

Shoreline Management Plans

A guide for coastal defence
authorities

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Department for Environment, Food and Rural Affairs

June 2001

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Foreword

Since the introduction of the original SMP guide in 1995, a long-term coastal strategy now covers the entire shoreline of England and Wales. However, the SMP initiative was a new concept and much has been learnt.

This guide is a result of a review of first generation SMPs. They were considered to be excellent high-level strategic documents, but to require more emphasis on improved links with the planning system, consideration of the environmental impacts and the development of longer-term coastal policies.

It was also considered that more research was needed into how the coast would evolve. National research was commissioned on the future coastal evolution of England and Wales which is due for completion in 2002 (Future Coastal Evolution Study, using the working title FutureCoast). It is envisaged that this research will be a key input to second generation SMPs.

This document is issued by the Department following full consultation with a wide range of interested bodies, and is expected to be adopted for use by the National Assembly of Wales. The Department gratefully acknowledges the contributions and comments received from these organisations.

**Flood and Coastal Defence with Emergencies Division
Department for Environment, Food and Rural Affairs
June 2001**

1 Introduction

1.1 Background

A Shoreline Management Plan (SMP) 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. In doing so, an SMP is a high-level document that forms an important element of the Strategy for Flood and Coastal Defence (Box A) of the Department for Environment, Food and Rural Affairs (DEFRA) and the National Assembly for Wales (NAW). The strategy aims to reduce risks by:

- encouraging the provision of adequate and cost-effective flood warning systems;
- encouraging the provision of adequate, technically, environmentally and economically sound and sustainable flood and coastal defence measures;
- discouraging inappropriate development in areas at risk from flooding or coastal erosion.

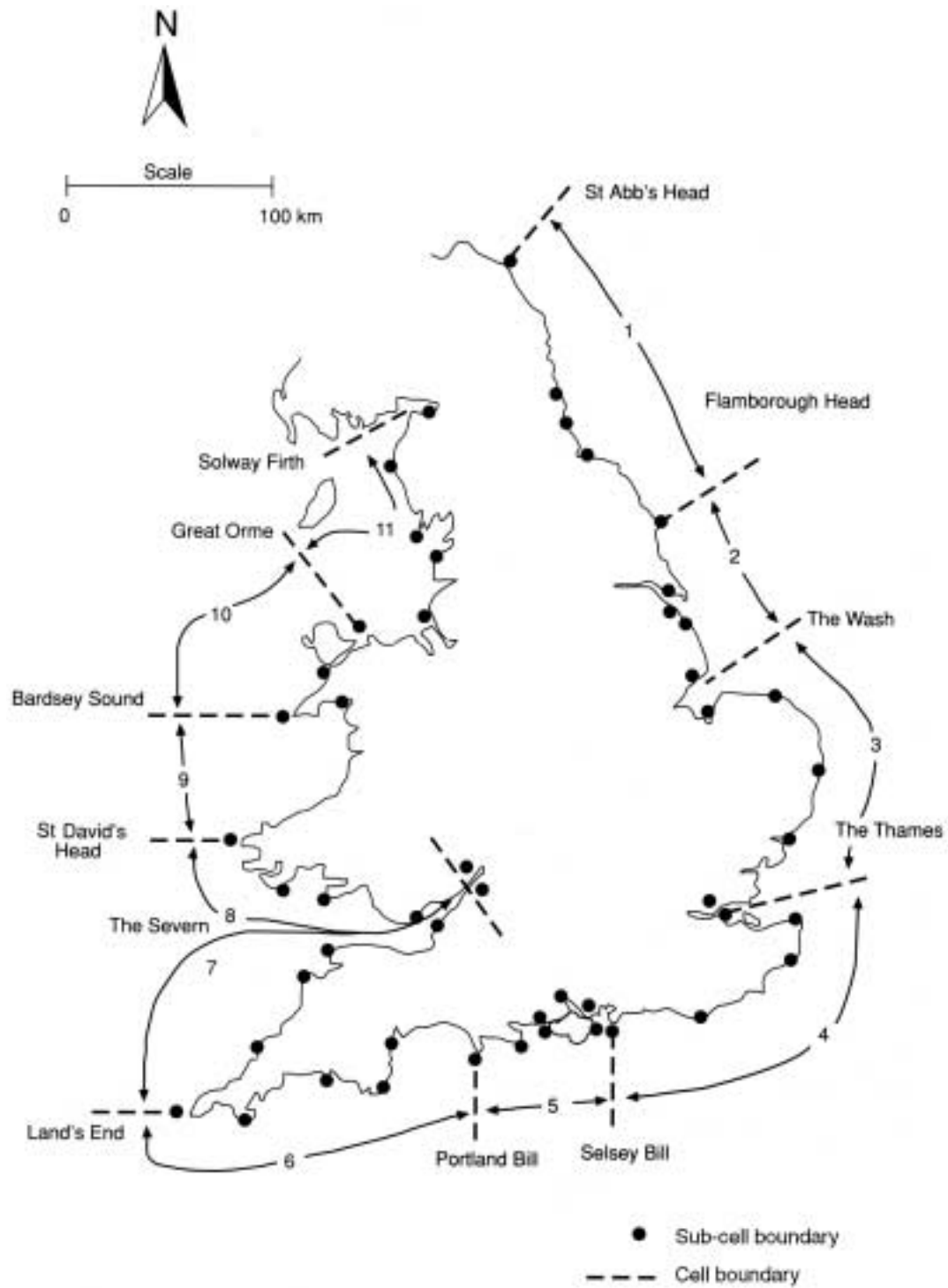
In 1995, the former Ministry of Agriculture, Fisheries and Food (MAFF) and the Welsh Office published guidance on the preparation of SMPs by operating authorities, such as maritime local authorities, the Environment Agency and Internal Drainage Boards, for discrete lengths of coastline (sediment 'cells' and 'sub-cells') (Figure 1; Box B). Since sediment cell and sub-cell boundaries were defined by coastal processes, it was often necessary for these operating authorities to work jointly with neighbouring authorities, as voluntary coastal groups, in order to produce an SMP which extends across a number of administrative boundaries. In all cases, one operating authority was nominated as a lead authority to assume overall responsibility for SMP production (Box C).

Box A Stages in the appraisal process (after FCDPAG4 *Approaches to Risk*)

There are a number of stages involved in achieving the aims of the Strategy for Flood and Coastal Defence (MAFF/Welsh Office 1993), from large-scale planning – i.e. the development of SMPs for shorelines and, from 2001 onwards, Catchment Flood Management Plans (CFMPs) for river catchments – to Strategy Plans, scheme development/design and post project evaluation. Each stage requires an understanding of coastal processes, coastal defence needs, environmental considerations, planning issues and current and future land use, but at an appropriate level of detail. The assessment of risks is an integral part of the appraisal process at each stage to ensure that decisions taken at that time are robust, and based on an awareness of the consequences and appropriate mitigation measures.

Stage	SMP	Strategy plan	Scheme
Aim	To identify policies to reduce risks	To identify appropriate scheme types to implement policies	To identify the nature of works to implement preferred scheme
Delivers	Broad-brush assessment of risks, opportunities and constraints, areas of uncertainty	Preferred approach (i.e. scheme type) including economic and environmental decisions	Comparison of different implementation options for preferred scheme type
Output	Generic policies (e.g. hold the line, advance the line, etc.)	Type of scheme (e.g. beach recharge, seawall, setback embankment, etc.)	Type of works (e.g. revetment, wall, recycling, etc.)

Figure 1 Boundaries of sediment cells and sub-cells (Wallingsford 1994)



Box B Coastal sediment cells and sub-cells

The coastline is a series of interlinked physical systems, comprising both offshore and onshore elements. Sediment (clay, silt, sand, gravel etc.) is moved around the coast by waves and currents in a series of linked systems (sediment transport cells). Simple cells comprise an arrangement of:

- sediment source areas (e.g. eroding cliffs, rivers, the sea bed);
- areas where sediment is moved by coastal processes; and
- sediment stores or sinks (e.g. beaches, estuaries or offshore sinks).

Along a particular stretch of coast there may be a series of such cells, often operating at different scales. In contrast to river catchments, coastal systems have no obvious boundaries. Suspended sediments, for example, may be carried thousands of miles around the coast. Although headlands can be identified which appear to mark the limits of coarse sediment transport, they are often not permanent boundaries – material may be moved around these sediment divides in severe storm conditions.

Major cells, many with sub-cells, have been suggested for the coast (Figure 1). These sub-cells represent a practical subdivision of the coastline into lengths that follow sediment cell principles while enabling suitably sized groups to be formed to consider coastal defence issues at the strategic level. This provides the necessary framework for operating authorities to prepare SMPs.

First generation SMPs have been completed around the coastline of England and Wales. Many operating authorities have adopted the recommendations of their Plan as a basis for the production (where necessary) of individual strategic plans, monitoring programmes and studies for all or parts of their coastline and, where proven by strategic plans to be necessary and sustainable, the implementation of appropriate schemes.

Box C Coastal groups

Groups of operating authorities and other relevant interests have been established to oversee the SMP process. These groups should:

- oversee the implementation of SMPs;
- develop and oversee implementation of Strategic Plans;
- monitor progress;
- initiate reviews and revisions of the SMP;
- liaise closely with the work of the Regional Coastal Authority Group (and other coastal groups) on all coastal issues;
- ensure that the DEFRA Regional Engineer / NAW is fully involved with future proposals.

Groups will vary in their membership, but should generally comprise:

- a chairman and technical secretary, preferably derived from the lead authority;
- all operating authorities with a statutory responsibility within the Plan area;
- a representative from the relevant local planning authorities (to provide a link to the development of coastal planning policies in local authority development plans);
- English Nature / Countryside Council for Wales (CCW);
- significant bodies who have an interest or stake in the shoreline;
- DEFRA Regional Engineers / NAW.

1.2 Lessons learnt and revised guidance

This guide has been produced following a review of the strengths and weaknesses of the first generation of SMPs (MAFF 2000). It is intended to encourage the production of the second generation and future SMPs around the coastline of England and Wales, and is aimed primarily at the operating authorities and their technical advisors. It will also be of use to other bodies with coastal interests, including local planning authorities.

The guide incorporates the key messages from the 12 Advisory Notes produced by the SMP Advisory Group (MAFF 1998). Reference should also be made to the series of Flood and Coastal Defence Project Appraisal Guidance (FCDPAG) documents (MAFF 1999–2001) and the High Level Targets for Flood and Coastal Defence (MAFF / NAW 1999). Of particular relevance is FCDPAG2 *Strategic Planning and Appraisal*. A glossary of the terms used throughout this document is included on page 43.

Future generations of SMPs should build on the first generation Plans, taking account of information subsequently collected or changing circumstances. This guidance reflects the lessons learnt from the first generation Plans and stresses the following important issues that should direct Plan revision:

- a clear focus on the assessment and management of flooding and coastal erosion risks over a consistent Plan time scale (50 years) (see section 2.1);
- recognition that the current SMP policy may no longer be feasible or acceptable at some time over the next 50 years. In such circumstances, the preferred policy should include a planned transition from the current SMP option to an alternative, sustainable policy (see section 2.2);

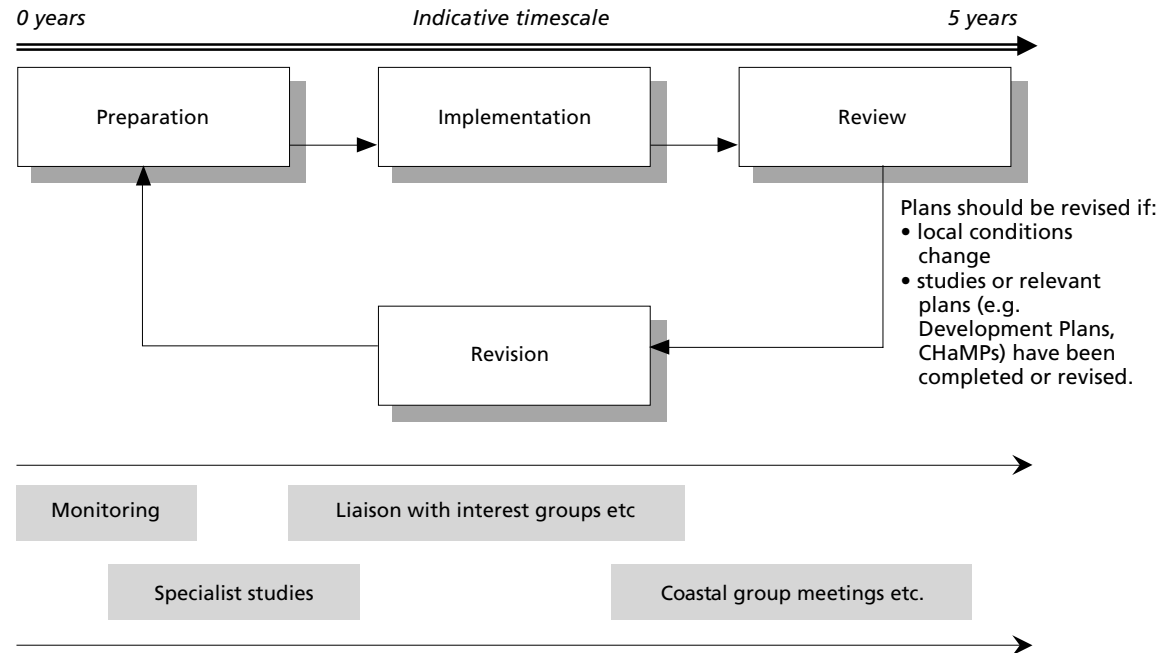
- awareness of the longer-term (50–100+ years) implications of coastal evolution, climate change and sea level rise (see section 2.2);
- awareness of the uncertainties associated with predicting future shoreline management requirements (see sections 2.3 and 4.2);
- more efficient and focussed consultation, with consultees invited to make representations on provisional policies and their likely consequences. The preferred policies should take into account all the representations from consultees. Where the preferred policies differ from the provisional policies, the reasons must be clearly stated (see section 2.5);
- the importance of informing and supporting the planning system in discouraging inappropriate development in areas at risk from flooding or coastal erosion (see section 2.6);
- consideration of estuaries within the SMP process (see section 4.2);
- identification of the consequences of adopting particular policies, at an appropriate level of detail. This should involve, amongst other things, an assessment of the implications of policies on European sites and biodiversity (see section 4.4);
- identification of the anticipated sources of funding for any coastal defence works or operations that might be required to implement the preferred policies, over the next ten years (see section 4.4);
- the value of a standard format for Plans, especially within the same coastal cell (see section 4.4 and Annex 4);
- the value of disseminating the Plan on CD-ROMs and via the Internet (see section 4.5), although it should be noted that copyright issues may need to be addressed.

SMPs are working documents which should be reviewed and, where necessary, revised at appropriate intervals to incorporate up-to-date information and reflect changes in policy guidance (Figure 2). This will lead to the production of successive generations of each SMP. Coastal groups should ensure that the SMP process continues between preparation and revision of Plans. This should involve:

- maintaining the SMP – e.g. databases updated with new information, new and emerging issues recorded, etc.;
- implementing the essential monitoring, studies and strategic plan preparation;
- dissemination of key experiences and lessons learned in the SMP preparation and implementation process at local, regional and national conferences and meetings.

The evolutionary nature of the SMP process may also necessitate further revisions to national guidance in the future.

Figure 2: The SMP process



2 Aims, objectives and general principles

2.1 Aims and objectives

The aim of an SMP should be to provide the basis for sustainable shoreline management policies over the next 50 years within a sediment cell or sub-cell(s) and to set the framework for the future management of risks along the coastline.

The objectives of the SMP process need to be consistent with the Strategy for Flood and Coastal Defence (MAFF / Welsh Office 1993), and are likely to include:

- to define, in general terms, the risks to people and the developed, historic and natural environment within the SMP area;
- to identify the preferred policies for managing these risks over the next 50 years;
- to identify the consequences of implementing the preferred policies;
- to set out procedures for monitoring the effectiveness of the SMP policies;
- to ensure that future land use and development of the shoreline takes due account of the risks and the preferred SMP policies;
- to comply with international and national nature conservation legislation and biodiversity obligations.

2.2 General principles

An SMP should identify the best sustainable approach or approaches to managing risks over the next 50 years (i.e. the shoreline management policy) from flooding and coastal erosion (including cliff instability), for individual management units (Box D). The plan should address, in broad terms, whether to defend, or continue to defend, assets with coastal defences or manage the risks through other means. It should be based on a strategic assessment of conditions within the Plan area and, where appropriate, adjacent Plan areas, rather than detailed studies of individual sites.

Sustainable shoreline management policies will be those which take account of the interrelationships with other defences, developments and processes, and which avoid as far as possible tying future generations into inflexible and expensive options for defence (MAFF 1993). Ideally, the implementation of policies should be of overall benefit to people, have no significant detrimental effect on the environment and contribute, where possible, towards environmental enhancement. This will not always be possible, but should be a key goal at the SMP level.

Box D Coastal process units and management units

A coastal process unit is a length of shoreline (it may include an estuary) in which the physical processes are relatively independent from processes operating in adjacent coastal process units. For management purposes, coastal process units provide the framework for considering the potential wider impacts of policies in a particular management unit(s) on the adjacent shoreline.

A **management unit** is a length of shoreline with coherent characteristics in terms of coastal processes and assets at risk that can be managed efficiently.

Where Strategic Plans are to be developed following SMP completion, they will generally be on the basis of a coastal process unit, an appropriate grouping of adjacent management units or an individual management unit.

It is clearly desirable to base decisions on a sound understanding of coastal processes and their interactions with the existing coastal defences and assets. However, this will not always be the case, as an understanding of processes may be lacking at present. In such instances, a broad-brush approach, which highlights the main factors that will influence policy selection, can be of value.

Each length of shoreline is currently managed in a particular fashion (the current SMP policy). However, for various reasons, this policy may no longer be feasible or acceptable at some time over the next 50 years. For example:

- the current standard of protection may be inappropriate;
- the current defences may have a limited residual life and improvements may not be economically viable;
- the risks to the developed, historic and natural environment may become unmanageable because of sea level rise or climate change.

An SMP should, therefore, identify the combination of policies that are likely to be feasible and acceptable over the next 50 years. This may involve continuing to implement the current policy or implementing an alternative policy at some time within the next 50 years. The operations and management activities necessary for achieving this change should be clearly identified and an estimated timetable set out. This preferred sequence of management approaches is the shoreline management policy i.e. it is the basis, in general terms, for an anticipated programme of strategic plans, works or operations (Figure 3). The SMP must also inform and support the planning system in discouraging inappropriate development in areas at risk from flooding and coastal erosion.

The timing of any change in shoreline management policy, in most cases, cannot be defined precisely. However, it will usually reflect a combination of technical, economic and environmental factors that may become more or less tolerable over time. At some point in time the current policy might become less tolerable than an alternative policy and a change in policy might be desirable (Figure 4). The transition from the current policy to an alternative policy will need to be preceded by planning and liaison with a range of interested parties from landowners, occupiers and business interests, to the local planning authority and conservation interests. The forewarning of change in the shoreline management policy should enable this to be an inclusive and co-ordinated process over a sufficient length of time to allow potential conflicts to be identified and resolved.

The best management solutions for current and future problems must be set in a longer-term context. For this reason, the implications of longer-term (i.e. greater than 50–100+ years) coastal change for shoreline management should be clearly defined within an SMP. This is particularly important where the scale of predicted coastal changes dictate that present approaches to risk reduction may no longer be viable at some time in the future. In doing so, SMPs can begin to help inform policy-makers and the public about the need for longer-term management responses to natural coastal evolution, climate change and sea level rise.

Figure 3 An example programme of shoreline management policies.

SUMMARY OF SHORELINE MANAGEMENT POLICY: Management unit: 1A

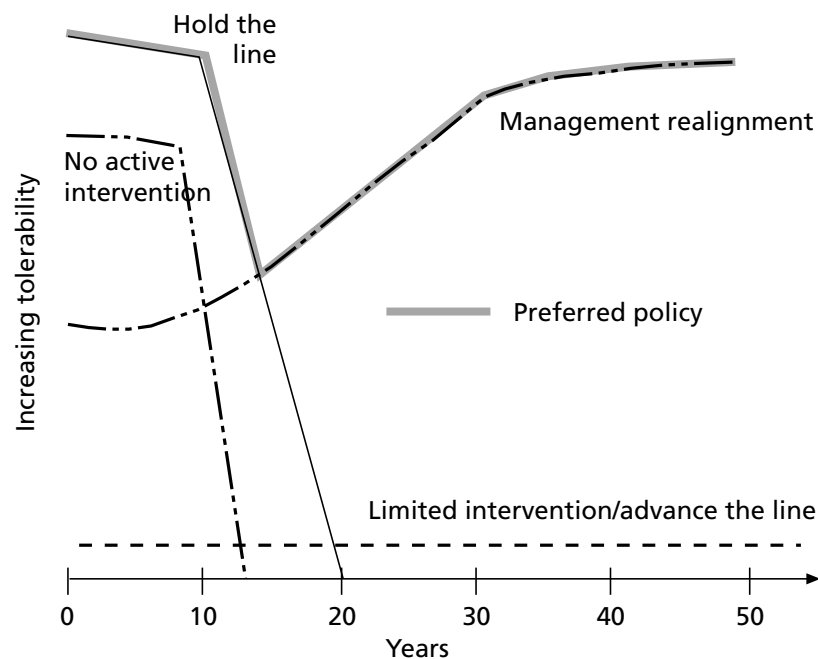
	Policy	Operations	Management
1	Hold the line	Maintenance	Baseline monitoring Discussions with landowners, conservation groups etc.
10		Maintenance	Managed realignment feasibility study
20		Maintenance	Monitoring
Years	Transition: Hold the line – managed realignment		Management agreement/Stewardship scheme
30		Defence realignment works	Monitoring
		Breach of old defences	Monitoring
40	Managed realignment		Monitoring
50			Monitoring

Longer-term implications: climate change and sea level rise over the next 100 years will result in significant changes in the pattern of erosion and accretion. It is envisaged that managed realignment will be the only long-term viable policy for this and adjacent management units.

SUMMARY OF SHORELINE MANAGEMENT POLICY: Management unit: 1B

	Policy	Operations	Management
1	Hold the line	Maintenance	Baseline monitoring
10		Maintenance	Monitoring
20		Maintenance Improvement scheme	Improvements: feasibility and options study Monitoring
30		Maintenance	Monitoring
40		Maintenance	Monitoring
50		Maintenance	Monitoring

Longer-term implications: climate change and sea level rise over the next 100 years will result in significant changes in the pattern of erosion and accretion. It is envisaged that hold the line will remain a viable long-term policy for this management unit after 50+ years.

Figure 4 An illustration of how the tolerability of different policies may change over time

The illustration shows a rural community protected from flooding by a seawall. The current policy is *hold the line*. However, the seawall has a limited residual life (<10 years) and a replacement scheme would not be economically viable or environmentally acceptable. *Advance the line* would be inappropriate, and would result in a loss of inter-tidal habitat. *Managed realignment* would lead to loss of agricultural land, but would lead to a habitat gain. *Limited intervention* would not be appropriate. *No active intervention* would result in increasing risk as the defences deteriorate over time.

2.3 The management of risks: Shoreline Management Policies

Shoreline management involves the identification and implementation of the best ways to reduce risks to people and the developed, historic and natural environment. A variety of responses are available for managing risks (see FCDPAG4 *Approaches to Risk*), including:

- removal of risks by avoiding or relocating inappropriate development in vulnerable areas, e.g. through land use planning;
- reducing the likelihood of damaging events, through proactive management operations (i.e. beach, cliff, dune, saltmarsh management etc.) or the use of back-up systems (e.g. for tidal defence);
- reducing the consequences of risks, e.g. by providing early warning systems such as flood warning systems operated by the Environment Agency;
- reducing the risks associated with potentially damaging events, through flood and coastal defence schemes or building modifications (e.g. flood proofing).

The most appropriate measures will depend on the nature of the problem, together with the technical, environmental and economic constraints. Some of these approaches are beyond the scope of shoreline management. However, in many cases the response will involve a combination of measures, including, for example, collaboration with local planning authorities to achieve mutual objectives.

The generic policies available to shoreline managers are:

- **hold the existing defence line** by maintaining or changing the standard of protection. This policy should cover those situations where works or operations are undertaken in front of the existing defences (e.g. beach recharge, rebuilding the toe of a structure, the construction of offshore breakwaters, etc.), to improve or maintain the standard of protection provided by the existing defence line. Policies that involve operations to the rear of existing defences (e.g. construction of secondary floodwalls) should be included under this policy where they form an integral part of maintaining the current coastal defence systems;
- **advance the existing defence line** by constructing new defences seaward of the original defences. Note that use of this policy should be limited to those management units where significant land reclamation is considered;
- **managed realignment** by identifying a new line of defence and, where appropriate, constructing new defences landward of the original defences;
- **limited intervention** by working with natural processes to reduce risks while allowing natural coastal change. This may range from measures which attempt to slow down rather than stop coastal erosion and cliff recession, to measures that address public safety issues (e.g. promoting the build-up of a beach in front of an unprotected cliff, preventing water leakage on unstable coastal slopes, dune management, flood warning systems, early warning systems for cliff instability, etc.). In other cases, measures might be undertaken to maintain the natural standard of defence on accreting shorelines, e.g. managing blow-outs on advancing dune systems etc.;
- **no active intervention**, where there is no investment in coastal defence assets or operations, i.e. no shoreline management activity.

Note: all the above policies will need to be supported by strategic monitoring and must, when implemented, take due account of existing Health and Safety legislation.

In most cases it is more appropriate to consider the defence line as a zone of defences protecting assets, particularly in those situations where there is a suite of structures (e.g. seawalls, groynes or revetments) and landforms (e.g. beaches, dunes) which together provide coastal defence. The addition of new components to this suite of defences should generally be viewed as improving the defence zone, rather than advancing the line or realignment. The latter policies should be used where a new zone of defence is considered.

2.4 Policy appraisal

Policy selection needs to take account of technical, environmental and economic factors, in accordance with the Strategy for Flood and Coastal Defence (MAFF/Welsh Office 1993). However, it is important to recognise that other factors may need to be taken into account in some instances (e.g. local socio-economic and political factors). Such factors should be considered and be given weighting appropriate to the particular circumstances. To identify and take account of these additional factors, the policy appraisal and selection exercise should include these separate steps:

- the identification of a provisional policy for each management unit based on an analysis of the available information, taking account of technical, environmental and economic factors;
- the examination of these policies by consultees;
- the identification of the preferred policies after due consideration of all representations and responses made by the consultees.

Where technical, environmental and economic factors do not support the preferred policy, it is important that this is clearly stated in the Plan.

It will generally be appropriate to adopt a policy screening approach to rule out unsuitable policies. However, it may only be possible to proceed further with policy selection if the available knowledge permits. Where significant uncertainties about future conditions exist, it may be necessary to proceed with more than one policy or default to the current policy, and to identify the studies that would be required to resolve the outstanding issues. The objective should be that a single policy would be identifiable by the next revision of the SMP.

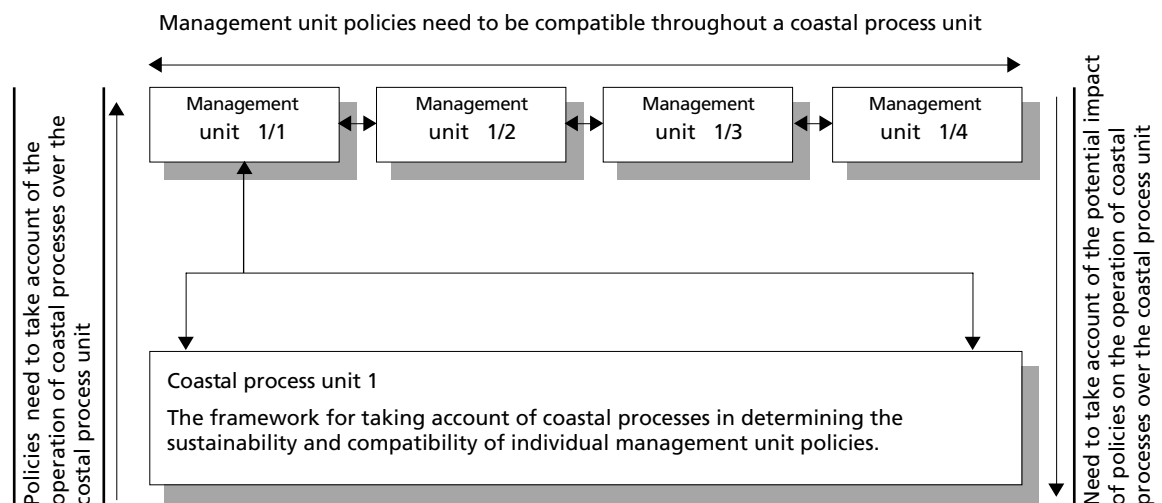
Hold the line should not be an automatic default policy. This policy needs to be thoroughly appraised, including an assessment of the broad longer-term costs and the impacts on wider processes (including, for example, pressures on regional demands for beach replenishment material) and comparison with other policies.

Where a strategic plan or CHaMP (Coastal Habitat Management Plan) has recently been undertaken, the results of this appraisal of policies should be fed directly into the SMP process. In such cases, it should not generally be necessary to undertake a further in-depth policy appraisal, unless the coastal conditions (e.g. areas at risk from flooding or erosion, the nature and extent of development, conservation status etc.) have significantly changed.

Individuals and some private organisations have rights or powers to protect their own property, although under existing legislative frameworks a number of consents are required before such works can be undertaken (see MAFF 1993). On many coasts there are lengths of coastal defences that are privately owned and maintained. SMP policies for these lengths need to take account of the aspirations of the landowners or occupiers and works that they intend to fund, existing legislative frameworks and existing management arrangements (e.g. Stewardship schemes) in addition to considering the sustainability of the defences.

The appraisal of policies for particular management units will need to take account of the following, as outlined in Figure 5:

Figure 5 A summary of the interrelationships between management units and coastal process units



- the operation of coastal processes within a coastal process unit;
- the potential impact of the policies on the operation of coastal processes elsewhere within the coastal process unit.

The preferred policy for individual management units needs to be compatible across a coastal process unit. Once provisionally set, policies in one coastal process unit should be assessed for potential influences on adjacent coastal process units. If unacceptable potential impacts are found, then the decision needs to be reconsidered.

2.5 Consultation

The purpose of consultation should be to:

- raise awareness of the SMP concept, its aims, objectives and findings;
- identify relevant data and information sources and to maximise their use in the project;
- ensure that interested parties have had an adequate opportunity to express their ideas, opinions and concerns, either informally or as part of the policy examination stage; and
- raise awareness about coastal evolution, the risks associated with flooding, coastal erosion and instability, and inappropriate locations for development.

The consultation process should continue throughout the review and revision of the Plan, including the following activities:

- notification by the coastal group of the proposals for a revision to the Plan;
- circulation of a scoping document at the start of Stage 1 of the SMP process: data collation, analysis and policy review;
- informal discussion and liaison with consultees through the data collation and policy appraisal elements of Stage 1;
- invitation to comment on the provisional policies set out in the Policy appraisal report (Stage 2);
- providing responses to the representations made by the consultees about the provisional policies (Stage 3);
- informal discussion and liaison to resolve conflicts over the selection of preferred policies in Stage 3. A model for conflict resolution has been proposed in draft guidance issued by the Government for the preparation of Regional Planning Guidance (DETR 1999);
- notification of the completion of the Plan, its status and availability (Stage 4);
- on-going discussions and liaison during Plan implementation.

Full details need to be included within the Plan of the methods applied, the consultees contacted, the responses received and the actions taken. This is necessary to demonstrate that consultation has been proactively undertaken and rigorously pursued.

Different communication levels/approaches (e.g. use of audio-visual media, locally based consultation meetings and/or seminars, non-technical public relations leaflets and/or newsletters to households, summary documents, public exhibitions, press advertisements) should be adopted depending upon the target audience, and the nature of any information being communicated. Local authorities and the Environment Agency have established experience in devising

mechanisms to entice a reluctant public to become involved in matters of policy that affect the environment. These skills could be used to good effect in the SMP process.

In considering the nature of consultation and/or participation appropriate for SMP preparation, two points are important:

- a clear presentation of the terminology; and
- consideration of the scope of shoreline management policy and the rights of individuals to influence it.

2.6 Informing the land use planning process

It is important to avoid placing an additional burden of responsibility on future generations by unnecessarily increasing the number of areas to be artificially protected. Although the regulation of development and use of land is the responsibility of the planning system (Box E), the need to minimise risks to people and the developed, historic and natural environment is a shared objective, as is the need to avoid damage to European sites (see Glossary) and identify opportunities for environmental enhancement. An SMP should provide information on coastal risks and the preferred future shoreline management approaches. Such information will help ensure that:

- development is not located in unsuitable areas at risk from flooding, coastal erosion and cliff instability;
- development is restricted in potential areas of managed realignment;
- development does not affect the natural balance of the coastline, to the extent that erosion is caused elsewhere or that additional or improved coastal defences have to be constructed and maintained.

2.7 The relationship with other plans

Due to the complex nature of coastal regions, a wide range of management plans and strategies have been developed to work towards achieving the aim of sustainable management (Figure 6). In many areas they form an important part of integrated coastal zone management in providing a focus for liaison and discussion. Although the relationship between these plans can be complex, they should inform and reinforce each other and provide frameworks for implementation, including the delivery of economic, social and nature conservation objectives. SMPs can support other coastal and estuary management plans, by providing information on the anticipated coastal evolution, coastal risks and the preferred future shoreline management approaches.

Figure 6 Existing coastal initiatives

(Note: All plans identified below should be inter-linked. Improved links are particularly required between SMPs and development plans)

Land use planning and development control	Shoreline management	Habitat management	Integrated coastal zone management
Statutory development plans (DPs)	Shoreline Management Plans (SMPs)	Coastal Habitat Management Plans (CHaMPs) * Management schemes for European sites *	Coastal Zone Management Plans (CZMPs) *
Statutory district local plans	Strategy Plans *	Habitat and Biodiversity Action Plans * Local Biodiversity Action Plans *	Estuary * Management Plans Harbour * Management Plans
Individual development proposals * Environmental Impact Assessments *	Project Appraisal Reports *	Water Level * Management Plans	Local Environment Agency Plans (LEAPs)

*These plans will not necessarily be developed for all parts of the English and Welsh coastline

Box E The Land Use Planning System

The town and country planning system regulates the development and use of land in the public interest. The principal planning legislation is contained in the Town and Country Planning Act 1990, with important amendments contained in the Planning and Compensation Act 1991. Development is defined as: 'the carrying out of building, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any building or other land' (1990 Act S.55).

The powers provided by the 1990 Act are exercised by local planning authorities whose administrative area (and, hence, limit of control) normally ends at mean low water mark. The two most important functions of planning authorities are the preparation of development plans and the control of development through the determination of planning applications.

In metropolitan areas, some non-metropolitan areas (e.g. the Isle of Wight) and in the unitary authorities of Wales, the development plan comprises a Unitary Development Plan (UDP) containing all planning policies for the administrative area.

In most non-metropolitan areas of England, the development plan comprises:

- a Structure Plan containing strategic policies and the framework for local plans for the whole administrative area. These are prepared by county councils, some unitary authorities and National Park authorities; and
- a Local Plan, containing detailed policies and proposals for the use and development of land for the whole administrative area. These are prepared by district councils, some unitary authorities and National Park authorities; and
- a Minerals and Waste Plan Local Plan, containing detailed policies and proposals for the use and development of land for minerals or waste, for the whole administrative area. These are prepared by county councils, some unitary authorities and National Park authorities.

The system may be described as plan-led in that all planning decisions (either by the local planning authorities or the Secretary of State) must be made in accordance with the development plan, unless material considerations indicate otherwise. This, in effect, results in a presumption in favour of proposals that conform to the development plan. Policy omissions, therefore, can result in development proceeding in areas that might not be suitable.

The former Department of the Environment, Transport and the Regions (DETR) and NAW have issued clear statements about the ways in which the planning system can be used to minimise development in areas at risk from flooding, coastal erosion and cliff instability, including:

- PPG 14 Development on Unstable Land (DoE/Welsh Office 1990)
- PPG 14 Annex 1 Development on Unstable Land: Landslides and Planning (DoE 1996)
- PPG 20 Coastal Planning (DoE 1992)
- PG 9 Nature Conservation (DoE 1994)
- PPG 25 Development and Flood Risk (DTLR 2001)
- Planning Guidance (Wales) Planning Policy
- TAN (Wales) 14 Coastal Planning (Welsh Office 1998)
- TAN (Wales) 15 Development and Flood Risk (Welsh Office 1998)

3 Policy appraisal: key issues

Five key issues need to be addressed in the appraisal of shoreline management policies. These are:

- coastal processes, including the historic and future evolution of the coastline, existing coastal data and studies;
- the coastal defences, including the purpose and ownership / responsibility of defences, the condition, performance and residual life of existing defences, and other factors such as the availability of beach recharge material to meet present and future needs;
- current and future land use, including current and future development proposals, agricultural and forestry issues, ports and harbour operations, aggregate and other dredging operations, recreation and tourism;
- historic and archaeological features recorded in Sites and Monuments Records and areas of high archaeological potential, including maritime archaeological features, scheduled monuments, listed buildings, registered battlefields;
- the natural environment, including the implications of The Conservation (Natural Habitats & c.) Regulations 1994 and biodiversity targets on shoreline management, landscape interests.

These issues provide a framework which influences policy selection for individual management units (Figure 7). In order to identify the most appropriate policy, it is essential that due account is taken of the environmental implications (Box F), including:

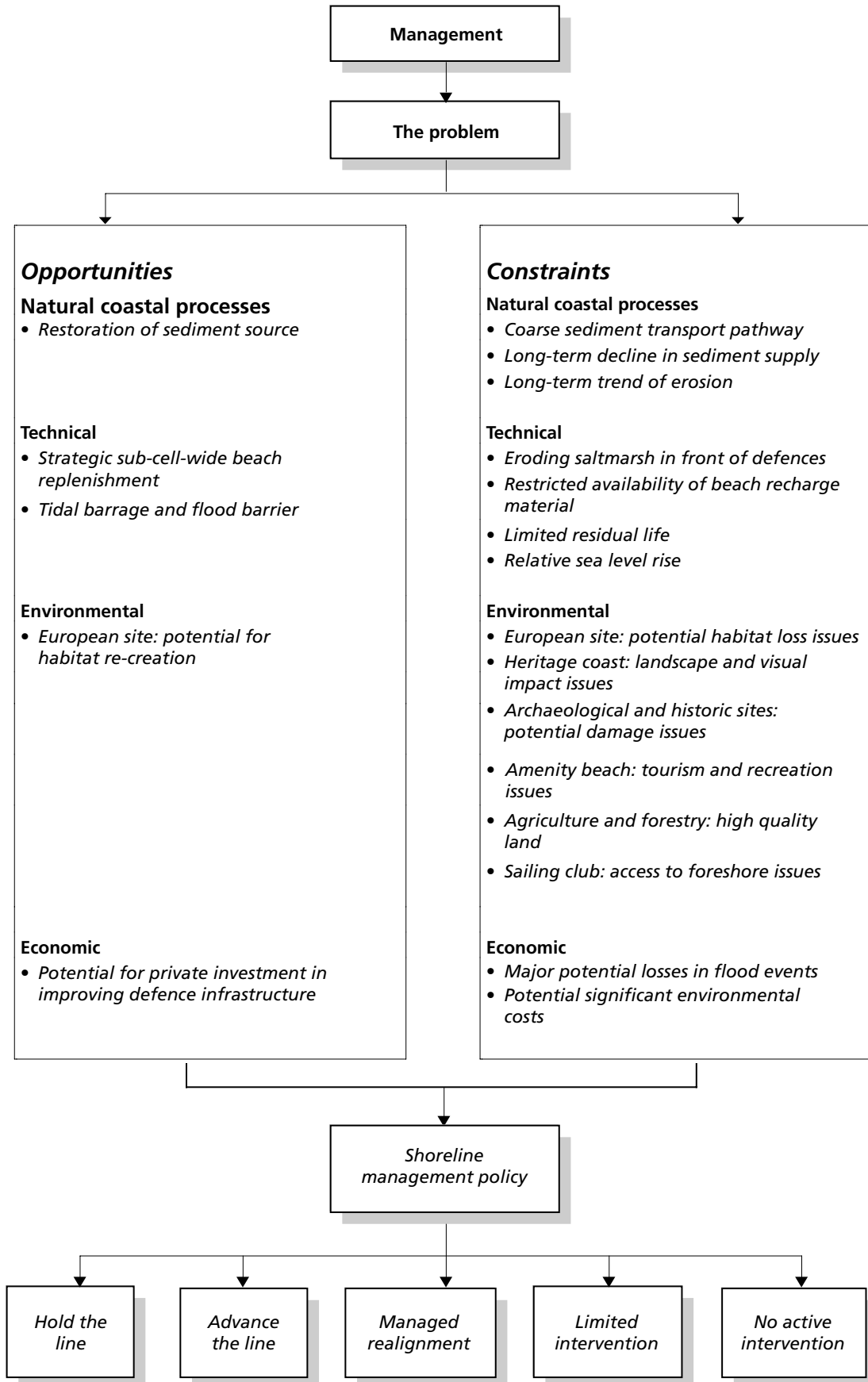
- **the potential opportunities** for environmental improvement (e.g. regeneration of tourism infrastructure), conservation or more efficient shoreline management within the sub-cell or cell which otherwise might go unrecognised. Unless they are taken into account in policy appraisal, the potential economic, cultural and environmental benefits of coastal assets will not be realised, and opportunities for sustainable development and use of the coast could be missed;
- **the potential constraints** which might limit policy selection. These constraints might range from the nature of the dynamic coastal environment to the condition of the existing defence infrastructure, environmental designations and the needs of coastal users.

3.1 Coastal processes

The key to strategic shoreline management is a knowledge of coastal processes in the area concerned. An understanding of the interrelationship between the coastal processes and coastal defence is fundamental. The following aspects need to be considered:

- the evolution of the coastline;
- existing coastal data and studies.

Figure 7 An example framework for policy selection in management units



Box F Environmental aspects of shoreline management (after FCDPAG5
Environmental Appraisal)

Environmental implications are fundamental to policy appraisal and selection. The strategic framework provided by SMPs allows environmental implications of policies to be considered over whole sub-cells or cells.

Coastal groups and their technical advisors should identify policies that:

- seek to avoid environmental damage;
- minimise environmental damage where some impact is unavoidable.

They should also:

- identify, in broad terms, suitable mitigation that could be provided to offset residual impacts where possible; and
- identify opportunities for environmental enhancement;
- ensure full compatibility with the content of the relevant Coastal Habitat Management Plan (CHaMP) in areas where such documents exist.

Where designated sites are involved, the starting point for policy appraisal must be to minimise risk to the features of interest. Guidance on identifying options is provided in the Code of Practice on Environmental Procedures (MAFF/Welsh Office 1996).

3.1.1 Evolution of the coastline

The natural evolution of the coast, together with the expected implications of climate change and sea level rise (Box G) presents a significant challenge to future shoreline management. It is expected that there will be increased levels of risk to many coastal assets. In some places, current approaches to risk reduction will not be viable in the future. It is important, therefore, that SMPs take into account an understanding of the anticipated evolution of the coast and the implications for future management. In doing so, SMPs can begin to help inform policy-makers and the public about the need for longer-term management responses.

The historic evolution of the coastline can provide information valuable in developing scenarios for future change. Present coastal landforms have developed since the last ice age and studies of the evolution since then should be considered. This can be achieved by interpretation of existing landforms and from historical maps, aerial photographs, archaeological records and other published and unpublished sources.

An understanding of the future evolution will allow the identification of areas where management problems are likely to arise in the future. Examples are:

- areas that will continue to evolve, by erosion or accretion;
- areas that will be increasingly at risk from flooding, erosion or instability;
- areas where the maintenance of existing defences is likely to become increasingly difficult or expensive;
- areas that will become increasingly important to the functioning of the shoreline and the coastal defence infrastructure, such as inter-tidal flats, sediment pathways, deltas, sediment sources.

Identifying those areas that will be likely to change in the long term will provide forewarning of the need to develop appropriate strategies for the next 50–100+ years.

An outline Future Coastal Evolution Study of the whole coastline of England and Wales, by major coastal cell, is currently in progress. The objective of this study is to improve the understanding of the major coastal processes and predict the likely coastal evolution over the next 100 years, or longer where appropriate. The study is scheduled to proceed in advance of the second generation of SMPs. The results of this study should feed directly into the SMP revision process and will allow contemporary and past shoreline management decisions to be viewed within the longer-term and wider scale framework. This broad framework should provide a vision for the coast and a scientific basis for considering the direction for strategic policies for sustainable shoreline management. It should also include an assessment of sensitivity to future climate change impacts.

Box G Climate change and sea level rise

The Intergovernmental Panel on Climate Change (IPCC) in 1995 concluded that human intervention is increasing the rate of atmospheric temperature rise and that this is having an effect on global sea levels. The actual estimates are continually refined and predictions of UK trends need to be treated with caution because of the significant degree of uncertainty.

Allowances recommended (November 1991 and reiterated in FCDPAG3) for the design or adaption of coastal defences are 6 mm per year (eastern and southern England), 4 mm per year (northwest and northeast England) and 5 mm per year (the remainder of England and Wales). Research is in progress on strategic land level monitoring. The results of this and other related research will be taken into account, in conjunction with any subsequent estimates of regional sea level rise, in keeping these allowances under review.

The UK Climate Impacts Programme (UKCIP) (e.g. Hulme *et al.* 1998) has predicted that the climate changes, as a result of human activity, expected over the next century are expected to increase risks from flooding and coastal erosion in two ways:

1. By the 2050s, the rise in sea level is predicted to increase the frequency of extreme high water levels from once a century to, typically, once a decade. This situation would be further exacerbated if storminess were to increase;
2. Days with heavy rainfall will become typically three or four times more common, increasing the risk of non-tidal floods in estuaries and, possibly, promoting accelerated cliff instability.

Future work of UKCIP will include scenarios with finer spatial resolution and shorter time steps and specific efforts will be made to predict potential changes in extremes. It is intended to provide further guidance specific to SMP studies and coastal defence design when the results of these and other research studies are available.

3.1.2 Existing coastal data and studies

Since the completion of the first generation SMPs, many parts of the coast have been monitored or studied to improve the level of knowledge of coastal processes, changes and landforms. This information needs to be analysed and taken into account in preparing future Plans. Of particular importance are:

- identification of areas at risk from flooding or coastal erosion;
- the interrelationships between sediment cells and sub-cells.

3.2 Coastal defences

Coastal defences and other coastal structures, such as ports and harbours, already exist on many shorelines and their effectiveness and residual life will affect future coastal evolution. It is important to evaluate the interaction of these defences with the coastal processes in respect of their effectiveness, down-drift effects and other impacts.

As part of the MAFF/NAW High Level Targets for Flood and Coastal Defence (MAFF 1999), operating authorities should ensure that a programme is in place for regular inspection of all defence assets. This, together with previous surveys, should provide up-to-date information on the location and type of existing defence structures, together with an assessment of their condition, performance and residual life. Use should be made of the data collated in the national flood and coastal defence database as part of the response to High Level Targets.

Where natural or man-made defences exist, it is important to include consideration of any updated assessment of their residual life. Many defences will require major works if existing defence standards are to be maintained or improved.

3.3 Current and future land use

The need for intervention to defend the coastline from flooding or coastal erosion arises from the location of many important residential, industrial, commercial, nature conservation and agricultural sites in the coastal zone. Government guidance has stressed that the policy for development in the coastal zone should be to avoid putting further development at risk – see PPG 20 Coastal Planning (DoE 1992), TAN (Wales) 14 Coastal Planning (Welsh Office 1998) and also the PPG 25 Development and Flood Risk (DTLR 2001). In particular, new development should not generally be permitted in areas that would need coastal defences.

While FCDPAG3 *Economic Appraisal* emphasises that it is not appropriate to protect new developments with publicly funded defences, shoreline management policies should take account of development plan policies that might influence the pattern, intensity and type of future development and land use within areas at risk. It is essential to liaise with the local planning authority and other interested parties when developing an SMP. If the planning authority deems it acceptable to allow development in areas at risk, then outline discussions can occur about the need for potential developers to fund any necessary defences or improvements. However, SMPs will need to maintain their strategic approach to the selection of shoreline management policies.

The Strategy for Flood and Coastal Defence highlights the complex variety of national assets in the coastal zone, which includes urban, commercial, agricultural, forestry and fishery interests. The significance of these assets to the local economy and their dependence on coastal defences may be a factor in identifying preferred policies.

3.4 The historic environment

The historic environment comprises all traces of past human activity i.e. archaeological remains, historic buildings, parks, gardens and landscapes, etc. Further details may be found in FCDPAG5 *Environmental Appraisal*.

Under the Ancient Monuments and Archaeological Areas Act 1979, English Heritage and Cadw: Welsh Historic Monuments (Cadw) are involved in the scheduling of ancient monuments and areas. The consent of the Secretary of State for Culture, Media and Sport (England) or the Secretary for Environment (Wales) is required before any work is carried out that will result in the demolition, destruction or damage, or involve removing, repairing, altering, adding to, flooding or covering up scheduled monuments. The overwhelming majority of archaeological sites are not

scheduled, although they may be of national or regional importance. In such cases, the best practice for taking unscheduled sites into account in the development process is provided in PPG 16 Archaeology and Planning (DoE 1990).

Under the Protection of Wrecks Act 1973, the appropriate Secretary of State can designate restricted areas around the site of a vessel of historic, archaeological or artistic value (excluding areas above mean high water mark). It is an offence to tamper with, damage or destroy any part of the vessels or object, or deposit anything that may damage or obstruct access without a licence from the Secretary of State.

SMPs should take account of the historic environment in the policy appraisal process, and consider, at an appropriate level of detail, the full range of historic environmental issues, including: terrestrial and marine archaeological remains; listed buildings and conservation areas; historic parks and gardens; and historic battlefields. The National Monuments Record and local authority records can provide advice on the location of designated and undesignated sites. English Heritage/Cadw and the local authority archaeologist should be consulted, particularly in relation to policy appraisal in those management units where archaeological remains or historic buildings are present and may be at risk within the next 50 years. The likely implications of the preferred policies on historic and archaeological interests should be clearly defined.

3.5 Landscape

SMP policies should take account of the landscape setting. This is particularly important in areas that have been designated for their landscape importance, including National Parks, Areas of Outstanding Natural Beauty (AONBs) and heritage coasts. The implications of any landscape designations on the selection of shoreline management policy need to be identified and taken into account. An attempt should be made, where appropriate, to identify those generic scheme options which, if implemented, could fit well with the landscape setting.

3.6 Nature conservation

The natural forces of wind, waves and tides along a coastline have produced a variety of coastal landforms, many of which are internationally or nationally important for their habitats and natural features. In recognition of this, many areas are afforded special protection by legislation (see Annex 1).

The term 'European site' is used to encompass Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), designated under the EC Habitats and Birds Directives respectively. These Directives have been transposed into UK law by the Conservation (Natural Habitats &c) Regulations 1994. Government policy is to treat Ramsar sites in the same way as SPAs and SACs, while proposed SPAs and candidate SACs are also to be treated as if they were designated.

Even where there are no European sites, it is possible that important nature conservation features and/or specially protected habitats or species are present; for example, habitats or species listed in Annexes 1 and 2 of the Habitats Directive, respectively or species which are given special protection under the Wildlife and Countryside Act 1981 (as amended).

The conservation of these sites may be dependent upon maintaining erosion, accretion or inundation and it should be recognised that interruption of coastal processes may have consequential effects.

The implications of environmental legislation, designations and the responsibilities of operating authorities have been dealt with in FCDPAG5 *Environmental Appraisal* and other publications,

including the *Code of Practice on Environmental Procedures for Flood Defence Operating Authorities* (MAFF/Welsh Office 1996).

Coastal defences can have significant impacts on habitats and species, both directly (e.g. where defences are extended onto inter-tidal areas) and indirectly (e.g. through promoting accelerated erosion of the inter-tidal area in front of the defences i.e. coastal squeeze). In other circumstances, coastal defences may protect the interest of a site, and too low a standard of protection may lead to the loss of that interest. SMPs potentially include policies that, if implemented, could adversely affect some designated sites. Indeed, each of the five generic policies could have an impact on a site, for example:

- hold the line could result in further 'coastal squeeze' in front of the defences while protecting freshwater and brackish habitats inland;
- advance the line could result in the loss or degradation of inter-tidal habitats;
- managed realignment could result in the loss or degradation of freshwater habitats behind the current defences, and the re-creation of inter-tidal habitats;
- no active intervention or limited intervention could lead to continued erosion or flooding of a designated site.

When identifying sustainable approaches to managing risks, particular attention will have to be paid to:

- sites classified under European Directives as Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) or Ramsar sites;
- conserving and enhancing the biological diversity of priority habitats and species.

3.6.1 Implications of shoreline management policies on habitats and species protected under European legislation

Where European sites (i.e. sites classified as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites) are present within the boundaries of an SMP, the detailed guidance in Annex 2 should be followed. It should be noted that not all SMPs will have European sites within their boundaries.

3.6.2 Biodiversity Action Plans

The Government is committed to maintaining and enhancing biodiversity. The overall goal is *'To conserve and enhance the biological diversity within the UK and to contribute to the conservation of global biodiversity through all appropriate mechanisms'*. In pursuance of this objective, the Government has set up a cross-sectoral Biodiversity Steering Group which has prepared agreed action plans for internationally important or threatened habitats and species.

SMPs provide an opportunity to contribute to the biodiversity targets set out in Biodiversity Action Plans, and any local biodiversity action plans prepared by local authorities and others.

In England, flood and coastal defence operating authorities have a specific high level target in relation to biodiversity. When carrying out flood and coastal defence works they must aim:

- to avoid damage to environmental interest;
- to ensure no net loss to habitats covered by National Biodiversity Action Plans; and

- to seek opportunities for environmental enhancement (e.g. through creating inter-tidal habitats to contribute to biodiversity targets).

They are also required to report all losses and gains to habitats covered by Biodiversity Action Plans to the Environment Agency, who will report annually to DEFRA. The National Assembly for Wales has issued similar targets.

SMPs provide an opportunity for flood and coastal defence operating authorities to consider and monitor their impact on biodiversity, and they should therefore contain estimates of the amount of habitats that would be lost and gained if the SMP was fully implemented.

The UK Biodiversity Action Plan sets specific quantified targets to maintain, restore and create these habitats, and the time scale to achieve the target. The plan aims to focus and prioritise work to conserve and enhance biodiversity. National targets for creation of habitats such as saltmarsh and mudflat are currently being broken down into local targets by English Nature and the Countryside Council for Wales (CCW), which will be an important consideration when identifying the preferred coastal management policies.

There are many existing sea walls that, in the face of rising sea levels, are preventing inter-tidal habitats such as saltmarsh, mudflat and saline lagoons from migrating landwards. Many existing SMPs have not fully recognised the significance of this effect on habitats. This process (i.e. coastal squeeze) is resulting in substantial losses of these important habitats, and the respective Habitat Action Plans, therefore, include ambitious targets for creating new habitats to offset losses.

In order to take full account of biodiversity issues, the shoreline management policy appraisal process needs to identify:

- policies which avoid damage to environmental interests;
- policies which, in combination, would result in no net loss to habitats covered by Habitat Action Plans;
- possible landform and habitat changes, over the next 50 years, associated with the preferred shoreline management policies and taking into account the potential effects of climate change and sea level rise. Attention is drawn to a nation-wide assessment of potential habitat losses and gains associated with shoreline management policies, undertaken for the Environment Agency, English Nature and the Countryside Council for Wales (Lee 1998);
- opportunities for habitat re-creation to compensate for net losses associated with the preferred shoreline management policies. This will involve identifying areas where managed realignment to re-create inter-tidal habitats might be possible;
- procedures for monitoring future habitat gains and losses.

4 Procedure for the production of a plan

4.1 Introduction

The coastal group should review the existing SMP on a regular basis. If new information has become available (e.g. coastal process or geomorphological studies), plans have been completed (e.g. strategic plans, CHaMPs) or circumstances have changed, then it will be appropriate to consider a revision (i.e. the production of an updated SMP). In most instances, review and revision should take place after relevant studies or plans have been completed.

The production of an SMP can be split into four stages (Figure 8):

- Stage 1 – data collation, analysis and policy revision;
- Stage 2 – public examination;
- Stage 3 – Plan preparation;
- Stage 4 – Plan dissemination.

The value of improved consistency of SMP format and quality should be taken into account during Plan production. Improved consistency would, for example, readily facilitate the production of cell-wide and/or national overview statements. Annex 4 provides a checklist of the summary information and topics that should be covered by an SMP.

Following completion of the SMP, formal adoption by the relevant organisations is important in ensuring that its status as a policy document is recognised and to underline the operating authority's commitment to monitor and review the Plan.

SMPs are intended to be working documents and will need to be reviewed at appropriate intervals, as and when conditions change or new information becomes available. Details of the frequency of these reviews and any requirement for further studies and monitoring should be covered in the Plan.

4.2 Stage 1: Data collation, analysis and policy revision

The objectives of Stage 1 are to:

- identify and define areas at risk over the next 50 years from flooding and coastal erosion;
- incorporate relevant output from national research and development studies (e.g. Future Coastal Evolution Study) to develop longer-term (50–100+ years) scenarios indicating the anticipated future evolution of the coast, taking into account the most recent predictions of climate change and sea level rise;
- identify the requirements and aspirations of interested bodies that will influence policy appraisal and selection;
- identify a provisional shoreline management policy or policies for each management unit, covering the next 50 years, that does not adversely interfere with the operation of natural processes within the Plan area or across Plan boundaries.

Figure 8 A summary of the SMP revision process

<p>STAGE 1 Data collection, analysis and policy revision</p> <ul style="list-style-type: none"> • Notify and consult with interested parties • Collate and analyse new data • Review boundaries • Define management unit issues • Review policies • Assess compatibility of policies • Identify provisional policies • Identify longer-term implications • Prepare Policy Appraisal Report 	<p>STAGE 2 Public examination</p> <ul style="list-style-type: none"> • Circulate Policy Appraisal document, management unit summaries • Public meetings • Seminars/workshops • Advertise in local press • Place copies of Plan for inspection • Consultation with local planning authorities 	<p>STAGE 3 Plan preparation</p> <ul style="list-style-type: none"> • Collate consultees' responses • Identify and confirm preferred option • Resolve conflicts • Assess uncertainties and risks • Identify need for further studies • Implications for European sites and biodiversity • Implications for land use planning • Plan production • Action Plan • Adoption 	<p>STAGE 4 Plan dissemination</p> <ul style="list-style-type: none"> • Plan format and availability • Databases/GIS • Public meetings etc. • Seminars/workshops • Liaison with local planning authority
<p>Key skills</p> <ul style="list-style-type: none"> • Coastal engineering • Coastal processes • Geomorphology • Land use planning • Nature conservation • Environment (landscape) • Environment (historic) • Economics 	<p>Key skills</p> <ul style="list-style-type: none"> • Public relations • Technical support 	<p>Key skills</p> <ul style="list-style-type: none"> • Policy-making • Technical support 	<p>Key skills</p> <ul style="list-style-type: none"> • Presentation • Public relations • Technical support

Prior to the start of the Plan review and revision process, a number of specialist studies may need to be undertaken and completed in order to provide essential information for policy appraisal (Box H). Plan revision should not normally commence until these studies have been completed. The coastal group should also review and update the list of consultees to be contacted during the preparation of the revised Plan. Those interested will include statutory and non-statutory bodies, including local planning authorities and those representing national and local interests, as well as local business interests (including farmers), landowners, occupiers and the general public.

Box H Supporting studies

The first generation SMPs identified gaps in existing knowledge that, in places, restricted the policy appraisal and selection process. While it will not be appropriate to wait for a scientific ideal to be reached, it is clearly desirable to base decisions on a sound understanding of coastal processes and their interactions with the existing coastal defences and assets, and the natural environment.

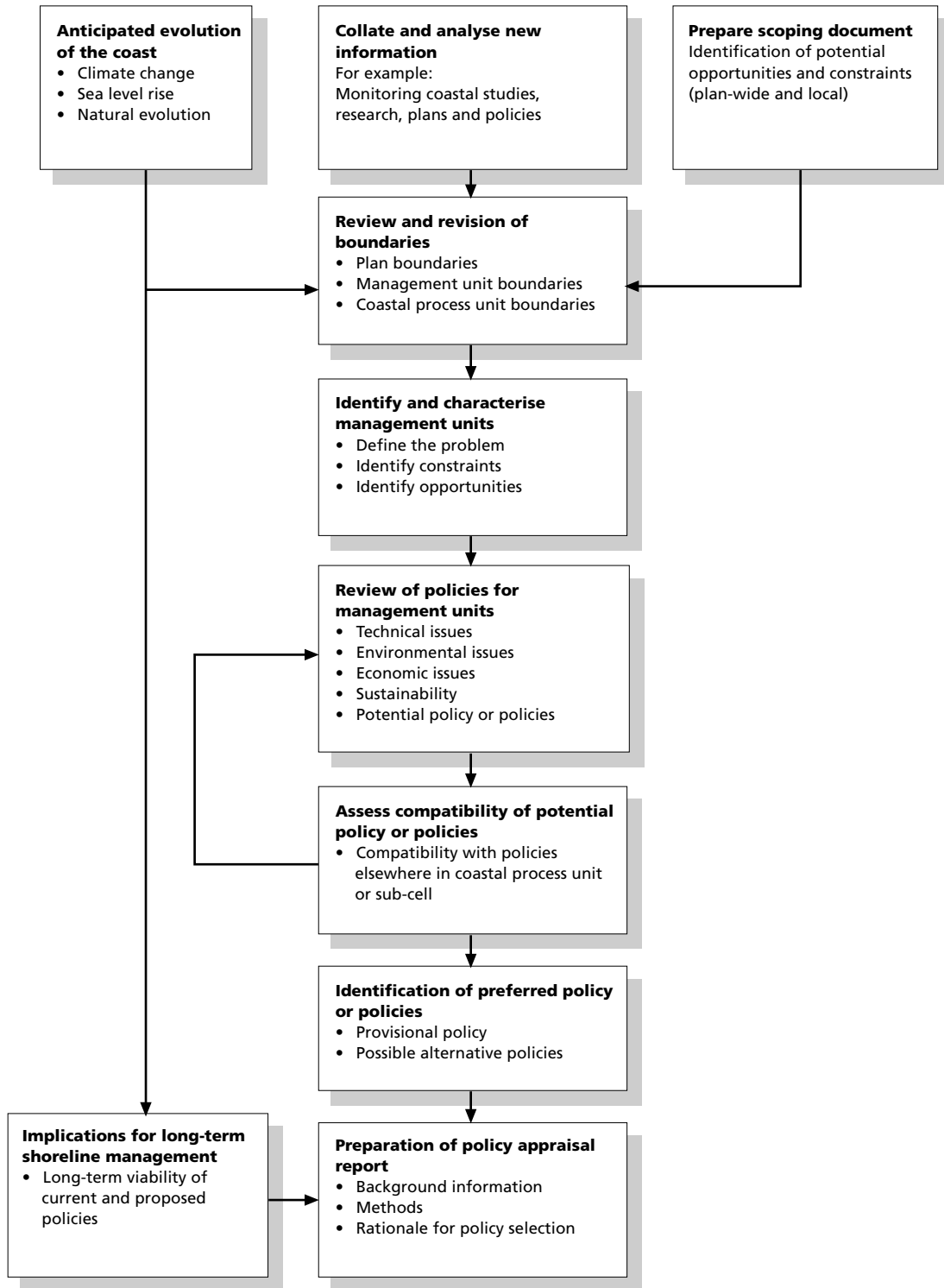
Plan revision should be scheduled to take place after any major deficiencies have been addressed in the existing knowledge identified by the first generation SMP. In many areas, these supporting studies are likely to include:

1. the results of the ongoing national Future Coastal Evolution Study that will develop a range of credible scenarios for the longer-term (50–100+ years) evolution of the coast;
2. any additional assessment of the sediment budget of the Plan area or parts of a sub-cell where sediment availability is a key issue for future shoreline management;
3. an assessment of the condition and performance of the existing defences, and their residual life – it may be necessary to extend this assessment to define the future loadings on the components, especially the joint probability of waves and extreme water levels;
4. the production of a Coastal Habitat Management Plan (CHaMP) to provide a framework for managing European sites – it is anticipated that operating authorities (normally the Environment Agency) and English Nature working together for some coastal site complexes will produce these plans;
5. flood risk maps produced by the Environment Agency, as required by the Water Resources Act 1991, S.105 – a national set of indicative flood risk mapping was issued to all local planning authorities in 1999, and is being further developed;
6. flood and erosion risk studies to identify areas where standards of defence cannot be sustained in the future;
7. studies to scope the necessity for inclusion of estuaries within an SMP.

The steps to be followed in Stage 1 (as shown in Figure 9) are described below:

- *Prepare a scoping document outlining the aims and objectives of the SMP revision.* This should be sent to all consultees. This document should invite the consultees to provide general information about issues of particular concern that they consider essential to identifying sustainable shoreline management policies. It is important that the consultees are aware that the SMP will take a broad-brush view on coastal issues, and that detailed information will generally not be required. At this time information should be provided to the consultees about how their views on the provisional shoreline management policies will be sought and taken into account. A minimum of three months should be given for responses.
- *Collate and analyse new information* – that has become available since the preparation of the first generation Plan. This may include, for example, shoreline monitoring data, the results of coastal studies or research, strategic plans, new development, revisions to development plans or management plans etc. Attention should be given to establishing a database and archive of all the relevant information used to produce the first generation SMP, together with new information. Wherever possible, the information should be mapped for future use in a geographical information system (GIS) system that is compatible with other systems used by the authorities involved.

Figure 9 A summary of Stage 1 of the SMP revision process



Stage 1 Data collection, analysis and policy review

Objective: to identify a provisional shoreline management policy or policies for each management unit, over the next 50 years, that does not adversely interfere with the operation of natural processes within the Plan area or across Plan boundaries.

Box I Estuaries and SMPs

The assessment and management of risks within an estuary should normally be considered in an SMP. This will either be as part of an SMP covering the frontage where the estuary joins the open sea coast or as an Estuary SMP developed in its own right. Whichever approach is adopted, an understanding of the following will be required:

- non-cohesive and cohesive sediment transport processes and, additionally, an understanding of estuarine morphology and its adaptation to the hydrodynamics (e.g. an indicative estimate of the sediment budget, simple relationships between plan form, tidal prism and cross-sectional area, and its predicted longer-term evolution, taking into account factors such as sea-level rise, etc.);
- the impacts of changes within an estuary upon the open coast and vice versa (e.g. changes to wave energy, tidal asymmetry, sediment supply and demand, etc.).

Shoreline management policies should be developed for the estuarine frontages, within the appropriate SMP. This approach should allow the implications of these policies to be assessed in terms of the cumulative estuary-wide impacts, and also in terms of their potential impacts on the adjacent open coast.

In practice, the minimum requirement should be for estuary processes to be integrated within SMPs as fully as possible; this will generally be up to the tidal limit. Policies will usually be selected for estuarine shores up to the existing Schedule IV boundary. It should, however, be noted that the Schedule IV boundary has been selected on a fairly arbitrary basis at many locations. If it is considered that the boundary is set in an inappropriate position, then early discussion should be held with the appropriate DEFRA Regional Engineer so that consideration can be given to its amendment.

The upstream boundary within an estuary should be consistent with any river management plan (e.g. Catchment Flood Management Plan) boundaries.

- *Review and revise boundaries.* The boundaries of the first generation SMP should be reviewed, taking into account the potential benefits of producing joint Plans for combinations of adjacent sub-cells. All SMP boundary limits should be unambiguous and fully acknowledge the continuity of habitats and the extent of marine/coastal influences upon shoreline management. Management unit and coastal process unit boundaries should also be reviewed to ensure that they provide the most efficient framework for achieving sustainable shoreline management. For example, the need to include an estuary within an SMP should be considered (Box I), noting that in some cases it may be advisable to apply for amendments to the existing location of the Schedule IV boundary. It may be appropriate to amalgamate a number of management units, or subdivide a large unit, if this would lead to more effective management. There may also be a need to revise coastal process unit boundaries, notably where strong morphological and process links exist between the open coast and estuaries.

- *Define and characterise management units.* For each management unit it will be necessary to define those areas at risk from flooding and coastal erosion, and to identify those issues (i.e. opportunities and constraints) which need to be taken into account in appraising policies. (Note: opportunities and constraints can be considered analogous to the primary and secondary management unit objectives contained within several first generation SMPs). The flood risk areas should be based on information produced by the Environment Agency, with erosion and instability risks based on an assessment of the areas expected to be affected by these processes over the next 50 years and, where appropriate, beyond. Where there are existing man-made or natural defences, their residual life will need to be assessed, with and without maintenance.
- *Review policies for individual management units.* The shoreline management objective for each management unit should be to reduce risks to people, and the developed, historic and natural environment.

Each policy should be evaluated in broad terms, addressing technical feasibility, environmental acceptability and economic viability, together with the issue of sustainability. The implications for biodiversity and the management of European sites should be factors in this screening exercise. After an initial screening, some policies might be considered not to be viable in a particular management unit; these non-viable policies should not be the focus of further scrutiny. The subsequent appraisal of short-listed policies should take account of those issues (i.e. opportunities and constraints) which might influence policy selection, including the implications of the Habitats Regulations and biodiversity objectives and targets.

Particular attention should be given to identifying, in general terms, the consequences of adopting particular policies. Further details are presented in FCDPAG3 *Economic Appraisal*, with a summary of some key points provided in Box J.

- *Assess compatibility of the potential policies across a coastal process unit.* Each potential policy for individual management units should be considered in relation to its effect on all the other management units within a coastal process unit, and on the sediment cell or sub-cell itself. Policies must be compatible with those policies identified for neighbouring management units and the processes at work within the process unit or sediment sub-cell. It may be necessary, therefore, to revise the initial policy selection for particular management units to ensure compatibility across the process unit or sediment sub-cell.
- *Identify a provisional policy.* The policy review exercise should result in the identification of a provisional policy, from a technical, economic and environmental viewpoint. In some management units it may be appropriate to identify alternative policies where this would be both sustainable and compatible with policies in neighbouring management units. Where significant uncertainties about future conditions exist, it may be necessary to proceed with more than one policy and identify the studies that would be required to resolve the outstanding issues.
- *Identify the longer-term implications of climate change and sea level rise for shoreline management in a particular management unit and within a coastal process unit or sediment sub-cell.* This review should provide an indication as to whether the current and proposed approaches to risk reduction will continue to be viable in the future (i.e. beyond the 50-year time scale of the Plan).
- *Review the risks and uncertainties associated with the provisional policies.* This should take account of the reliability and adequacy of the existing information and the level of confidence that should be placed on the policies (e.g. the level of certainty that future coastal defence improvements would be economically viable or environmentally sound, the residual risks). The consequences of not being able to deliver the provisional policy should be identified. FCDPAG4 *Approaches to Risk* provides information on risk assessment at the large-scale planning level.

Box J Criteria for policy appraisal

All issues need to be considered at an appropriate level of detail for screening, appraising and selecting policies. A broad-brush assessment is required, not an in-depth study that would be more appropriate to Strategic Plans or scheme design.

Technical feasibility

Potential issues include:

- sustainability;
- residual life of the natural or man-made defence components;
- longer-term coastal evolution;
- sea level rise and climate change;
- sediment budget trends (e.g. net decline in sediment inputs);
- longer-term availability of beach recharge material.

Environmental acceptability

Potential issues include significant impacts of shoreline management policies on:

- sustainability;
- coastal processes and coastal evolution;
- the favourable condition and conservation objectives of European sites;
- biodiversity objectives and targets;
- wildlife and Earth heritage conservation interests;
- designated sites (e.g. SSSIs) within the SMP area;
- landscape and visual factors;
- archaeology (including marine sites) and historic features;
- land use planning issues;
- tourism, amenity and recreation;
- businesses, including agriculture and forestry;
- port and harbour operations;
- coastal defences elsewhere in the coastal process unit;
- navigation and use of the sea.

Economic viability

For details see FCDPAG3 *Economic Appraisal*. Economic assessment should be both broad-scale and quantitative. It should address whether or not each policy is:

- clearly economically viable;
- clearly not economically viable; or
- of marginal viability (under a broad-brush assessment) and therefore in need of more detailed assessment at a later date (e.g. a Strategic Plan).

Broad-scale benefit assessments could be based upon existing databases of: land areas and uses; Council Tax housing bands; land grades and values; statistics from the County Valuation Office; etc.

Box J Criteria for policy appraisal (continued)

Broad-scale cost assessments for policies could be based upon a range of typical cost/ metre run calculations for the full range of shoreline management methods (e.g. structural solutions, maintenance, low-cost measures etc.).

The appraisal should also identify in general terms the nature and potential significance of any intangible benefits.

- *Prepare a policy appraisal report.* This should include a summary of the factors considered, together with background technical information and a detailed description of the methods of analysis and policy appraisal exercise. It should clearly state the rationale for particular policy decisions and the consequences of adopting particular policies. The longer-term viability of particular shoreline management policies should be fully explained.

4.3 Stage 2: Public examination

The objective of Stage 2 is to:

- identify and collect the views of interested parties about the provisional policy for managing the shoreline over the next 50 years.

The coastal group should publicise and consult widely on the SMP process, with the local planning authority and amongst interested bodies and all relevant stakeholders. This might involve seeking representations on:

- the provisional shoreline management policies for the whole Plan area, as set out in the Stage 1 policy appraisal report;
- the provisional shoreline management policy for specific management units – Figure 10 provides an example of the type of information that might be compiled and circulated to consultees for individual management units.

Possible mechanisms for publicising the SMP process include advertising in the local press, distributing leaflets (e.g. in more widely based newsletters), use of audio-visual media, public exhibitions, workshops and seminars. Copies of the policy appraisal report and management unit summary statements should be made available at the offices of the various coastal group members and in other public buildings (e.g. libraries). The Internet offers a major opportunity to engage with the wider public. It is important that consultees are made aware of the way in which they can participate in the SMP process and how their representations will be taken into account.

Many local authorities have lengthy experience of engaging with the community over a variety of issues, including planning and transport policy. This expertise should be utilised in the SMP process.

A fixed period of at least three months from consultation should be set for receipt of representations. This period must be made clear to those who may wish to make representations.

4.4 Stage 3: Plan preparation

The objectives of Stage 3 (Figure 11) are to:

- determine sustainable policies for shoreline management over the next 50 years that take account of the representations made through the consultation process;
- assess the risks and uncertainties associated with the preferred shoreline management policies;

Figure 10 Example summary of management unit issues

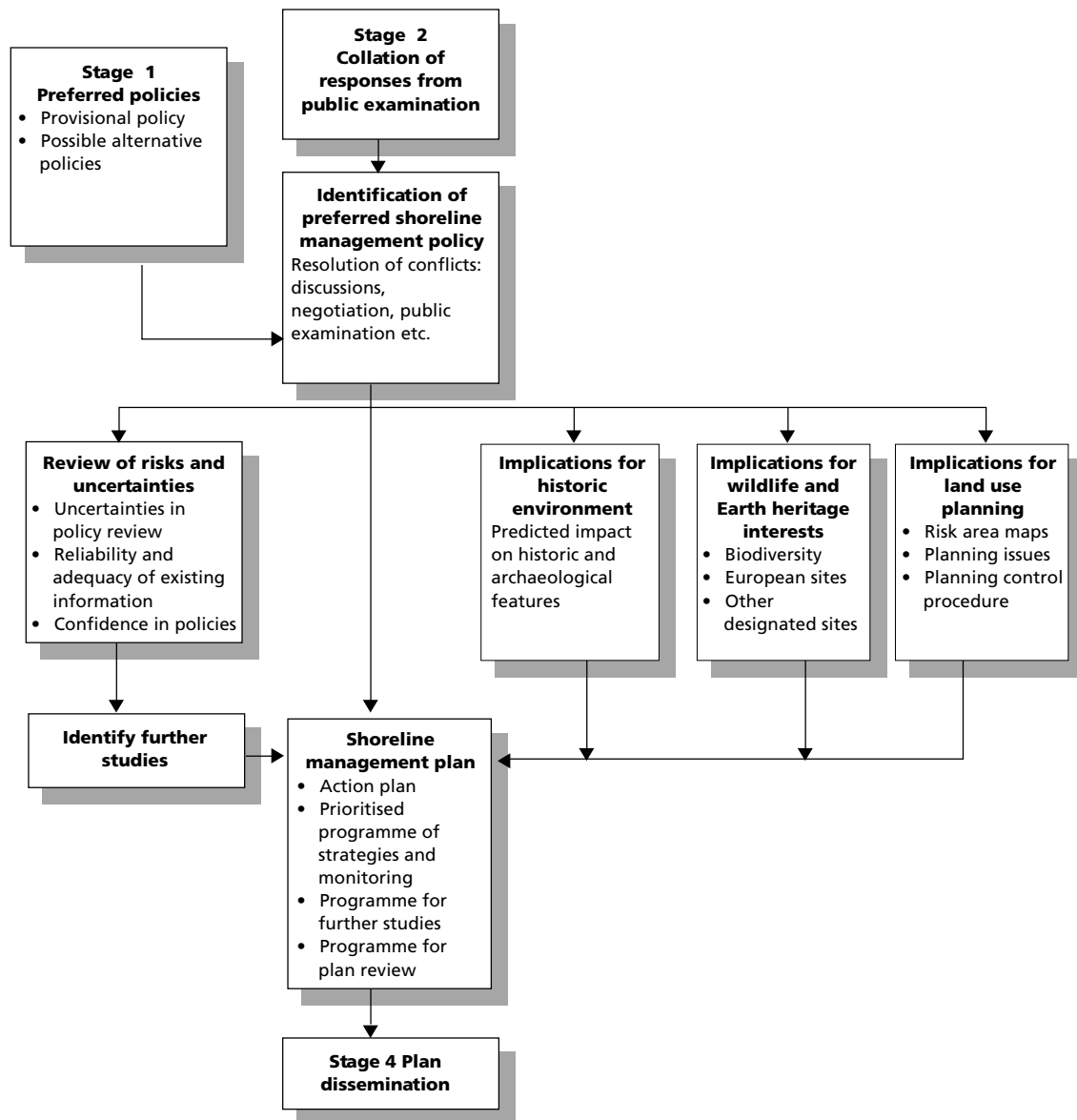
Management unit:	1/A
Location:	Belle View, Bridehaven
The problem:	Tidal flooding
The risks:	Flood risk to people and property
Existing defences:	Concrete seawalls, residual life: c25 years

OPPORTUNITIES			
Natural coastal processes	Technical	Environmental	Economic
	Possible bay-wide land reclamation and coastal defence improvement scheme	Integration with traffic improvement measures. Contribution to Local Pride environmental improvements. Contribution to possible bay-wide amenity and environmental improvements.	Possible financial contributions from Local Pride initiative

CONSTRAINTS			
Natural coastal processes	Technical	Environmental	Economic
Long-term beach decline	Limited residual life	Potential for visual intrusion	No constraints anticipated
Coarse sediment transport pathway	Relative sea-level rise (5mm/year)	Foreshore is a SSSI (geological) Interference with RNLI and harbour operations Important amenity beach	

Policies				
Hold the line	Technical feasibility	Environmental acceptability	Economic viability	Consequences
	With regular maintenance the seawall will be adequate for the next 50 years. However, sea-level rise will gradually reduce standard of protection against flooding.	No significant issues identified. Possible improvements could impact on: landscape, visual and amenity interests; harbour and RNLI operations.	Potential benefits significantly exceed likely costs.	Continued regular flooding of seafront property. Problems will worsen with sea level rise unless improvements are made.
Managed realignment	New defence line would be needed along Belle View Road	Significant conflicts with most environmental issues.	Potential benefits unlikely to significantly exceed likely costs (including disbenefits).	Loss of vehicle access along Belle View Road, loss of some businesses etc.
Advance the line	Not possible to determine whether this option would be technically feasible – would need to be hydraulically tested.	Likely to generate significant environmental issues – beach usage, damage to SSSIs etc. Could contribute to re-generation of Bride Bay tourist and amenity facilities.	Uncertain whether potential benefits would exceed likely costs.	At site: loss of parts of amenity beach. Improved flood protection to seafront property. Bride Bay: opportunities for regeneration etc.
Limited intervention	NOT A VIABLE OPTION: see consequences	NOT A VIABLE OPTION: see consequences	NOT A VIABLE OPTION: see consequences	Decline in seawall condition. Increased flood risk to life and property. Degradation of Belle View Road area.
No active intervention	NOT A VIABLE OPTION: see consequences	NOT A VIABLE OPTION: see consequences	NOT A VIABLE OPTION: see consequences	Decline in seawall condition. Increased flood risk to life and property. Degradation of Belle View Road area.

RECOMMENDATIONS	
Provisional policy:	Hold the line: the current policy is considered sustainable over the next 50 years, with improvements probably required within the next 25 years.
Possible alternative policy:	Advance the line: as part of a bay-wide coastal defence/land claim project for economic/environmental regeneration. The feasibility of this policy would need to be investigated in detail before implementation.
Longer-term implications:	climate change and sea level rise over the next 100 years will probably result in relatively minor changes in the pattern of erosion and accretion. It is envisaged that hold the line will remain a viable long-term policy for this management unit.

Figure 11 Stage 3: plan preparation

- assess the implications of the Plan and its shoreline management policies on the environment – including historic and archaeological sites, European sites and biodiversity – and identify opportunities for habitat re-creation;
- assess the implications of the Plan for current and future land use planning in the area;
- develop a timetable for future reviews and, where appropriate, revisions of the Plan – this should take account of the development plan review programme;
- develop a prioritised programme of strategic plans and an outline of future schemes, monitoring and further studies.

A preferred policy should be identified for each management unit. This should generally be in accordance with the provisional policy identified in Stage 1, unless other factors indicate otherwise. In preparing the Plan it is important that:

- all representations from consultees are considered; the representations and the responses to the representations should be made available for public inspection, allowing the process of Plan preparation to be transparent;
- where the preferred policy differs from the provisional policy set out in the policy appraisal report and considered to best satisfy the criteria of technical, economic and environmental acceptability, the reasons must be clearly stated.

There is likely to be a range of opinions about the preferred shoreline management policy. The process of consultation, itself, may result in the modification of views of interested parties or of those preparing the Plan so that conflict is avoided. When this does not happen, the coastal group is well placed to assist in the resolution of conflict. Mechanisms that could be adopted include negotiating with objectors and providing opportunities for round-table discussions. In all cases, it is important that the needs and experiences of those affected by the shoreline management policies are fully considered. If difficulties still remain, DEFRA or the National Assembly for Wales (NAW) will offer advice as to how matters might best be resolved. However, it will ultimately be a matter for local decision-makers to determine the contents of an SMP based on their responsibilities to the taxpayer and the community.

An indication of the anticipated source of funding for any coastal defence works or operations over the next ten years should be provided e.g. DEFRA/NAW grant-aid, private finance etc. It should be noted that in order to qualify for grant-aid, schemes need to be technically sound, environmentally acceptable and economically viable, and, in England demonstrate appropriate priority in a national context.

The Plan preparation process should also involve the following steps:

- *Review the risks and uncertainties associated with the preferred policies.* This should take account of the reliability and adequacy of the existing information and the level of confidence that should be placed on the policies (e.g. the level of certainty that future coastal defence improvements would be economically viable or environmentally sound, the residual risks). The consequences of not being able to deliver the preferred policy should be identified. FCDPAG4 *Approaches to Risk* provides information on risk assessment at the large scale planning level;
- *Identify the need for further studies* – particularly studies that might be needed to address uncertainties associated with the preferred policies. Such studies should ideally be programmed to be commissioned and completed in advance of the next review of the Plan. Further studies need to be included within the Action Plan (see below);
- *Estimate the implications of the Plan and its policies on biodiversity targets* in published national Habitats and Biodiversity Action Plans. A habitat loss/gain account for the Plan area should be developed, based on an assessment of the anticipated impacts of the preferred shoreline management policies (see Table 5 Annex 4). Areas that are likely to be suitable for habitat re-creation should be identified as a means to help meet the national Habitats and Biodiversity Action Plan targets;
- *Identify the implications of the Plan and its policies for European and Ramsar sites.* Consideration needs to be given as to whether or not the proposed shoreline management policies are likely to have a significant effect and therefore resulting strategies and schemes require an appropriate assessment under the Conservation (Natural Habitats &c.) Regulations, 1994. While the SMP process is not responsible for such an assessment, it will greatly assist in the delivery of the SMP's chosen policies if those management units where there are potential impacts are identified at an early stage;

- *Estimate the implications of the Plan and its policies on the historic environment.* An indication should be provided of the likely impact of the preferred policies on historic and archaeological sites or interests;
- *Develop procedures for informing and supporting the planning system.* Liaison and sharing of information between coastal groups and local planning authorities is important in order to develop a co-ordinated approach to shoreline management. Box K provides an indication of the ways in which the SMP process and coastal groups can support the planning system in discouraging inappropriate development in areas at risk from flooding, coastal erosion and cliff instability. The Plan can also provide potential developers with background information about particular sites, enabling them to be forewarned of potential problems and the possible precautionary measures that may be necessary;

Box K The role of SMPs in supporting the planning system

Forward planning

Inform the regional planning process by:

- identifying those issues that need to be considered over a wider area than a single planning authority area.

Inform the local planning authority of shoreline management issues by:

- identifying areas at risk from flooding and coastal erosion over the next 50 years (i.e. provide risk maps at an appropriate scale);
- predicting longer-term coastal evolution and the implications for planning and development;
- liaising with the local planning authority to identify suitable development plan policies for addressing risk and shoreline management issues;
- identifying key shoreline management issues that have implications for land use planning in the Plan area or within specific management units.

Where the local planning authority is considering allocating coastal sites for development:

- provide information on the risks associated with potential development sites;
- provide information on whether, in principle, any necessary coastal defence works (e.g. undertaken by the developer) or improvements would be acceptable, or will require significant mitigation works elsewhere.

Development control

In advance of considering planning applications in defined coastal areas:

- facilitate consultation between the relevant operating authority engineers and the local planning authority on individual planning applications, especially with regard to planning conditions, planning obligations to mitigate risk or modifications to proposed designs.

- *Develop an action plan.* This should include a prioritised and, where appropriate, costed programme of future strategic plans, an outline of future schemes, monitoring and studies. If necessary, action plans should look beyond the boundaries of individual SMPs to link with recommendations in adjacent SMPs. The prioritisation exercise should identify those further studies which are deemed to be essential for completion before SMP review, those studies which are needed within the mid-term, and those studies which would provide useful supplementary information. A programme for the periodic review of the SMP should be included.

A completed SMP should include the following:

- A summary report aimed at a non-technical audience, containing the preferred policies for individual management units, together with a brief commentary on the key shoreline issues and the implications of climate change and sea level rise on future shoreline management;
- A plan document, containing the following, and supported by further maps and annotated aerial photographs, as appropriate (see Annex 4):
 - a summary statement about the risks from flooding and coastal erosion in the Plan area;
 - a summary statement about the shoreline issues in the Plan area;
 - an indication of the anticipated evolution of the coast (including the anticipated effects of climate change and sea level rise) and the implications for future shoreline management;
 - the preferred policies for individual management units, including anticipated sources of funding for any coastal defence works or operations over the next ten years (e.g. Table 2 Annex 4). Where the preferred policy differs from the provisional policy, the reasons must be clearly stated;
 - an indication of the risks and uncertainties associated with the Plan and policies;
 - a map showing coastal defences, risk areas and other relevant spatial information held in GIS format;
 - an indication of the implications of the Plan and policies for European sites;
 - an indication of the way the Plan has taken account of biodiversity objectives and targets and list the gains and losses predicted to occur to habitats covered by Habitat Action Plans;
 - a summary of the land use planning implications, including an indication, in general terms, of areas at risk (i.e. maps of the risk areas, at an appropriate scale);
 - an action plan, including a prioritised and costed programme of future strategic plans, stand-alone schemes, monitoring and studies;
 - an indication of the future timetable for Plan review and how interested parties can contribute to the review process.
- A database (including appropriate software) and archive of all relevant coastal process and shoreline information, to be held by the coastal group;
- Supplementary volumes containing background information, the methods used in the Plan process, the sources of information, consultees' representations and the responses to them etc. Consideration should also be given to identifying the lessons learnt from the Plan revision process and recommendations to DEFRA/NAW for developing future Plan guidance.

A consistent Plan content is recommended, as this would readily facilitate the production of cell-wide and/or national overview statements. A suggested Plan structure is included in Annex 4.

The ease of subsequent revision should be a factor in the layout and production of the Plan. Consideration should be given to producing the Plan on CD-ROM and in a suitable format for Internet access. A standard Plan format should be adopted for adjacent Plans within the same coastal cell.

On completion, the Plan should be formally adopted by the relevant operating authorities and organisations involved in preparing the document. The status of the Plan (i.e. a non-statutory document) should be made clear to all users, interested bodies and the general public. An indication should be given as to the weight that operating authorities, local planning authorities and other regulatory bodies will place on the statements made in the Plan when reaching decisions.

4.5 Stage 4: Plan dissemination

The objective of Stage 4 is to:

- raise awareness of the SMP process, the management of the shoreline and the longer-term implications of climate change and sea level rise;
- inform, encourage and support the planning system in discouraging inappropriate development in areas at risk from flooding and coastal erosion.

Possible mechanisms for dissemination of the completed Plan include the preparation of a leaflet or newsletter, the use of audio-visual media, the production of a CD-ROM, a web-page on the Internet (which should consider copyright issues and ideally be linked to the DEFRA/NAW web site), public meetings, seminars and workshops.

Local planning authorities should be fully involved in the SMP process, including the decision to adopt a SMP. They should be given a copy of, or access to, the document. Where appropriate, the SMP should be included within the authority-wide GIS or database.

Copies of the Plan should be made available for inspection in the offices of the coastal group members and in other public buildings.

4.6 Implementation of the plan

Following preparation of the Plan, the coastal group should make arrangements for its on-going implementation. This should include:

- implementing the action plan programme of strategic plans, stand-alone schemes, monitoring and studies;
- undertaking on-going strategic coastal monitoring (see section 4.7);
- consulting on a regular basis with local planning authorities, interested bodies and relevant stakeholders on shoreline management issues;
- developing, where appropriate, strategic plans for management units within their areas of responsibility.

Future reviews of the Plan should take place at appropriate intervals. However, in many cases it may not be appropriate to undertake a revision of the Plan unless and until there has been significant change in the local conditions or sufficient monitoring or study data have been collected to resolve particular uncertainties.

Coastal groups need to continue their active involvement between SMP revisions and should not devolve all actions to the individual operating authorities and their consultants. The SMP should be actively maintained between reviews (e.g. updating databases with new reports or results from studies, recording emerging issues, etc.).

4.7 Strategic coastal monitoring

Strategic coastal monitoring is an essential part of the SMP process, providing high-level baseline information to assist with Plan preparation and future Plan revisions. Where authorities have undertaken schemes between revisions of the Plan there needs to be a review of the impact of those schemes, with monitoring to evaluate the scheme performance.

Monitoring is an on-going process. Details of current monitoring should be included in the Plan, together with an outline of future monitoring requirements.

It is important that long-term, high quality monitoring data are available so that policy decisions are based on up-to-date and reliable information. Monitoring can provide a level of data against which future comparisons can be made (i.e. a baseline) and changes in form can be identified. Furthermore, coastal monitoring allows operating authorities to understand coastal change better and to predict future evolution more reliably.

When developing a monitoring strategy there is a clear need to establish standard, repeatable, accurate and cost-effective methods. Box L provides guidance on the content of a strategic monitoring programme. Further information is contained within CIRIA's report *Maximising the use and exchange of coastal data: a guide to best practice* (Millard and Sayers 2000). A co-ordinated approach to monitoring should be developed in association with other bodies with an interest in coastal change (e.g. English Nature/Countryside Council for Wales). This will help ensure that the monitoring activities are efficient and targeted to specific needs.

Data sets need to be collected in a systematic manner. It is essential that the data are quality assured, interpreted and stored as quickly as possible. The use of GIS is recommended, where appropriate.

In order to accurately interpret changes in the data, it is necessary for operating authorities to maintain records of all shoreline management activities. Examples include offshore/inshore dredging, coastal defence works, maintenance operations etc.

Box I Strategic monitoring programmes

Before embarking upon a measurement and monitoring programme, it is necessary to have a clear idea of why the information is needed. The development of a monitoring strategy will need to address the following issues to determine what should be measured and how.

- *The nature of the coastline;* establish the nature of the coastal processes and the key features that could be measured or monitored. This should also provide an indication of the appropriate spacing of measurement points and frequency of recording.
- *The level of risk;* a preliminary appraisal of the current and likely future risks along a coastline will highlight the priority sites for monitoring programmes.
- *Setting objectives;* the objectives of the programme might range from keeping coastal changes under review, to updating predictions of coastal change, establishing a baseline condition or providing early warning.
- *Selection of technique;* the measurement techniques that are adopted need to reflect the programme objectives. For example, if the objective is to aid the updating of predictions it is essential that the measurement techniques provide the correct type of information, measured at the appropriate frequency and spacing.

Shoreline form: monitoring of the morphological and material changes that occur along a shoreline and the nearshore seabed. Possible techniques include:

- visual inspections and recording;
- fixed aspect photography;
- beach profile and plan-shape surveying;
- bathymetric surveys;
- aerial photography which may lead to photogrammetric analysis;
- other remote sensing methods, such as LIDAR (Laser-Induced Direction and Range);
- sediment surveys;
- condition surveys.

Coastal processes: monitoring the forcing factors causing coastal change. Possible techniques include:

- wave-rider buoys, pressure transducers or wave pole arrays;
- hindcast waves from wind data;
- purchase of meteorological records;
- purchase of tide level records.

Natural environment: surveying habitat changes to establish a baseline and subsequent monitoring to quantify future changes against the baseline. Possible techniques include:

- aircraft-based remote sensing methods (e.g. aerial photography, CASI Compact Airborne Spectrographic Imager);
- satellite-based remote sensing (e.g. Landsat satellite images).

Land use: monitoring the nature and extent of new development in risk areas, through liaison with the local planning authorities.

5 DEFRA grant-aid, submissions and approvals

Grant-aid may be available towards the preparation and updating of SMPs in that the Department will consider applications for studies leading to such Plans. Detailed scheme design and specific site investigations or model tests do not fall within this definition and will be considered for grant-aid with scheme construction costs. Applications for SMP studies should be submitted to the DEFRA Regional Engineer setting out:

- the problem to be studied, including the geographical extent;
- the methods of achieving the objectives of the study;
- the estimated cost and duration of the study.

The suggested approach in England is that a nominated coastal defence authority takes the lead in making an application on behalf of the coastal group or other group of operating authorities. Where a study is proposed for an area less than a sediment cell, it will be necessary to demonstrate how account is to be taken of adjacent shorelines within the cell when preparing a plan.

Studies leading to SMP production or review are essentially coastal process studies under the Coast Protection Act 1949 or the Environment Act 1995. For most practical purposes, the Department regards the 'coast' as being limited to areas defined in schedule IV of the Coast Protection Act 1949. However, the Department accepts that many coastal processes do not recognise such fixed boundaries and is prepared to exercise some flexibility where coastal processes may be influenced by effects arising upstream of the schedule IV boundary. Where grant aid is requested, the onus will be on applicant authorities to demonstrate that processes to be studied upstream of these boundaries are likely to have a significant impact on the consideration of strategic options for the length of coast concerned.

Preliminary studies, which may lead to schemes being undertaken, including studies for the development of a strategic plan, can be supported with grant-aid in any location. Such studies should have clear objectives in relation to potential works, although it is recognised that, as there should be no initial presumption as to the appropriate solution, there will be some cases in which it is concluded that no works are justified. The level of investment in such studies should be justified on the basis of the expected costs and benefits of the intended works.

Where SMPs are in place, the Department will expect flood defence and coast protection schemes submitted for grant-aid to be consistent with them. This means that, although the Department will not formally approve such Plans, they will play an important part in the approval of schemes. It is therefore advisable to keep the DEFRA Regional Engineer informed about the development and agreement of the Plan. They are available to offer advice at all stages of Plan development. The Regional Engineer will wish to be satisfied that the Plan has addressed all the issues, that it fully takes account of natural processes and wider issues, and that all reasonable steps have been taken to resolve conflicting objectives.

Following production of the SMP and the associated action plan, it is anticipated that individual operating authorities will develop or update strategic plans covering those management units within their area of responsibility where significant works or management activities are required. These strategic plans provide a detailed assessment of the SMP policies for each management unit

(see FCDPAG2) and will entail a rigorous examination of all the options, including benefit–cost analysis in line with the FCDPAG3 *Economic Appraisal* (MAFF 1999). Grant-aid may be available for studies in connection with the development of such scheme strategies.

Application for agreement of strategic plans or agreement in principle (not coast protection) can be given by the Department to phases of work covering a period of three to five years. Individual schemes should be presented to the Department for consideration in accordance with the current grant memoranda issued to all operating authorities.

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Welsh Office 1998. *Technical Advice Note (TAN) 14: Coastal Planning*. The Stationery Office.

Welsh Office 1998. *Technical Advice Note (TAN) 15: Development and Flood Risk*. The Stationery Office.

The Department for Environment, Food and Rural Affairs has produced a series of guides on the appraisal of flood and coastal defence in England and Wales. These are:

FCDPAG1 *Overview* (published May 2001), MAFF Publications PB 5518

FCDPAG2 *Strategic Planning and Appraisal* (published May 2001), MAFF Publications PB5476

FCDPAG3 *Economic Appraisal* (published December 1999), MAFF Publications PB 4650

FCDPAG4 *Approaches to Risk* (published March 2000), MAFF Publications PB 4907

FCDPAG5 *Environmental Appraisal* (published March 2000), MAFF Publications PB 4915

FCDPAG6 *Post Project Evaluation* (under consideration)

These volumes are designed to provide an integrated suite of guidance on all aspects of project appraisal.

Former MAFF Publications are now available from DEFRA Publications, 08459 556000.

Glossary

Biodiversity Action Plan

A national action plan for a key habitat or species, approved by Government, as part of the overall UK Biodiversity Action Plan. [See references on UK Biodiversity Group, 1995 and 1999.]

Coastal defence

A term used to encompass both coastal protection against erosion and sea defence against flooding.

Coastal Defence Strategy Plan

A detailed assessment of the strategic coastal defence option(s) for a management unit(s), based on FCDPAG2.

Coastal Habitat Management Plan (CHaMP)

A management plan that identifies the flood and coastal defence works that are likely to be required in a given area to conserve the nature conservation interest of a European site or group of such sites, particularly where the current defence line may be unsustainable.

Coastal Zone Management Plan

Plans through which local authorities and others implement planning objectives and policies for an area of the coast, which deal with a range of issues such as landscape management, development, recreation, conservation, etc.

Coastal process unit

A length of shoreline in which the physical processes are relatively independent from the processes operating in adjacent coastal process units. For management purposes, coastal process units provide the framework for considering the potential wider impacts of policies in a particular management unit(s) on the adjacent shoreline. Where strategic plans are to be developed following SMP completion, they may be on the basis of a coastal process unit.

Coastal squeeze

The process by which coastal habitats and natural features are progressively lost or drowned, caught between coastal defences and rising sea levels.

Consequence

An outcome or impact such as economic, social or environmental impact. It may be expressed as a quantity (e.g. monetary value), categorical (e.g. high, medium, low) or descriptive (see FCDPAG4).

Downdrift effects

Impacts occurring in the lee of any coastal activity resulting from associated changes to the coastal processes, particularly sediment supply.

Earth heritage

Geology and geomorphology

Economic appraisal

An appraisal, which takes into account a wide range of costs and benefits, generally those that can be valued in money terms.

Environment

Where environmental issues are referred to, this term is used to encompass landscape/natural beauty, flora, fauna, geological or geomorphological features and buildings, sites and objects of archaeological, architectural or historical interest.

Erosion

The loss of land or encroachment by the sea through a combination of wave attack and, in the case of coastal cliffs, slope processes (e.g. high groundwater levels). This may include cliff instability, where coastal processes result in the periodic reactivation of landslide systems or promote rock falls.

European site

Any site that has been designated as a site of international nature conservation importance either as a Special Protection Area (SPA), a Special Area of Conservation (SAC) or a Ramsar Site. In regard to planning considerations it is Government policy to treat potential SPAs, candidate SACs and listed Ramsar Sites as if they were already designated.

Flooding

Refers to inundation by water whether this is caused by breaches, overtopping of banks or defences, or by inadequate or slow drainage of rainfall or underlying ground water levels. Flooding due to blocked drains and sewers or the escape of water from a water supply service will usually be the responsibility of the local water company and does not fall within the scope of a Shoreline Management Plan.

Habitat Action Plan

A biodiversity action plan for a habitat.

Habitat Directive

EC Directive 92/43 on the conservation of natural habitats and of wild fauna and flora.

Habitat Regulations

The conservation (Natural Habitats & c.) Regulations 1994. This transposes the Habitats Directive into UK Law.

Hazard

A situation with the potential to result in harm. A hazard does not necessarily lead to harm.

Geomorphology

The study of landforms and land forming processes.

Management unit

A length of shoreline with coherent characteristics in terms of coastal processes and assets at risk that can be managed efficiently. Where strategic plans are to be developed following SMP completion, they may be on the basis of an appropriate grouping of adjacent management units or for an individual management unit.

Natural

Encompasses both the small number of natural areas and the much greater semi-natural areas of Britain, which have been influenced by man over the years. It is also applied to those processes over which man has no significant control, e.g., wind, waves, sediment transport, etc.

Operating authority

A body with statutory powers to undertake flood defence or coast protection activities, usually the Environment Agency or maritime District Council.

Residual life

The time to when a defence is no longer able to achieve minimum acceptable performance criteria in terms of serviceability or structural strength.

Residual risk

The risk which remains after risk management and mitigation. It may include, for example, risk due to very severe storms (above design standard) or risks from unforeseen hazards.

Risk assessment

Consideration of risks to people and the developed, historic and natural environment.

Risk management

The activity of mitigating and monitoring risks.

Schedule IV

'Waters excluded for purposes of definitions of 'sea' and 'seashore''. Refer to Coast Protection Act, 1949.

Sediment cell

A length of coastline and its associated near shore area within which the movement of coarse sediment (sand and shingle) is largely self contained. Interruptions to the movement of sand and shingle within one cell should not affect beaches in an adjacent sediment cell.

Sediment sub-cell

A sub-set of a sediment cell within which the movement of coarse sediment (sand and shingle) is relatively self contained. The sediment sub-cell is in many cases, likely to provide the appropriate basis for the development of Shoreline Management Plans.

Shoreline

Interface between the land and sea.

Significant effect

Where a plan or project is likely to affect a European Site it is necessary to decide whether or not it would have a significant effect. If there is any doubt, the operating authority must consult English Nature/the Countryside Council for Wales. They will advise whether, in their view, the proposed scheme would be likely to have a significant effect.

Shoreline management policy

Generic term for any management option, e.g. no active intervention, limited intervention, advance, realign or hold the existing coastal defence line.

Strategic

Used to describe the undertaking of any process in a holistic manner taking account of all associated impacts, interests of other parties and considering the widest possible set of potential options for the solution of a problem. In the context of this document the word 'strategic' does not imply any particular level in the hierarchy of the planning process.

Sustainable policies

Sustainable policies lead to coastal defence solutions that avoid tying future generations into inflexible and/or expensive options for defence. They will usually include consideration of interrelationships with other defences and likely developments and processes within a coastal cell or sub-cell. They will also take account of long-term demands for non-renewable materials.

Wildlife

Flora and fauna.

Consultees

The level and scope of consultation undertaken will depend on the range of interested parties identified and their level of involvement in the area. Those that are most likely to have an interest in the different aspects of the area are listed below. This list is not exhaustive, however, and local interest groups should be consulted where they exist. The involvement of all interested bodies at all stages in the development of an SMP is recommended.

Planning	Planning authority, organisations involved in Development Plans or Coastal Zone Management Plans.
Flood and coastal defence	DEFRA Regional Engineer, the National Assembly for Wales (NAW), Environment Agency, local authorities, Internal Drainage Boards (IDBs) where appropriate.
Marine environment	DEFRA Rural and Marine Environment Division from whom a licence under the Food and Environment Protection Act 1985 may be required either for disposals at sea or construction works or, where there may be any interference with marine ecology, the National Assembly for Wales (NAW), English Nature (EN) and Countryside Council for Wales (CCW).
Ports, harbours and navigation	Port and harbour authorities, Department for Transport, Local Government and the Regions (DTLR).
Agriculture	DEFRA Conservation Management Division, National Farmers Union (NFU), Farmers' Union of Wales (FUW), Tenant Farmers Association and Country Land and Business Association (CLA).
Landowners	Country Land and Business Association (CLA). Where appropriate, Crown Estate Commissioners, National Trust, Royal Society for the Protection of Birds (RSPB), county wildlife trusts, Forestry Authority and local councils, Ministry of Defence.
Fisheries	Sea Fisheries Committees (where fisheries interests may be affected and where marine aggregate extraction is undertaken).
Business	CBI, Chambers of Commerce, Association of British Insurers.
Nature conservation	English Nature, Countryside Council for Wales (CCW), Worldwide Fund for Nature (WWF), county wildlife trusts, Marine Conservation Society, Royal Society for the Protection of Birds (RSPB), Joint Nature Conservation Committee, local nature conservation organisations, Regionally Important Geological/Geomorphological Site (RIGS) Groups, Forestry Authority.
Landscape	Countryside Agency, Countryside Council for Wales (CCW), Heritage Coast Forum, Council for the Protection of Rural England (CPRE), Campaign for the Protection of Rural Wales (CPRW), Forestry Authority.

Archaeological/historical sites or features	English Heritage, Cadw, county, district and local authority archaeological and conservation officers
Recreation and access	Countryside Agency, Countryside Council for Wales (CCW), Water companies, Forestry Authority, town and parish councils, British Association for Shooting and Conservation (BASC), Ramblers Association, Royal Yachting Association, other sporting associations
Local interests	General public, occupiers (and their advisors e.g. Royal Institute of Chartered Surveyors).

Annex 1: Nature conservation designations

The following is a list of statutory and non-statutory nature conservation designations.

- National Nature Reserves designated under the Wildlife and Countryside Act 1981;
- Sites of Special Scientific Interest (SSSIs) designated for their wildlife and/or Earth heritage interest under the Wildlife and Countryside Act 1981;
- Areas of Special Protection, formerly bird sanctuaries, designated under the Wildlife and Countryside Act 1981;
- wetlands of international importance (Ramsar Sites) designated under the 1971 Ramsar Convention;
- Special Protection Areas (SPAs) designated under the EC Birds Directive (79/409/EEC Conservation of Wild Birds);
- Special Areas of Conservation (SACs) designated under the EC Habitats Directive (92/43/EEC Conservation of Natural Habitats and of Wild Fauna and Flora);
- Local Nature Reserves (LNRs) designated by local authorities under section 21 of the National Parks and Access to the Countryside Act 1949;
- Non-statutory nature conservation sites (e.g. Regionally Important Geological/Geomorphological Sites (RIGS) or Sites of Interest for Nature Conservation (SINC) and land held for conservation purposes by other bodies (e.g. The National Trust).

Annex 2: Implications of shoreline management policies on habitats and species protected under European legislation

The Conservation (Natural Habitats &c) Regulations 1994 (referred to as the Habitats Regulations), make provisions for implementing the EC Habitats and Birds Directives in Great Britain. The Regulations require that the implications to be considered for any 'plan or project' that is likely to have a significant effect on a SPA or SAC. Any scheme to implement the preferred flood and coastal defence policy is a plan or project, and must comply with the requirements of the Regulations. This legal requirement will be an important factor in determining the policy in future SMPs.

In identifying suitable shoreline management policies, it must be borne in mind that, if proposed works would damage an SPA or SAC, consent can only be obtained if there are no alternative solutions, and there are imperative reasons of overriding public interest. If the site contains priority habitats or species (identified in the Annexes to the Habitats and Birds Directives), the work can only be approved if there are no alternative solutions and there are human health or safety considerations, or benefits of primary importance to the environment. In most circumstances there are alternative solutions to a flood or coastal defence proposal, and it is therefore unlikely that approval will be obtained for a project which would adversely affect the integrity of a European site.

Where there would be an adverse effect on site integrity but the Secretary of State for the Environment (England)/ Assembly Secretary (Wales) decides that the scheme should proceed, for reasons of overriding public interest, then compensation (replacement habitat creation) will be needed.

Coastal Habitat Management Plans (CHaMPs; Box M) will be prepared by operating authorities (normally the Environment Agency) and English Nature to provide a framework for managing some European Sites (English Nature *et al.* 2000). In those areas where CHaMPs have been prepared, or are in preparation, SMP policies need to be fully compatible with the stated approach to site management. In many instances it will not be appropriate to revise the SMP until the CHaMP has been completed.

Where a CHaMP will not be prepared for managing European sites within the SMP area, a number of important principles will govern the policy appraisal process.

- Where coastal defences protect internationally designated terrestrial or freshwater habitat, the preferred policy will be to hold the line where it is sustainable to do so. English Nature/Countryside Council for Wales can provide advice on appropriate standards of protection, taking account of the sensitivity of the habitats concerned.
- Alternative policies for managing internationally designated terrestrial or freshwater habitat can only be entertained where to hold the line is not sustainable.
- Where the designated habitat is inter-tidal habitat such as saltmarsh and mudflat it may be necessary to retreat the line in order to maintain site integrity.

- Where coastal defence works are likely to have an adverse effect on the integrity of a site, compensatory habitat will be required in advance of actual loss to maintain favourable condition.

The situation becomes more complicated when both the inter-tidal habitat and the landward habitat are European or Ramsar sites. A CHaMP will normally need to be prepared to decide how to proceed in such cases.

The preferred policy will be determined by balancing the need to protect habitats and the sustainability of defences. In general, it will be sustainable to protect features *in situ* where to do so would:

- not result in an adverse effect on the integrity of the designated site or any other European or Ramsar site, and
- would work with rather than against coastal processes.

Where full or partial realignment over a European site is proposed, and there would be no means of avoiding an adverse effect on integrity, the DEFRA/NAW Secretary (Assembly Secretary) will have to be consulted.

Box M Coastal Habitat Management Plans (CHaMPs)

In England, CHaMPs are to be developed for many coastal site complexes. These will help to ensure that appropriate schemes are developed where coastal SPAs and SACs are involved. The objective of these plans is to identify the flood and coastal defence works that may be required in a given area to conserve the nature conservation interest of a European site or group of such sites, particularly where the current defence line may be unsustainable. Where flood and coastal defence works are likely to have an adverse effect on the integrity of a site, they will also identify the amount of replacement habitat that is required to maintain nature conservation status, and should ideally indicate suitable locations where this new habitat will be created.

The CHaMP will draw on information presented in the most recent version of the SMP, but will revisit the preferred options for each section of coast, having regard to the need to maintain SPAs and SACs. The level of detail in a CHaMP will be much greater than in the SMP, but relevant information in the CHaMP will need to be incorporated in future revisions of the SMP. A CHaMP will contain a similar level of detail to a Strategy Plan for flood and coastal defence, and in time it should be possible to merge the two processes to produce a single, all encompassing strategic plan.

For further details see English Nature, Environment Agency, LIFE and the Centre for Coastal and Marine Sciences 2000. *Coastal Habitat Management Plans: an interim guide to content and structure*.

Annex 3: Suggested model brief for revising a plan

This annex provides a suggested model brief for use by authorities when engaging consultants for the revision of existing SMPs.

Background

A Shoreline Management Plan (SMP) 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. In doing so, an SMP is a high-level document that forms an important element of the strategy for flood and coastal defence of the Department for Environment, Food and Rural Affairs (DEFRA) and the National Assembly for Wales (NAW). The strategy aims to reduce risks by:

- encouraging the provision of adequate and cost-effective flood warning systems;
- encouraging the provision of adequate, technically, environmentally and economically sound and sustainable flood and coastal defence measures;
- discouraging inappropriate development in areas at risk from flooding or coastal erosion.

A first generation Plan was completed in 199x for the xx Coastal Group, comprising the following operating authorities: The operating authorities have adopted the recommendations of the Plan as a basis for the production of individual strategic plans, monitoring programmes and studies for part, or parts, of their coastline, and the implementation of appropriate schemes.

It is the intention of the coastal group to undertake a thorough revision of the Plan, building on the first generation Plan and taking account of information subsequently collected and changing circumstances. The revision will be undertaken in accordance with the revised guidance issued by DEFRA/NAW. The second generation Plan will need to include:

- a clear focus on the assessment and management of flooding and coastal erosion risks over a consistent Plan time scale (50 years);
- awareness of the longer-term (50–100+ years) implications of coastal evolution, climate change and sea level rise;
- awareness of the uncertainties associated with predicting future shoreline management requirements;
- recognition that the current shoreline management policy may no longer be feasible or acceptable at some time over the next 50 years. In such circumstances the preferred policy should include a planned transition from the current SMP option to an alternative, sustainable policy;
- identification of the consequences of adopting particular policies, at an appropriate level of detail. This should involve, amongst other things, an assessment of the implications of policies on internationally and nationally protected sites as well as non-statutory sites and habitats considered by Biodiversity Action Plans;
- consideration of estuaries within the SMP process;

- efficient and focussed consultation, with consultees invited to make representations on provisional policies and their likely consequences;
- identification of the anticipated sources of funding for any coastal defence works or operations that might be required to implement the preferred policies, over the next ten years;
- provision for informing and supporting the planning system in discouraging inappropriate development in areas at risk from flooding or coastal erosion;
- a standard format for Plans, especially within the same coastal cell;
- dissemination of the Plan on CD-ROM and via the Internet.

Aims and objectives

The aims of the Plan are to provide the basis for sustainable shoreline management policies over the next 50 years within sediment sub-cell xx and to set the framework for the future management of risks along the coastline.

The objectives of the SMP process are:

- to define, in general terms, the risks to people and the developed, historic and natural environment within the SMP area;
- to identify the preferred policies for managing these risks over the next 50 years;
- to identify the consequences of implementing the preferred policies;
- to set out procedures for monitoring the effectiveness of the SMP policies;
- to ensure that future land use and development of the shoreline takes due account of the risks and the preferred SMP policies.

The revision of the Plan will involve four stages:

- Stage 1 – data collation, analysis and policy revision;
- Stage 2 – public examination;
- Stage 3 – Plan preparation;
- Stage 4 – Plan dissemination.

The main purpose of this approach is to allow the coastal group to consult widely on *provisional policies* identified by an independent *policy appraisal report* and then develop its own Plan. Following completion of Stage 1 the coastal group will wish to retain the services of the appointed consultant to support the group during Stages 2–4 of the revision process.

Stage 1: Methods

The objectives of Stage 1 are to:

- identify and define areas at risk from flooding and coastal erosion, over the next 50 years;
- incorporate relevant output from national research and development studies (e.g. Future Coastal Evolution Study) to develop longer-term (50-100+ years) scenarios indicating the anticipated future evolution of the coast, taking into account the most recent predictions of climate change and sea level rise;

- identify the requirements and aspirations of interested bodies that will influence policy appraisal and selection;
- identify a provisional shoreline management policy or policies for each management unit, over the next 50 years, that does not adversely interfere with the operation of natural processes within the Plan area or across Plan boundaries.

The study will be undertaken in accordance with, and follow the methods set out in, the DEFRA guidance on the preparation of the second generation SMPs.

The study will need to take full account of studies and plans prepared since the production of the first generation Plan, including the results of the Future Coastal Evolution Study (2000–2002), Coastal Habitat Management Plans (CHaMPs) and monitoring programmes.

The following steps will be taken.

1. *Prepare a scoping study outlining the aims and objectives of the SMP review.* This should be sent to all consultees. This document should invite the consultees to provide general information about issues of particular concern that they consider essential to identifying sustainable shoreline management policies. It is important that the consultees are aware that the SMP will take a broad-brush view on coastal issues, and that detailed information will generally not be required. At this stage information should be provided to the consultees about how their views on the provisional shoreline management policies will be sought and taken into account. A minimum of three months should be given for responses.
2. *Collate and analyse new information* available since the preparation of the first generation SMP. This may include, for example, shoreline monitoring data, the results of coastal studies or research (e.g. Future Coastal Evolution Study), strategic plans, new development, revisions to development plans or management plans, etc. Attention should be given to establishing a database and archive of all the relevant information used to produce the first generation Plan, together with new information. The information should be mapped for future use in a GIS.
3. *Review and revise of boundaries.* The boundaries of the first generation SMP should be reviewed, taking into account the potential benefits of producing joint Plans for combinations of adjacent sub-cells. All SMP boundary limits should be unambiguous and fully acknowledge the continuity of habitats and the extent of marine / coastal influences upon shoreline management. Management unit and coastal process unit boundaries should also be reviewed to ensure that they provide the most efficient framework for achieving sustainable shoreline management. For example, the need to include an estuary within an SMP should be considered (Box I), noting that in some cases it may be advisable to apply for amendments to the existing location of the Schedule IV boundary. It may be appropriate to amalgamate a number of management units, or subdivide a large unit, if this would lead to more effective management. There may also be a need to revise coastal process unit boundaries, notably where strong morphological and process links exist between the open coast and estuaries.
4. *Define and characterise management units.* For each management unit, it will be necessary to define those areas at risk from flooding and coastal erosion, and to identify those issues which need to be taken into account in appraising policies. The flood risk areas should be based on information produced by the Environment Agency, with erosion and instability risks based on an assessment of the areas expected to be affected by these processes over the next 50 years and, where appropriate, beyond. Where there are existing man-made or natural defences, their residual life will need to be assessed, with and without maintenance.

5. *Review policies for individual management units.* The shoreline management objective for each management unit should be to reduce risks to people, and the developed, historic and natural environment.

Each policy should be evaluated in broad terms, addressing technical feasibility, environmental acceptability and economic viability, together with the issue of sustainability. The implications for biodiversity and the management of European sites should be a factor in this screening exercise. After an initial screening, some policies might be considered not to be viable in a particular management unit; these non-viable policies should not be the focus of further scrutiny. The subsequent appraisal of short-listed policies should take account of those issues that might influence policy selection, including the implications of the Habitats Regulations and biodiversity objectives and targets.

Particular attention should be given to identifying, in general terms, the consequences of adopting particular policies.

6. *Assess compatibility of the potential policies across a coastal process unit.* Each potential policy for individual management units should be considered in relation to its effect on all the other management units within a coastal process unit, and on the sediment cell or sub-cell itself. Policies must be compatible with those policies identified for neighbouring management units and the processes at work within the process unit or sediment sub-cell. It may be necessary, therefore, to revise the initial policy selection for particular management units to ensure compatibility across the process unit or sediment sub-cell.
7. *Identify a provisional policy.* The policy review exercise should result in the identification of a provisional policy, from a technical, economic and environmental viewpoint. In some management units, it may be appropriate to identify alternative policies where this would be both sustainable and compatible with policies in neighbouring management units. Where significant uncertainties about future conditions exist, it may be necessary to proceed with more than one policy and identify the studies that would be required to resolve the outstanding issues.
8. *Identify the longer-term implications* of climate change and sea level rise for shoreline management in a particular management unit and within a coastal process unit or sediment sub-cell. This review should provide an indication as to whether the current and proposed approaches to risk reduction will continue to be viable in the future (i.e. beyond the 50-year time scale of the Plan).
9. *Review the risks and uncertainties associated with the provisional policies.* This should take account of the reliability and adequacy of the existing information and the level of confidence that should be placed on the policies (e.g. the level of certainty that future coastal defence improvements would be economically viable or environmentally sound, the residual risks). The consequences of not being able to deliver the provisional policy should be identified.
10. *Prepare a policy appraisal report.* This should include a summary of the factors considered, together with background technical information and a detailed description of the methods of analysis and policy appraisal exercise. It should clearly state the rationale for particular policy decisions and the consequences of adopting particular policies. The longer-term viability of particular shoreline management policies should be fully explained.

Stage 1: Consultation

The purpose of consultation should be to:

- raise awareness of the SMP, its aims, objectives and findings;
- to identify relevant data and information sources and to maximise their use in the project; and
- ensure that interested parties have had an adequate opportunity to express their ideas, opinions and concerns, either informally or as part of the policy examination stage.

The consultant is required to prepare a scoping document for use during the initial period of Stage 1. The scoping document is likely to include the following components:

- outline objectives of the SMP;
- a request for comments about specific aspects of the first generation Plan;
- a request for an indication of issues that have emerged since the first generation Plan;
- a request for relevant information that has become available since the first generation Plan;
- information about how consultee views on the provisional shoreline management policies will be sought and taken into account.

The organisations and groups identified by the first generation Plan and in the subsequent period as having an interest in the different aspects of the area are listed below:

Stage 1: Outputs

The output from Stage 1 will include:

1. a summary report aimed at a non-technical audience, containing the provisional policies for individual management units, together with a brief commentary on the key shoreline issues and the implications of climate change and sea level rise on future shoreline management.
2. a policy appraisal report, containing:
 - a summary statement (with maps and annotated aerial photographs at an appropriate scale) about the risks from flooding, coastal erosion and cliff instability in the Plan area;
 - a summary statement about the shoreline issues in the Plan area;
 - an indication of the anticipated evolution of the coast and the implications for future shoreline management;
 - the provisional policies for individual management units;
3. management unit summary sheets for circulation to consultees – these should include a summary of the policy appraisal exercise and clearly set out the rationale behind the selection of the provisional policy;
4. a database (including appropriate software) and archive of all relevant coastal process and shoreline information, to be held by the coastal group;
5. maps of relevant spatial information including coastal defences and risk areas produced in an agreed GIS format;

6. appendices containing background information, the methods used in the Plan process, the sources of information, etc.

Stage 2: Public examination

The objective of Stage 2 is to:

- identify and collect the views of interested parties about the provisional policy for managing the shoreline over the next 50 years.

This will involve seeking representations from interested bodies and all relevant stakeholders on:

- the provisional shoreline management policies for the whole Plan area, as set out in the Stage 1 policy appraisal report;
- the provisional shoreline management policy for specific management units.

This exercise will be co-ordinated by the coastal group, with technical support to be provided by the appointed consultant.

A fixed period of at least three months from consultation will be set for receipt of representations.

Stage 3: Plan preparation

The objectives of Stage 3 are to:

- determine sustainable policies for shoreline management over the next 50 years that take account of the representations made through the consultation process;
- assess the risks and uncertainties associated with the preferred shoreline management policies;
- assess the implications of the Plan and its shoreline management policies on the environment, including historic and archaeological sites, European sites and biodiversity, and identify opportunities for habitat re-creation;
- assess the implications of the Plan for current and future land use planning in the area;
- develop a timetable for future reviews and, where appropriate, revisions of the Plan. This should take account of the development plan review programme;
- develop a prioritised programme of strategic plans and an outline of future schemes, monitoring and further studies.

A preferred policy should be identified for each management unit. This should generally be in accordance with the provisional policy identified in Stage 1, unless other factors indicate otherwise.

The Stage 3 Plan preparation process will be carried out by (e.g. a partnership with the coastal group) and the appointed consultant should also involve the following steps.

- *Review the risks and uncertainties associated with the preferred policies.* This should take account of the reliability and adequacy of the existing information and the level of confidence that should be placed on the policies (e.g. the level of certainty that future coastal defence improvements would be economically viable or environmentally sound, the residual risks). The consequences of not being able to deliver the preferred policy should be identified.

- *Identify the need for further studies*, particularly studies that might be needed to address uncertainties associated with the preferred policies. Such studies should ideally be programmed to be commissioned and completed in advance of the next review of the Plan. Further studies need to be included within the action plan.
- *Estimate the implications of the Plan and its policies on biodiversity targets* in published national Habitats and Species Biodiversity Action Plans. A habitat loss/gain account for the Plan area should be developed, based on an assessment of the anticipated impacts of the preferred shoreline management policies (see Table 5 Annex 4). Areas that are likely to be suitable for habitat re-creation should be identified as a means to help meet the national habitats and species Biodiversity Action Plan targets.
- *Identify the implications of the Plan and its policies for European and Ramsar sites*. Consideration needs to be given as to whether or not the proposed shoreline management policies are likely to have a significant effect and therefore resulting strategies and schemes require an appropriate assessment under the Conservation (Natural Habitats &c.) Regulations, 1994. While the SMP process is not responsible for such an assessment, it will greatly assist in the delivery of the SMP's chosen policies if those management units where there are potential impacts are identified at an early stage.
- *Estimate the implications of the Plan and its policies on the historic environment*. An indication should be provided of the likely impact of the preferred policies on historic and archaeological sites or interests.
- *Develop procedures for informing and supporting the planning system*. Procedures for liaison and sharing of information between coastal groups and local planning authorities should be set out in order to develop a co-ordinated approach to shoreline management. The Plan should also provide potential developers with background information about particular sites, enabling them to be forewarned of potential problems and the possible precautionary measures that may be necessary.
- *Develop an action plan*. This should include a prioritised and, where appropriate, costed programme of future strategic plans, an outline of future schemes, monitoring and studies. If necessary, action plans should look beyond the boundaries of individual SMPs to link with recommendations in adjacent SMPs. The prioritisation exercise should identify those further studies which are deemed to be essential for completion before SMP review, those studies which are needed within the mid-term, and those studies which would provide useful supplementary information. A programme for the periodic review of the SMP should be included.

Stage 3: Outputs

A completed SMP should include:

1. *A summary report* aimed at a non-technical audience, containing the preferred policies for individual management units, together with a brief commentary on the key shoreline issues and the implications of climate change and sea level rise on future shoreline management.
2. A plan document, containing the following, and supported by maps and annotated aerial photographs (see Annex 4):
 - a summary statement about the risks from flooding and coastal erosion in the Plan area;
 - a summary statement about the shoreline issues in the Plan area;

- an indication of the anticipated evolution of the coast (including the anticipated effects of climate change and sea level rise) and the implications for future shoreline management;
 - the preferred policies for individual management units, including anticipated sources of funding for any coastal defence works or operations over the next ten years. Where the preferred policy differs from the provisional policy, the reasons must be clearly stated;
 - an indication of the risks and uncertainties associated with the Plan and policies;
 - an indication of the implications of the Plan and policies for European sites;
 - an indication of the way the Plan has taken account of biodiversity objectives and targets and list the gains and losses predicted to occur to habitats covered by Habitat Action Plans;
 - a summary of the land use planning implications, including an indication, in general terms, of areas at risk (i.e. maps of the risk areas, at an appropriate scale);
 - an action plan, indicating the priorities and urgencies for implementing the recommendations of the SMP;
 - an indication of the future timetable for Plan review and how interested parties can contribute to the review process.
3. *A database* (including appropriate software) and archive of all relevant coastal process and shoreline information, to be held by the coastal group.
 4. *Maps* of relevant spatial information including coastal defences and risk areas produced in an agreed GIS format.
 5. *Supplementary volumes* containing background information, the methods used in the Plan process, the sources of information, consultees' representations and the responses to them etc. Consideration should also be given to identifying the lessons learnt from the Plan revision process and recommendations to the Department for developing future Plan guidance.

A Plan structure is included in Annex 1. The Plan format should be consistent with those adopted for adjacent Plans within the same coastal cell.

The ease of subsequent revision should be a factor in the layout and production of the Plan. The Plan will need to be produced on CD-ROM and should be accessible over the Internet.

Stage 4: Plan dissemination

The objective of Stage 4 is to:

- raise awareness of the SMP process, the management of the shoreline and the longer-term implications of climate change and sea level rise;
- inform and support the planning system in discouraging inappropriate development in areas at risk from flooding and coastal erosion.

Possible mechanisms for dissemination of the completed Plan include the preparation of a leaflet or newsletter, the use of audio-visual media, the production of a CD ROM, a web-page on the Internet (this should be linked to the DEFRA/NAW web site), public meetings, seminars and workshops.

This exercise will be co-ordinated by the coastal group, with technical support to be provided by the appointed consultant.

Project Information

Information available from the coastal group

The second generation Plan should build on the first generation Plan, making full use of the database of existing information (held by ...). A significant amount of relevant information has been collected or made available since the preparation of the first generation Plan. This additional information includes: ...

Project management

The SMP will be produced under a partnership between ...

A project management group has been established to steer, manage and co-ordinate the project. DEFRA/NAW and English Nature/Countryside Council for Wales will sit on the group. The group may wish to appoint a technical advisor (from either a consultancy or an operating authority) to each of their individual SMP management groups in order that a uniform representation is developed throughout the sediment cell, thus ensuring a greater consistency of approach and output.

Progress meetings are to take place between the management group and the consultant at regular (x monthly) intervals within the work programme to ensure continuity of the study.

The project manager shall be All communication regarding the project are to be directed via the project manager unless otherwise directed.

A programme of work is to be agreed between the group and the consultant, based on the following milestones: ...

The project standards are: ...

Presentation

The precise structure and content of the policy appraisal report will be agreed with the project management group as the work proceeds. The SMP format and content will be consistent with that set out in Annex 4. The consultant should take account of:

1. the group wishes to adopt a standard format for policy appraisal report and subsequent Plans within the same coastal cell;
2. the format of the policy appraisal report and databases which should allow for easy updating at the next Plan revision;
3. the database (including appropriate software) and archive of all relevant coastal process and shoreline information which will be passed onto and held by the coastal group;
4. need for provision for disseminating the policy appraisal report and subsequent Plans on CD-ROM and via the Internet.

Xx copies of the policy appraisal report will be supplied to the project manager by the agreed date.

Xx copies of the management unit summary sheets will be supplied to the project manager by the agreed date.

The consultant should also make provision for xx separate illustrated formal presentations to the group and other key interest groups and organisations. The format of these presentations is to be agreed as the work progresses.

Procurement

A fixed cost/lump sum pricing arrangement will be sought for Stage 1.

A schedule of hourly rates will be sought for services provided by the consultant in Stages 2–4.

When assessing proposals, the group will place a high emphasis on the quality component, through either a cost/quality models or 'double-envelope' assessment method, the quality components of which will be tested against pre-established quality criteria.

Every effort will be made to engage consultants with the relevant range of proven high quality expertise.

Annex 4: Recommended format and content of a plan

In order to achieve a consistent approach to producing SMPs, it is recommended that each SMP includes, as a minimum, the following:

- a standard Plan structure and content (see Table 1);
- maps of relevant spatial information including coastal defences and risk areas produced in an agreed GIS format;
- a summary statement about the preferred policies for each management unit (see Table 2);
- a summary table of the shoreline lengths associated with particular policies (see Table 3);
- a summary table of the coastal defence infrastructure for each management unit (see Table 4);
- a summary table of the implications for the environment, including biodiversity and the historic environment (see Table 5);
- a habitat loss and gain account (see Table 6).

Note all tables should be made available in a standard electronic format that provides the opportunity for rapid combination and analysis of summary data from different SMPs. Templates will be available on the DEFRA web site.

Table 1 Suggested Plan structure and content

The Plan Document should be concise and jargon-free, and accessible for a non-technical audience. Detailed background information (e.g. coastal processes, geomorphology, coastal defences, policy appraisal, etc.) should be included in supplementary volumes.

1 Introduction

- The Plan revision process
- Aims and objectives
- Status of the Plan

2 Risks from flooding and coastal erosion

- Risks to people and the developed, historic and natural environment

3 A Summary of the shoreline issues in the plan area

- Anticipated future evolution of the coast
- Coastal defences
- Current and future land use, amenity and recreation uses
- Historic environment
- Landscape
- Nature conservation

4 The SMP policies

- Policy appraisal
- Summary statements for each management unit
- Risks and uncertainties

5 Implications of implementing the SMP policies

- Implications for people
- Implications for current and future land use and development, industry, amenity and recreation uses, major infrastructure
- Implications for European sites
- Implications for biodiversity and nature conservation
- Implications for the historic environment
- Implications for landscape issues

6 Land use planning considerations

- A summary of shoreline management issues for planners and developers
- Forward planning
- Development control
- Consultation arrangements

7 The action plan

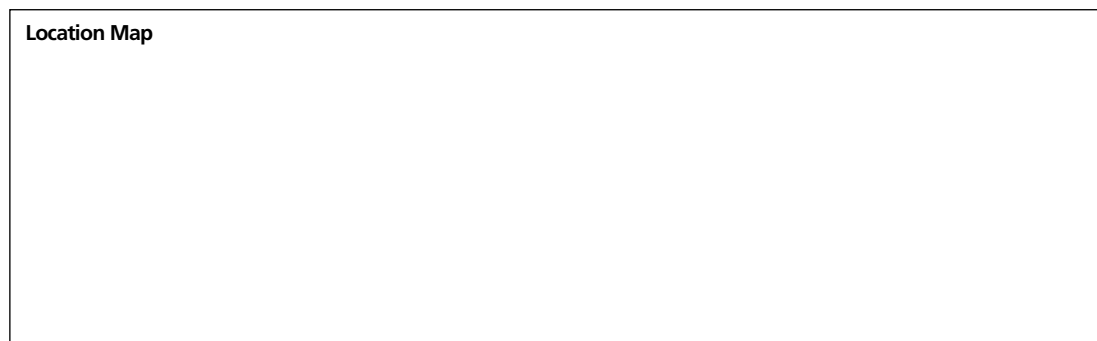
- Programme of strategic plans and future schemes
- Monitoring
- Further studies

8 Programme of review and revision

- Arrangements for review and revision
- Arrangements for on-going liaison and consultation
- Arrangements for monitoring the effectiveness of the Plan

Table 2 A summary statement about the preferred policies for a management unit

Management unit 1A



	Policy	Operations	Management
1	Hold the line	Maintenance	Baseline monitoring
10		Maintenance	Discussions with landowners, conservation groups etc. Managed realignment feasibility study
20		Maintenance	
Years	Transition: Hold the line – managed realignment		Land purchase/ Stewardship scheme
30		Defence realignment works	Monitoring
40		Breach of old defences	Monitoring
40	Managed realignment		Monitoring
50			Monitoring

Longer-term implications: climate change and sea level rise over the next 100 years will result in significant changes in the pattern of erosion and accretion. It is envisaged that managed realignment will be the only long-term viable policy for this and adjacent management units.

Current policy:	Hold the line until the defences approach the end of their design life.
Future preferred policy:	Managed realignment , with a new line of defences to be built in around 30–40 years time. This scheme will also deliver significant saltmarsh gains.
Reasons for change:	Hold the line is not considered to be environmentally acceptable or economically viable after the end of the design life of the current defences.
Consequences:	Managed realignment will result in the loss of around 25 dwellings and 100 ha of agricultural land, but lead to re-creation of saltmarsh habitats. Land purchase issues or stewardship schemes need to be resolved.
Sources of funding:	It is anticipated that the realignment works and all necessary studies will qualify for grant-aid.
Monitoring:	Strategic monitoring of saltmarsh erosion along the frontage will be on-going.

Table 3 A summary of the shoreline lengths associated with particular policies

Type of Policy	Policy	Number of management units	Overall length (km)	Estimated financial implications (years 1–10).
Maintain current option	Hold the line			
	Advance the line			
	Managed realignment			
	Limited intervention			
	No active intervention			
Change option	Hold the line – advance the line			
	Hold the line – managed realignment			
	Hold the line – limited intervention			
	Hold the line – no active intervention			
	Advance the line – hold the line			
	Advance the line – managed realignment			
	Advance the line – limited intervention			
	Advance the line – no active intervention			
	Managed realignment – hold the line			
	Managed realignment – advance the line			
	Managed realignment – limited intervention			
	Managed realignment – no active intervention			
	Limited intervention – hold the line			
	Limited intervention – advance the line			
	Limited intervention – managed realignment			
	Limited intervention – no active intervention			
No active intervention – hold the line				
No active intervention – advance the line				
No active intervention – managed realignment				
No active intervention – limited intervention				

Table 4 A summary of the coastal defence infrastructure

Coastal process units	Management unit	Location	Length (km)	Policy	Defence type	Length protected (km)	Residual life	Assets at risk	Area at risk (ha)
1	1.1	Sea View	15.5	Hold the line	Seawall fronted by beach	15.5	>20 years	High density urban area, housing, industry, etc.	30
	1.2	Mud Side	5	Hold the line – managed realignment (Year 10)	Earthwork embankment	5	<10 years	Agricultural land and isolated properties	8
	1.3	West Cliff	13	Limited intervention	None	0	NA	Roman fort, agricultural land, coastal footpath	1*
2	2.1	Golden Sands	4	Hold the line – no active intervention (year 20)	Seawall (limited residual life)	4	<20 years	Low density rural properties	6

* Area at risk from erosion over the next 50 years. NA, not applicable.

Table 5 A summary of the implications the SMP policies for the environment

Coastal process units	Management unit	Location	Policy	Implications for European sites	Implications for biodiversity	Implications for historic environment	Implications for future land use
1	1.1	Sea View	Hold the line	None	Estimated loss of 2.5 ha of inter-tidal habitat over the next 50 years	Potential loss/ degradation of inter-tidal archaeological site Provides protection to historic buildings	Standard of protection likely to be maintained over the next 50 years
	1.2	Mud Side	Hold the line – managed realignment (year 10)	Potential gain of 10 ha of inter-tidal habitat	Potential gain of 10 ha of inter-tidal habitat	None	Unlikely to be suitable for most forms of development because of risks
	1.3	West Cliff	Limited intervention	none	Maintains maritime cliff and slope habitat	Loss of Roman fort, probably by year 40	Area at risk from erosion over the next 50 years defined on risk maps
2	2.1	Golden Sands	Hold the line – no active intervention (year 20)	None	None	None	Unlikely to be suitable for most forms of development because of risks

Table 6 A template for a habitat loss and gain account

Habitat	No active intervention		Limited intervention		Hold the line		Advance the line		Managed realignment		Total		Balance (ha)
	Loss (ha)	Gain (ha)	Loss (ha)	Gain (ha)	Loss (ha)	Gain (ha)	Loss (ha)	Gain (ha)	Loss (ha)	Gain (ha)	Loss (ha)	Gain (ha)	
Inter-tidal													
Saltmarsh													
Shingle bank													
Sand dune													
Cliff top													
Soft cliff													
Hard cliff													
Wet grassland													
Coastal lagoon													
Reed bed													
TOTAL													

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