the dunes to develop naturally. If their flood defence function reduces, work will be undertaken to sustain it (including maintaining the existing groynes and revetment).	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

No substantial change from existing policy. The draft plan is compatible with the SMP1 policy of hold the line.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

4.4 Super-frontage 2 (east): Wells to Stiffkey

The policy statements for this area are presented separately from the area west of Wells-next-the-Sea. Both areas are part of super-frontage 2 because they are within the zone of influence of Scolt Head Island. They are discussed separately in this document to allow more focused consultation, because super-frontage 2 is so big.

The overall plan for the frontage from Wells-next-the-Sea to Stiffkey is to move to more sustainable shoreline management by increasing the role of natural processes, while continuing to sustain flood defence to all existing low-lying houses and important infrastructure. Where there is currently no active management, the plan is to allow natural development to continue.

The current defences at Wells west embankment and Wells quay will be held where they are now. Stiffkey bay will remain undefended. For Wells east bank, the plan proposes managed realignment in the short-term. This will improve navigability of Wells harbour channel, create more intertidal habitat and move defences to more sustainable sheltered positions. There are potential disadvantages. The realignment will come partly at the expense of current freshwater habitats and limited agricultural land use. It may also affect the stability of Wells west bank and have other negative local effects. These effects need to be addressed during project appraisal and scheme development, which will be carried out before starting any works with full stakeholder involvement. This process will need to achieve landowner agreement and show that the negative effects are acceptable and manageable. This realignment will play an important role in generating the knowledge needed to confirm the medium and long-term plan for the other frontages.

Overall, the total economic benefits of the draft policy are estimated to exceed the costs, although not by a wide margin. Because the calculation method is conservative (generally resulting in high costs and low benefits), the overall plan for this super-frontage is confirmed to be economically viable. However, for the realignment of Wells east bank on its own, analysis of the economic viability shows that it may not be possible to fund this realignment from the national flood risk management budget. This means that local or third party funding may have to be found.

Location reference:	Wells flood embankment
Policy development zone:	PDZ 2J

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To maintain the defences where they are now to sustain current land use (tourism, beach access, agriculture and freshwater habitats) protected by the embankment.

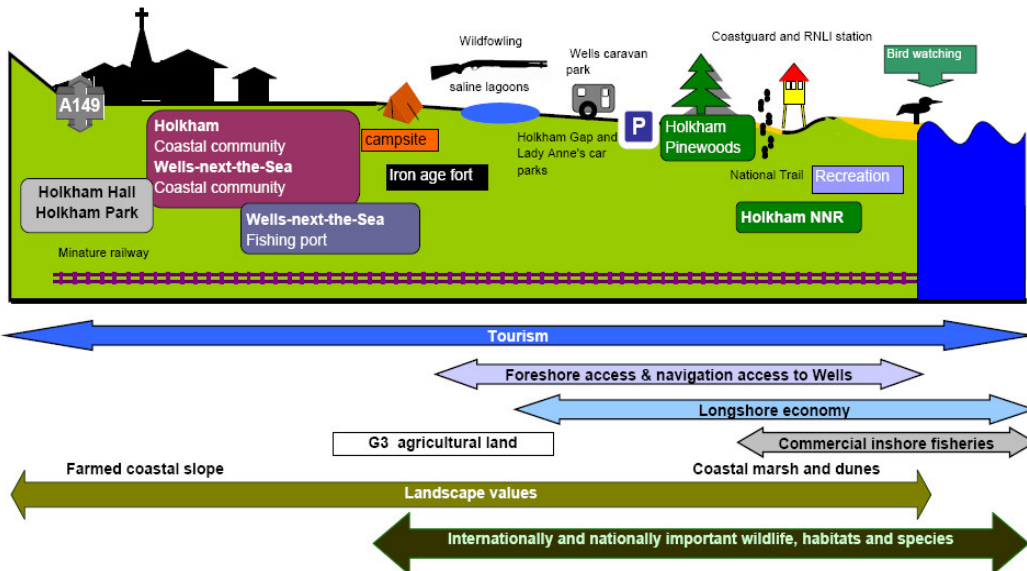
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to sustain current land use (tourism, beach access, agriculture and freshwater habitats) protected by the embankment.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Wells quay
Policy development zone:	PDZ 2K

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To continue to maintain the defences where they are now to protect current use of the quayside and associated features in Wells-next-the-Sea.

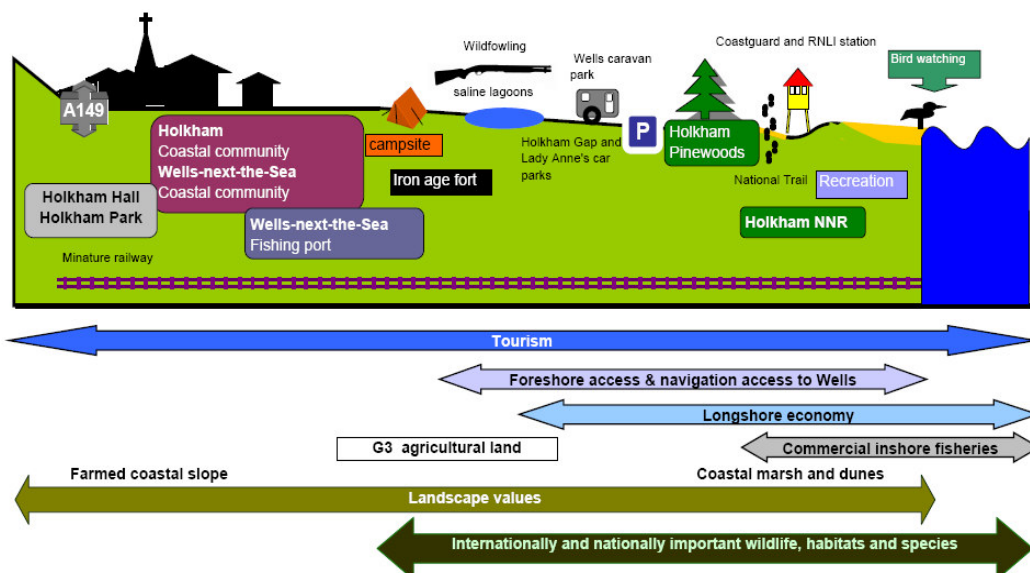
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to protect current use of the quayside and associated features in Wells-next-the-Sea.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Wells east bank
Policy development zone:	PDZ 2L

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain flood defence to all houses and infrastructure together with increasing the tidal exchange in Wells harbour channel by realigning Wells east bank. This increase in tidal exchange is likely to support navigation in the harbour channel which will create social and economic benefits. Also, by enhancing the outer estuary, the increase in tidal prism is likely to reduce pressure on Holkham dunes and support their role as a habitat and as a natural flood defence. The realignment will move the defences to a more sustainable sheltered position, which will reduce the risk of flooding to the people of Wells-next-the-Sea. Also, the realignments will create intertidal habitat and are likely to contribute to the ecological status of Stiffkey bay.

There are, however, also potential negative effects. Firstly, the realignment comes at the expense of current agricultural land use. Also, it may affect the allotments to the east of Wells, although their location and higher elevation may allow continued use or even defence. The footpath on top of the existing sea bank will need to be moved. Finally, the increased flow through Wells harbour channel may affect the stability of Wells flood embankment. These effects will be taken into account during project appraisal and scheme development, which will be carried out with full stakeholder involvement before any works start. This process will need to achieve landowner agreement and show that the negative effects are acceptable and manageable. The SMP's action plan will contain a specific programme of actions (monitoring, consultation and studies) that are needed for this.

The intent is to carry out this realignment in epoch 1, with the additional benefit of generating knowledge about the effects of managed realignment on the increase in tidal prism and the associated benefits. It will therefore also act as a pilot to confirm decisions about medium-term realignments elsewhere in the SMP area.

Analysis of the economic viability shows that it may not be possible to fund this realignment from the national flood risk management budget. This means that local or third party funding may have to be found. If it turns out that no funding is available for the realignment, then Wells east bank will be held where it is now.

SUMMARY OF SPECIFIC POLICIES

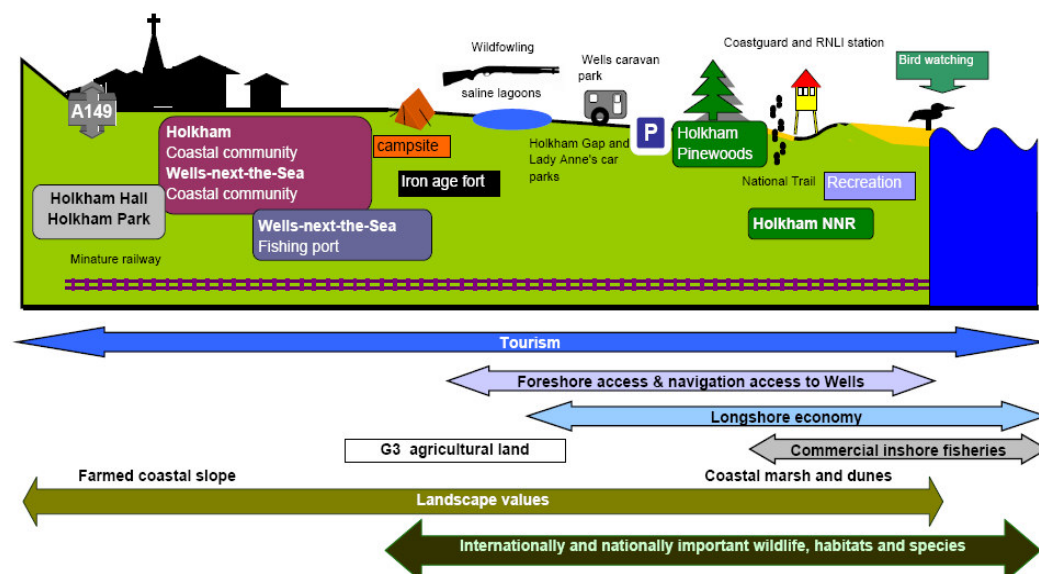
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Managed realignment (MR2)	Hold the line	Hold the line	To sustain flood defence to all houses and infrastructure together with increasing the tidal exchange in Wells harbour channel by realigning Wells east bank.
Local management policy	If confirmed through policy appraisal, build new defences to protect properties and infrastructure. Then partly remove existing defences to increase tidal exchange.	Hold the new line of defence.	Hold the new line of defence.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence































CHANGES FROM PRESENT MANAGEMENT

This policy is a significant change from the SMP1 policy of holding the line at Wells east bank.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Stiffkey bay
Policy development zone:	PDZ 2M

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To continue the current situation where the frontage is allowed to develop naturally. Currently it is not defended and it is unlikely that there will be any reasons for introducing defences in the future.

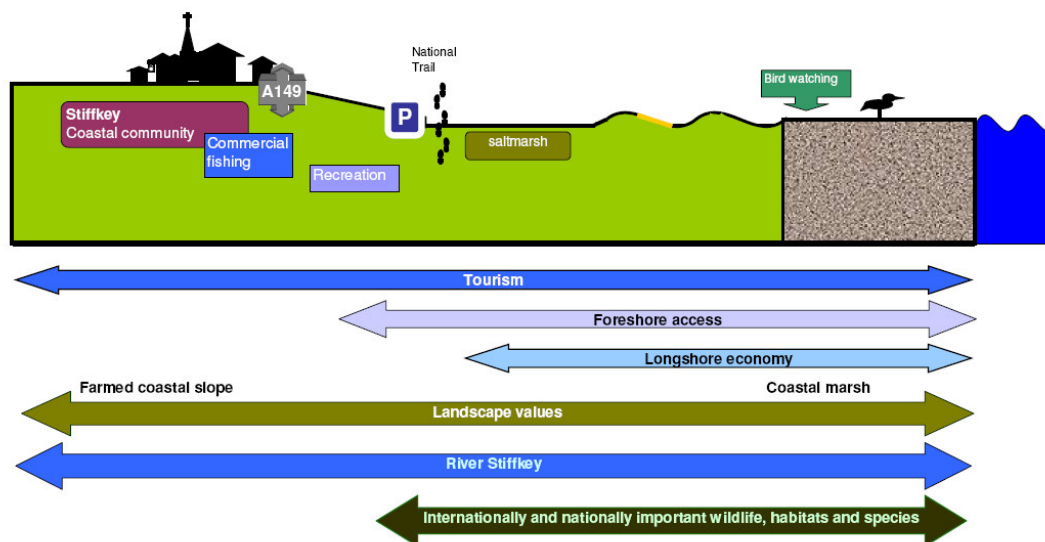
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	No active intervention	No active intervention	No active intervention	No change from current policy of allowing the coast to develop naturally
Local management policy	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

4.5 Super-frontage 3: Stiffkey to Kelling Hard

The overall plan for the frontage from Stiffkey to Kelling Hard is to move to more sustainable shoreline management by increasing the role of natural processes, while continuing to sustain flood defence to all existing low-lying houses and important infrastructure.

The plan is expected to sustain the role of Blakeney spit as a control for Stiffkey bay to its west, which will reduce pressure on the intertidal area. The plan will improve navigability of the channels behind Blakeney spit, create more intertidal habitat and move defences to more sustainable sheltered positions. However, this will come partly at the expense of current freshwater habitats and limited agricultural land use, and may have other negative local effects.

Despite this, the SMP has identified that, for some places, the potential disadvantages of the plan are significant. For those places, more knowledge needs to be generated in the short-term to confirm the changes proposed for the medium and long-term. The exception in this super-frontage is Morston, for which the plan in the short-term consists of realignment (with sustained flood defence for houses and infrastructure). This realignment will play an important role in generating the knowledge needed to confirm the medium and long-term plan for the other frontages.

For the Cley to Salthouse shingle ridge the plan is to continue the current approach.

For super-frontage 3, the total economic benefits of the draft policy are estimated to exceed the costs, although not by a wide margin. Because the calculation method is conservative (generally resulting in high costs and low benefits), the draft policy is confirmed to be economically viable. However, for the realignment of Morston on its own, analysis of the economic viability shows that it may not be possible to fund this realignment from the national flood risk management budget. This means that local or third party funding may have to be found.

Location reference:	Reclaimed areas behind Blakeney spit
Policy development zone:	PDZ 3A

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To sustain flood defence to all dwellings and infrastructure together with gradually increasing tidal exchange by realigning the reclaimed areas at Morston, and possibly, if confirmed during epoch 1, also at Blakeney Freshes and Cley Marshes.

This increase in tidal exchange is likely to support navigation in the tidal channels and the outer estuary which will create social and economic benefits. Also, by enhancing the outer estuary, the increase in tidal prism is likely to strengthen the role of Blakeney Point as a control point for Stiffkey bay and support the role of the saltmarshes as a habitat and as a natural flood defence. The realignments will move the defences to more sustainable sheltered positions, which will reduce the risk of flooding to the people of Morston, Blakeney and Cley-next-the-Sea. Also, the realignments will create intertidal habitat and are likely to benefit the ecological integrity of the area by sustaining the channels and supporting the dunes in Stiffkey bay. They may also contribute to the ecological status of Stiffkey bay.

There are, however, also potential negative effects. Firstly, the realignments come at the expense of partly-designated freshwater habitats and current agricultural land use. The footpaths on top of the existing sea banks will need to be moved. Finally, the increased channel flows may have local negative effects on structures.

The SMP has identified that where realignments have significant negative consequences, more knowledge is needed to assess these effects and confirm the intent to realign. This is the case for Blakeney Freshes and Cley marshes because of their ecological interest. The realignment at Morston however, which includes continued protection of the houses and the A149, could be carried out in epoch 1. All potential effects of the Morston realignment will be taken into account during project appraisal and scheme development, which will be carried out with full stakeholder involvement before any works start. This process will need to achieve landowner agreement and show that the negative effects are acceptable and manageable. The SMP's action plan will contain a specific programme of actions (monitoring, consultation and studies) that are needed for this. Analysis of the economic viability shows that it may not be possible to fund the Morston realignment from the national flood risk management budget. This means that local or third party funding may have to be found. If it turns out that no funding is available for the realignment, the bank at Morston will be held where it is now.

Carrying out this realignment in epoch 1 has the extra benefit of generating knowledge about the effect of managed realignment on the increase in tidal

prism and the associated benefits. It will therefore also act as a pilot to confirm decisions about medium-term realignments elsewhere in the SMP area, including Blakeney Freshes and Cley marshes. The SMP's action plan will therefore contain a specific programme of actions (monitoring, consultation and studies, including the Morston realignment) to investigate the potential positive and negative effects described above. If this confirms the intent to realign Blakeney Freshes and Cley marshes, management for these areas would be changed in the medium and long-term and land use of the currently-reclaimed areas would probably need adapting.

The intent is to sustain the tidal flood defence function of the River Stiffkey and River Glaven outfalls.

SUMMARY OF SPECIFIC POLICIES

PDZ3A.1 – River Stiffkey outfall

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to sustain the communities in River Stiffkey valley.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	

PDZ3A.2 – Morston

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Managed realignment (MR2)	Hold the line	Hold the line	Sustain flood defence to all houses and infrastructure together with increasing the tidal exchange in Morston channel by realigning the sea bank east of Morston.
Local management policy	If confirmed through policy appraisal, build new defences to protect properties and infrastructure. Then partly remove existing defences to increase tidal exchange.	Hold the new line of defence	Hold the new line of defence	

PDZ3A.3 – Blakeney Fresh marshes

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Managed realignment (MR2) or hold the line	Hold the line	The policy for epoch 2 is conditional. It depends on the results of monitoring and research into the effects of realignment to be carried during epoch 1.
Local management policy	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	If confirmed, build new defences to protect properties and infrastructure. Then partly remove existing defences to increase tidal exchange.	Hold the new line of defence	

PDZ3A.4 – River Glaven Outfall

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to sustain the communities in River Glaven valley.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

PDZ3A.5 – Cley marshes

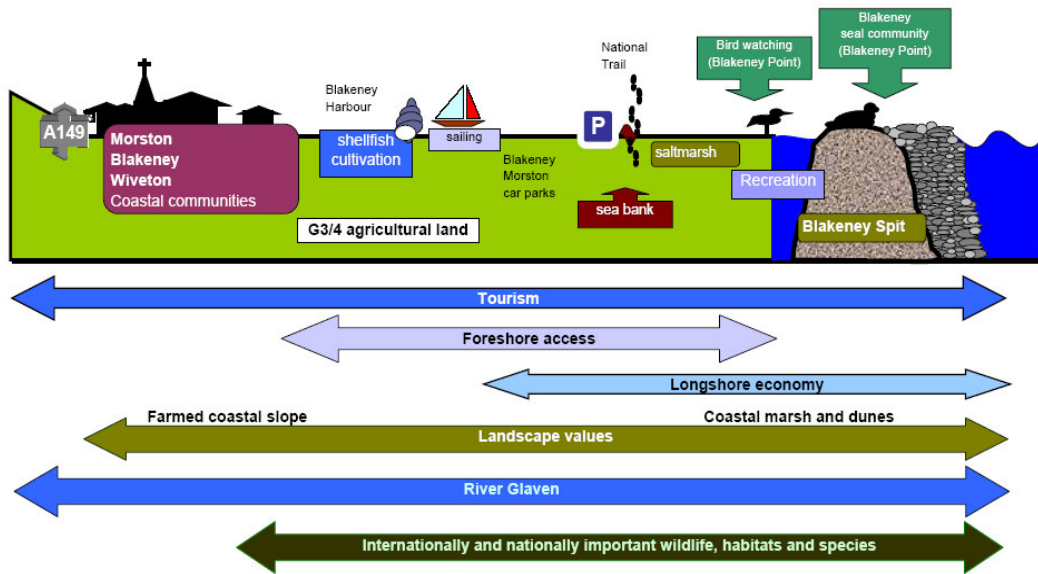
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Managed realignment (MR2) or hold the line	The policy for epoch 3 is conditional. It depends on the results of monitoring and research into the effects of realignment, to be carried out during epochs 1 and 2.
Local management policy	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	Maintain defences where they are now, allowing time for monitoring and study to investigate realignment in the future.	If confirmed, build new defences to protect properties and infrastructure. Then partly remove existing defences to increase tidal exchange.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

There is significant change from the present policy of hold the line for the whole frontage. SMP1 suggested managed realignment in the longer term but did not specify where and when, so the draft policy is compatible to some extent.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

Location reference:	Stiffkey to Morston
Policy development zone:	PDZ 3B

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To continue the current situation where the frontage is allowed to develop naturally. Currently it is not defended and it is unlikely that there will be any reasons for introducing defences in the future.

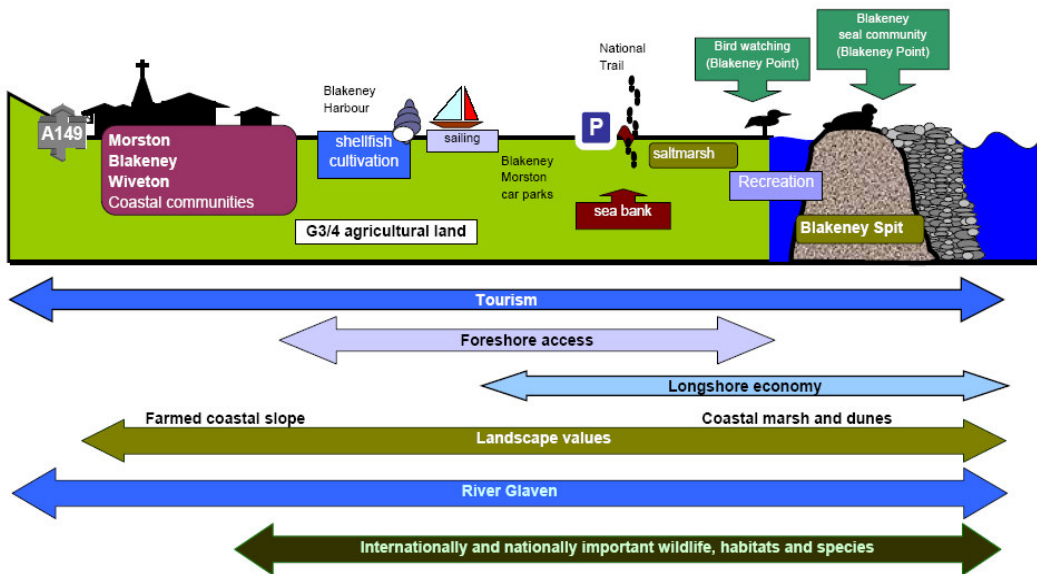
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	No active intervention	No active intervention	No active intervention	No change from current policy of allowing the coast to develop naturally
Local management policy	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	Continue to allow the frontage to develop naturally.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Blakeney
Policy development zone:	PDZ 3C

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To continue to maintain the defences where they are now to protect current use of the quayside and associated features in Blakeney.

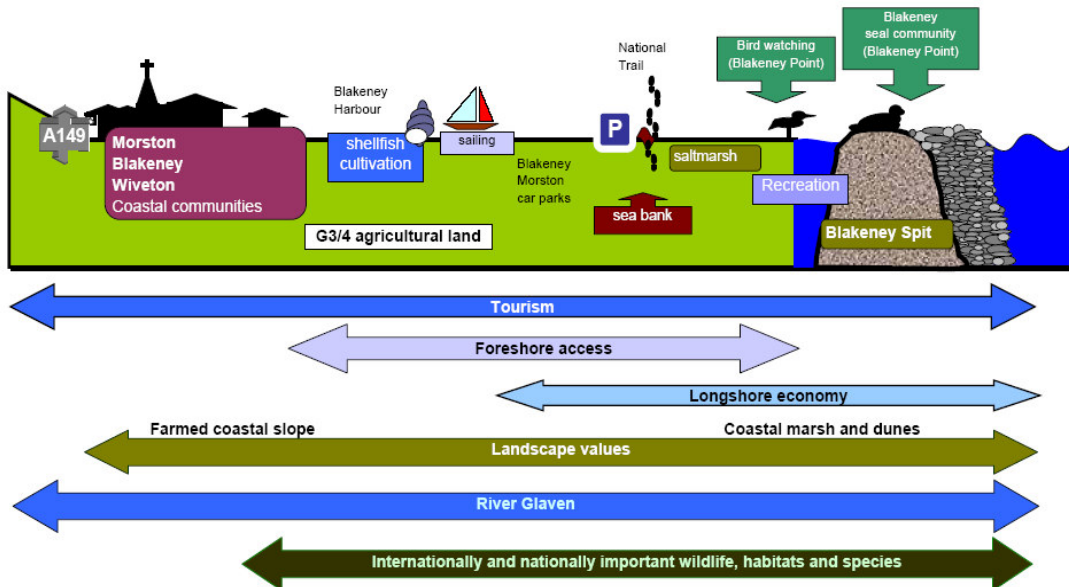
SUMMARY OF SPECIFIC POLICIES

Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Hold the line	Hold the line	Hold the line	Maintain the defences where they are now to protect current use of the quayside and associated features in Blakeney.
Local management policy	Sustain defences where they are now.	Sustain defences where they are now.	Sustain defences where they are now.	































CHANGES FROM PRESENT MANAGEMENT

No change from existing policy.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
					
Epoch 2					
					
Epoch 3					
					

See page 53 for a key to the symbols

Location reference:	Cley to Salthouse
Policy development zone:	PDZ 3D

SUMMARY OF DRAFT PLAN, RECOMMENDATIONS AND JUSTIFICATION

PLAN: To allow natural development of the shingle ridge to continue, while allowing for intervention in response to events that cause immediate risk to life and to residential and commercial buildings in Cley and Salthouse, or threaten the transport function of the A149. This continues the current approach. The long-term intent to realign part of Cley west bank (see PDZ 3A) would reduce the need for flood protection from the shingle ridge.

SUMMARY OF SPECIFIC POLICIES

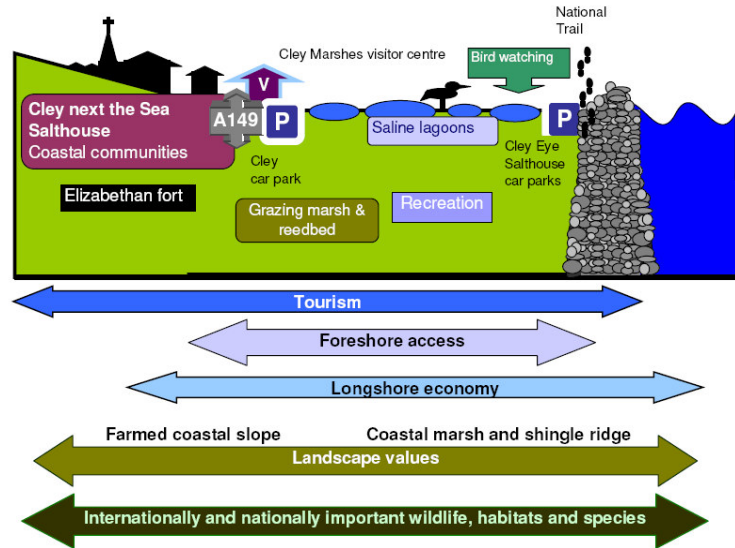
Draft policy	to 2025	2025 to 2055	2055 to 2105	What this means
National SMP policy	Managed realignment (MR1)	Managed realignment (MR1)	Managed realignment (MR1)	Monitoring and managing the natural development of the shingle ridge, if needed to manage immediate risk to life, residential and commercial buildings or the A149.
Local management policy	Allow the shingle ridge to develop naturally. Intervene in response to events, if needed, to manage immediate risk to life, residential and commercial buildings or the A149.	Allow the shingle ridge to develop naturally. Intervene in response to events, if needed, to manage immediate risk to life, residential and commercial buildings or the A149.	Allow the shingle ridge to develop naturally. Intervene in response to events, if needed, to manage immediate risk to life, residential and commercial buildings or the A149.	

Key: MR – Managed realignment:
 MR1 – Sustain natural defence with minimum intervention
 MR2 – Breach of frontline defence after building landward defence
 MR3 – Breach of frontline defence, no building of landward defence

CHANGES FROM PRESENT MANAGEMENT

No substantial change from existing policy. SMP1 suggested that, in the medium to long-term, a policy of managed realignment should be implemented and the current draft policy is compatible with this.

KEY FEATURES AND VALUES:



POLICY APPRAISAL RESULTS:

Epoch 1					
Epoch 2					
Epoch 3					

See page 53 for a key to the symbols

5 Action plan

In the final Shoreline Management Plan, this section will contain the action plan. This will be developed for the final version of the SMP, after incorporating feedback from the public consultation.

The action plan will summarise all the specific actions that are needed to implement the plan and the policies. This can include actions by the Environment Agency and local authorities to develop flood and erosion risk management strategies and schemes. It will also include actions for the other partner authorities, for example to incorporate the plan into the land use planning system or support adaptation of affected people, businesses and organisations. A specific element for the North Norfolk SMP action plan will concern the monitoring and study needed to confirm the intended managed realignments for the medium and long-term.

The action plan will be set up to use as a living document, to allow management of the actions in the period up to the next SMP review. This is expected in five to 10 years' time.

6 Appendices (overview)

This section gives an overview of the contents of the SMP appendices. They are provided as separate documents.

Appendix A SMP development

- Describe stages and tasks
- Includes references to main text and other appendices for content
- Includes graphics/diagrams shown in CSG/EMF presentations to explain logic of the SMP tasks

Appendix B Stakeholder engagement

- Based on stakeholder engagement strategy
- Includes information about all meetings and public events that have taken place so far

Appendix C Baseline processes

- Final report looking at coastal processes and evolution.

Appendix D Thematic review

- Final report (incorporating results of questionnaires and updated Rapid Coastal Zone Assessment (RZCA)) defining features, benefits and issues.

Appendix E Policy development and appraisal

- Describes the policy development and appraisal process
- Objective-setting, including description of the agreed approach, characterisation, objectives for each frontage and accompanying key value graphics
- Policy development, including:
 - playing field
 - definition of policy packages (including defining the options for appraisal and defining the alignment of the policy packages)
- Policy appraisal (including additional task of testing the baseline scenarios which helped to shape the policy appraisal methodology). This includes the full policy appraisal results in tabular form for one PP for one PDZ, and will present the complete set of policy appraisal graphics for all PPs for all PDZs.
- From policy appraisal to draft policy. Describes the steps we went through for PDZ1 and PDZ2 in terms of extra work, modelling, sensitivity analysis, and the way forward from this additional work.

Appendix F Shoreline interactions and responses

- Final report prepared for the assessment of coastal defences.
- Final report prepared for developing baseline scenarios.
- Final report prepared for assessing shoreline response (under all PPs for all PDZs).

- From policy appraisal to draft policy. Mirrors the same chapter as in appendix E. Discusses the extra work in more detail and focuses on the coastal processes elements of the additional work.

Appendix G Draft policy appraisal

- Focuses only on draft policy packages
- Provides final alignments and shoreline response figures for the draft PP for each PDZ and the final policy appraisal graphics.
- Focuses more on the justification and less on the description of the draft policy.

Appendix H Economics

- Final report prepared for the socio-economic assessment.
- Provides high-level assessment of the economic justification of the draft policy in terms of justified, not justified and marginal.

Appendix I Metadatabase and bibliographic database

- Description and tables. Refers to digital deliverables.

Appendix J Sustainability appraisal signposting

- Contains 'roadmap' of how the SMP covers the requirements of the sustainability appraisal.

Appendix K Water Framework Directive compliance assessment

- Assessment of the plan and policies against the objectives of the River Basin Management Plan.

Appendix L Strategic Environmental Assessment

- Contains the structured evaluation of the draft plan against an established suite of environmental and socio-economic receptors.

Appendix M Appropriate Assessment

- Contains the assessment of the plan for its potential effects on international wildlife designations in line with the Habitats regulations.