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# Strategic Environmental Assessment

## Environmental Report

Flood and Coastal Erosion Risk Management:  
Development of a National Strategy for Wales

Date of issue: 10 May 2011





# **Non Technical Summary**

## **What is this document?**

This is the non-technical summary of the environmental report that accompanies the consultation on the draft National Flood and Coastal Erosion Risk Management (FCERM) Strategy for Wales. The consultation period runs from 10<sup>th</sup> May to 7<sup>th</sup> June 2011.

## **Strategic Environmental Assessment**

A strategic environmental assessment (SEA) has been undertaken to ensure that environmental effects are considered during the development of the strategy alongside technical, economic and other considerations. The environmental report sets out the findings of the strategic environmental assessment (SEA).

Scoping was undertaken to ensure that the assessment focused only on the likely significant effects of the strategy. This concluded that significant effects on air quality and waste were unlikely and therefore these topics were scoped out. However, the need for assessment of these issues should be considered in the environmental assessment of strategies or projects for particular localities.

## **Summary of Significant Environmental Effects and Mitigation / Enhancement Opportunities**

Significant positive effects on population and human health are anticipated. Improved flood and coastal erosion risk management will have financial benefits resulting from better protection, where possible, and an improved ability to recover from events. Communities benefiting from higher resilience and improved emergency response and recovery will lead to reduced stress of coping with a flood or coastal erosion. The emphasis within the strategy on prioritising investment on areas of greatest risk is considered to have a potentially significant positive effect on reducing inequalities and protecting the most vulnerable within communities. New flood defence schemes can also provide opportunities for enhancements that benefit the health and wellbeing of communities, such as improvements to recreation and access to waterside environments.

Biodiversity can benefit from flood and coastal erosion risk management through the protection, maintenance or improvement of sites valued for nature conservation that would otherwise be at risk from flooding or coastal erosion. Alternative solutions that work with natural processes can benefit biodiversity through improved connectivity between habitats or improved water quality. However, there can also be conflicts with the maintenance and improvement of biodiversity, particularly in coastal areas, such as the loss of important inter-tidal habitat. Identifying and prioritising solutions that work with natural processes and achieve the objectives of the Water Framework Directive (WFD) will help to mitigate these effects. Regional habitat creation programmes provide a cost effective means of offsetting the overall impacts of

FCERM on biodiversity where it is not possible to fully mitigate the effects locally. There are few and diminishing opportunities in some parts of Wales, which may mean that in some cases it may only be possible to compensate some distance away from where the impacts occur.

No significant effects on soil or contaminated land arising from the strategy are anticipated. Managing catchment run off better, promoting innovative land management solutions, and the use of sustainable drainage systems (SuDS) will help reduce potential erosion of soils, release of contaminants, and contribute to reducing diffuse pollution.

Significant effects on the water environment depend on the character (quantity, quality, functioning and flow regime) of the water bodies affected, and the types of solutions proposed. Solutions that work with natural processes, that are aligned with the objectives of the WFD will result in significant positive effects. The strategy encourages the use of solutions that work with natural processes, opportunities should be taken to align such solutions with WFD measures to maximise the benefits for the water environment. FCERM solutions can also potentially adversely affect the status of water bodies. For example, the supply and transport of sediment, both in river catchments and along the coast, can be affected by the introduction of artificial hard flood defence structures.

The strategy is anticipated to have a significant positive impact on the ability of the country to adapt to climate change. Through advanced planning of FCERM, taking into account climate change predictions, this will also have significant benefit in helping communities adapt to climate change and its effects. The construction process, particularly for traditional engineered flood defences, and the embodied energy contained in the materials used, will add to the country's carbon emissions, albeit not significant on a national scale. Solutions that work with natural processes have potential for positive effects. For example, the creation of wetlands for flood storage, or woodland planting to reduce runoff, can have benefits from the sequestration of carbon, and can also help natural systems to adapt to the effects of climate change.

The impacts of the strategy on material assets are considered to be predominantly positive, with the management of risk to properties and businesses being one of the fundamental objectives of the strategy. Prioritised investment will result in the protection of the most important new and existing material assets, with actions to increase resilience of infrastructure also likely to result in benefits. However, focusing on areas of greatest risk may leave other lower priority material assets at increasing risk, such as agricultural land.

Measures to manage flood and coastal erosion risks can have significant benefits for cultural heritage, by improving the level of protection, enhancing the longevity of features and reducing the costs of maintenance. However, areas of cultural heritage interest away from areas prioritised for FCERM investment may become more exposed to flood and coastal erosion risk, and there is potential conflict where new flood and coastal defence solutions are proposed in areas of high cultural / archaeological sensitivity.

The strategy supports and promotes FCERM that works with natural processes, which is more likely to be compatible with, or may even enhance

the character of the landscape. In urban areas, if sensitively designed, FCERM solutions can contribute to the continuity and character of a local townscape, thereby maintaining or even enhancing regional or local distinctiveness. However, some forms of FCERM may detract from the character of the landscape. For example, engineering solutions such as walls being considered visually intrusive which may not be possible to successfully mitigate, and lack of sufficient funding could result in lack of adequately sensitive design taking into account the regional / local landscape character.

## **‘Do-nothing’ alternative scenario**

The ‘do-nothing’ alternative was also assessed to compare this to the proposed strategy. This was assessed as having predominantly significant negative impacts focused on the increases in flood and coastal erosion risk and the associated negative effects on communities, material assets, the economy and cultural heritage, exacerbated by climate change. Potential significant positive impacts on biodiversity and landscape character were identified as a result of a gradual return to natural processes in the water environment.

## **Monitoring**

Monitoring is proposed to determine whether changes to the strategy are required in future reviews. We propose to link this to annual reporting to the Welsh Assembly Government on the implementation of the National Strategy. Monitoring would include improvements in the management of flood and coastal erosion risk benefiting communities, property, infrastructure and businesses as well as improvement to the environment. Changes affecting deprived communities should be separately addressed. As the risks to agriculture are shown by the assessment to differ from material assets associated with the urban environment, we propose that this should also be separately addressed. Annual reporting will also include the extent of flood and coastal erosion risk to cultural heritage in Wales.

Annual monitoring of progress toward achieving Water Framework Directive (WFD) objectives is proposed as an indicator of the extent to which flood and coastal erosion risk management is contributing to this.

**How to respond** You can respond by contacting us in any of these ways:

- Via the e-consultation feedback form, accessible from: <https://consult.environment-agency.gov.uk/portal/re/wales/flood/walessea/consultation>
- by post, email, or phone, please see the contact details given below.

**Further information and related documents**

Large print, Braille and alternate language versions of this document are available on request.

Further information on the consultation and the National FCERM Strategy for Wales is available from:  
<https://consult.environment-agency.gov.uk/portal/re/wales/flood/walessea/consultation>

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**Data protection**

How the views and information you give us will be used

Any response you send us will be seen in full by Welsh Assembly Government staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Assembly Government staff to help them plan future consultations.

The Welsh Assembly Government intends to publish a summary of the responses to this document, in the form of a Strategic Environmental Assessment 'Statement of Particulars'. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Assembly Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into

account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

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**Appendix 1: Summary of Consultation on Scope of the SEA**

**Appendix 2: List of Policies, Plans, Programmes and Legislation considered**

**Appendix 3: Assessment Tables (A1 to A4): Assessment of actions proposed in the National FCERM Strategy and ‘Do nothing’ scenario**

# 1. Introduction

## 1.1 Development of the National Flood and Coastal Erosion Risk Management Strategy

The Flood and Water Management Act 2010 requires the Welsh Assembly Government to “*develop, maintain and apply a strategy for flood and coastal erosion risk management in Wales*”<sup>1</sup>. In response to this requirement, the National Strategy for Flood and Coastal Erosion Risk Management in Wales is being developed by the Welsh Assembly Government, to establish a delivery framework for flood risk and coastal risk management for Wales now and in the future.

The Act also requires a National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England, which is being developed by the Environment Agency, in parallel with the National Strategy for Wales. Of critical importance is the development of an integrated strategy to ensure that cross border flood and coastal erosion risks are taken into account, considering the flood risk and coastal erosion policies and strategies in the different administrations across the Wales-England border. This co-ordinated risk management across the national border is recognised and taken into account by both the Welsh and English strategies<sup>2</sup>.

The aim of the National Strategy is to set out a framework for delivering an effective service to address the increasing risk from flood and coastal erosion in Wales in the future.

The National Strategy describes the roles and responsibilities of those involved in managing the risk of flooding and coastal erosion, the approaches to managing those risks and their effects, and the way funding for flood and coastal erosion risk management is allocated. It sets out the national approach to flood and coastal erosion risk in Wales, describing the long-term goals for managing flooding from surface water, rivers and the sea, as well as coastal erosion, and how these will be achieved.

The Welsh Assembly Government aims to develop a system for flood and coastal erosion risk management in Wales that:

- Embeds sustainable development as the key principle for informing decisions and which is reflected in an approach that promotes the wellbeing of people in Wales and addresses the needs of the economy and the environment.
- Is focused on the needs of individuals, communities and businesses and which recognises that different groups have different needs and varying capacity to deal with flood risk and that the service they receive must be tailored accordingly.

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<sup>1</sup> As defined under Part 1, Regulation 8(1) of the Flood and Water Management Act 2010.

<sup>2</sup> For example, the Welsh Assembly Government is co-funding research (on an England and Wales basis) to improve the understanding of coastal erosion risks, and the Environment Agency is leading on work to better understand the risks from coastal erosion in England and Wales (proposed to publish the results in conjunction with completion of the review of Shoreline Management Plans).

- Promotes equality and does not exacerbate poverty.
- Is based upon a holistic understanding of the risks (likelihood and consequences) of all sources of flooding and areas of coastal erosion.
- Considers the full range of risk management responses.
- Facilitates long term resource planning.
- Allows prioritisation of investment, resources and actions.

## **1.2 Need for and Purpose of Strategic Environmental Assessment (SEA)**

It is a legal requirement in the UK for certain plans and programmes stipulated by the SEA Directive (2001/42/EC), to undergo Strategic Environmental Assessment (SEA). The SEA Directive is implemented in Wales by the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (SI 2004 No. 1656, W170), hereafter referred to as the SEA Regulations. The Welsh Assembly Government has determined that the National Strategy for Flood and Coastal Erosion Risk Management in Wales (hereafter referred to as the National FCERM Strategy) requires SEA.

The purpose of SEA is to provide for a high level of protection of the environment, to ensure the integration of environmental considerations into the preparation and adoption of plans and programmes, and to contribute to the promotion of sustainable development and environmental protection.

## **1.3 Contents of the SEA Environmental Report**

This environmental report provides a brief description of the SEA process that was followed and the decisions taken during this; considers other policy and legislation that should be taken into account; identifies key environmental issues and trends that provide a context for the National FCERM Strategy; sets out the assessment of the effects of the Strategy together with relevant mitigation and enhancement measures; and proposes monitoring to use the information to influence future reviews of the strategy.

## **1.4 Consultation on the draft Strategy and SEA to date**

The draft strategy consultation document was issued via the Welsh Assembly Government website on 16<sup>th</sup> July 2010 for a period of twelve weeks. The Welsh Assembly Government has published a summary of consultation responses received, and how these comments have been taken into account in the development of the strategy. These documents are also included for reference alongside this consultation, and can be viewed from: <https://consult.environment-agency.gov.uk/portal/re/wales/flood/walessea/consultation> . Further details of the background to the strategy, its development and consultation, are also available on the Welsh Assembly Government website: <http://cymru.gov.uk/consultations/environmentandcountryside/floodstrategy/?lang=en&ts=3>

Regulation 12(5) of the SEA Regulations requires consultation with the consultation bodies on the scope and level of detail of the SEA. We produced an SEA scoping report and consulted with the Countryside Council for Wales (CCW), Cadw and Environment Agency Wales, and for completeness, we also consulted the relevant transboundary consultation bodies, Natural England and English Heritage. A summary of the key points raised in response is presented below:

- A number of suggestions or recommendations for additions and / or amendments to the policies, plans, programmes and legislation review.
- Consideration of cumulative impacts of the National Strategy, along with sources of information on potentially relevant plans or projects.
- Recommendations for additional, or amendments to the existing assessment criteria proposed for use within the assessment.
- Issues, strategy elements, or environmental topics / disciplines for consideration for inclusion within the scope of the assessment (see sections 2.2 and 2.3 for further detail).
- Environmental issues to consider and suggestions for sources of information.

For further detail of the consultation responses, and how they have been taken into account in the SEA, please refer to Appendix 2 of this report.

### **1.5 How to comment on the Environmental Report and the draft National FCERM Strategy**

You can contact us in any of these ways:

- Via the e-consultation feedback form, accessible from: <https://consult.environment-agency.gov.uk/portal/re/wales/flood/walessea/consultation>
- email at [bruce.munro@environment-agency.gov.uk](mailto:bruce.munro@environment-agency.gov.uk)
- phone on 08708 506 506
- post to: Bruce Munro, Principal Environmental Project Manager, National Environmental Assessment Service, Environment Agency, Global Avenue, Leeds, LS11 8PG.

We have developed a series of consultation questions, to assist you in providing a consultation response:

- 1) Are there any other key issues or trends that you think should be considered in the SEA?**
- 2) Are there additional environmental effects (including those on humans) that need to be taken into account when developing the National FCERM Strategy?**

- 3) Is there any additional mitigation for adverse effects, or enhancement opportunities that should be incorporated into the National FCERM Strategy?**
- 4) Are there any key environmental indicators that should be incorporated into annual reporting on the National FCERM Strategy?**
- 5) Please tell us if you have any overall views or comments on the SEA or our National FCERM Strategy that have not been covered by previous questions.**

**This consultation is open for a 28-day period, from 10<sup>th</sup> May 2011 and closes on 7<sup>th</sup> June 2011.**

## 2. Environmental Context

### 2.1 Introduction

This section of the report describes the key environmental issues and baseline environment of relevance to the National FCERM Strategy for Wales. It also summarises the review of policies, plans and programmes relevant to the strategy and this SEA.

The SEA Directive requires technical difficulties to be documented with regard to the collection of baseline information. Given the national context of the Strategy, baseline information has been gathered to highlight national issues and trends. For some of the environmental topics covered it was not possible to obtain baseline information specific to Wales. In these cases, information for England and Wales, or the wider UK has been used.

### 2.2 Scoping of Environmental Issues

The scoping phase of the SEA considered the range of environmental issues required to be considered by the Regulations and the extent to which they are likely to be affected by the strategy. The issues listed in the Regulations are:

- Biodiversity, flora and fauna
- Population and human health
- Soil
- Water
- Air
- Climatic factors
- Material assets
- Cultural heritage, including architectural and archaeological heritage
- Landscape; and
- the inter-relationship between the above issues.

A key consideration when determining whether an environmental issue should be addressed in detail in the assessment was the whether the strategy was likely to result in significant environmental effects (as described in Schedule 2 (paragraph 6) of the Regulations). Given that the National FCERM Strategy is focused at the national scale, and includes no location or area specific actions, we have focused on whether the impact is likely to be nationally significant. Impacts on specific locations or sensitive sites are best addressed by an assessment of a more local level strategy or scheme.

We considered that significant impacts on air quality and waste as a result of the strategy were unlikely to occur and so these issues were scoped out of the assessment.

However, 'air quality' and 'waste' environmental disciplines should not be discounted from lower-tier strategies, plans or projects, where air quality or waste issues may occur that may be significant at that regional / or local scale, and must therefore be considered as part of the SEA / EIA process at that level.

### **2.3 Scoping elements of the National FCERM Strategy**

The National FCERM Strategy sets out the approach to managing flood and coastal erosion risk under a series of overarching objectives for flood and coastal erosion risk management in Wales:

- Reducing the impacts on individuals, communities and businesses from flooding and coastal erosion.
- Raising awareness of and engaging people in the response to flood and coastal erosion risk.
- Providing an effective and sustained response to flood and coastal erosion events.
- Prioritising investment in the most at risk communities.

These have provided the basis for this assessment. When scoping the SEA we identified that not all of these themes are likely to result in significant environmental effects. Specifically, the theme that is focused on raising awareness will not result in significant effects and therefore do not require a detailed assessment. We have therefore scoped out the theme of "Raising Awareness and Engaging People" (see Appendix 1 table presenting a summary of the consultation on the scope of the SEA, for further details of reasoning).

### **2.4 Policy, Plan and Legal Context**

The SEA Regulations require that consideration is given to the relationship with other policies, plans, programmes and environmental objectives set at an international, (European) community or national level. Given the national context of this strategy, only relevant national policies, plans, programmes and legislation has been considered as part of this review. Table 2.2 sets out the key themes arising from the policy review. The purpose of the review is to take account of the objectives of these key documents in the assessment with a view to aligning the Strategy to compliment and work with other environmental policies and legislation rather than against them. The documents consulted are listed in Appendix 1.

**Table 2.2: Common Themes and Influences from the Policies, Plans, Programmes and Legislation Review**

<b>Category of Policy / Plan / Programme / Legislation</b>	<b>Common themes</b>
Water and flood risk management	<ul style="list-style-type: none"> <li>• Protection, improvement, sustainable management and use of the water environment (surface ground, estuarine and coastal waters), in terms of quantity and quality – for the benefit of the human and natural environment.</li> </ul>
Marine and Coastal	<ul style="list-style-type: none"> <li>• Sustainable development and integrated management of coastal areas, balancing the mixed uses of the coastal environment such as nature conservation, fisheries, navigation, recreation and access and coastal protection.</li> <li>• Aims to reduce the risk of coastal change affecting new development and restrict inappropriate development.</li> </ul>
Biodiversity and conservation	<ul style="list-style-type: none"> <li>• Protection and enhancement of important habitats and species, both from a statutory basis (International and National conservation designations and protected species) and through policy objectives, such as working on an ecosystems basis, maintaining and promoting healthy functioning ecosystems and creating BAP habitat.</li> </ul>
Soils and contaminated land	<ul style="list-style-type: none"> <li>• Long term protection, sustainable management and improvement of soils.</li> <li>• Contaminated land issues and links to pollution of the water environment.</li> </ul>
Climate / climatic factors	<ul style="list-style-type: none"> <li>• Long term aims for reduction of carbon dioxide emissions including binding targets, and wide-reaching policies across all sectors to deliver reductions.</li> <li>• Requirements to adapt to climate change and associated threats, the need for increased resilience to climate change.</li> </ul>
Economy and sustainable development	<ul style="list-style-type: none"> <li>• Sustainable economic development, for the benefit of the economy, communities and the wider environment.</li> </ul>
Planning, transport and infrastructure	<ul style="list-style-type: none"> <li>• Improvement and sustainable development of public services, and management of transport networks.</li> </ul>
Population and human health	<ul style="list-style-type: none"> <li>• Improved health, wellbeing and standard of living and the reduction of inequalities.</li> <li>• Prosperous, healthy and sustainable local communities.</li> <li>• Provision and enhancement of public access and recreation, protection of open spaces and recreational areas.</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>• Sustainable development in relation to historic assets through conservation and enhancement.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• Legislation and policy to protect existing sensitive landscapes (such as National Parks and AONBs), and to promote the enhancement of natural beauty and amenity of inland and coastal waters.</li> </ul>

## **2.5 Environmental Baseline**

### **2.5.1 Background and National Context**

This section of the report presents an overview of the existing state of the environment, particularly aspects of relevance to flood and coastal erosion risk management. The information presented in this section is at a strategic level, appropriate to the scale of the National FCERM Strategy.

The information is broadly set out according to the environmental disciplines, or topics, as set out in the SEA Regulations. However, air quality has been scoped out of the assessment and is therefore omitted. An additional suggestion of the inclusion of 'waste' as an environmental issue, has also been scoped out of the assessment, and therefore also omitted from the following sections. See section 2.2, scoping of environmental issues, which provides the reasoning why these issues have been excluded from the assessment.

### **2.5.2 Population and human health**

#### **Overview and trends**

Wales has seen an increase in its population over the last decade from 2.9 million in 1999 to nearly 3 million by 2009. This trend is likely to continue with the population increasing to 3.2 million by 2023<sup>3</sup>. Growth in the population will increase the demand for housing that will inevitably lead to added pressure on public water supply and sewage discharges.

The health of the population within Wales is extremely variable with the south Wales valleys having amongst the highest percentages of populations with poor health in England and Wales (Census 2001, Office of National Statistics). There are significant health index differences between affluent and deprived communities; the reasons are complex but are linked to particular social circumstances and access to and use of services. The natural environment can play a major role in the health of a population and water-related recreational activities are an important contributing factor.

Wales has some of the finest water environments within the UK, that are used for a range of recreation activities, such as; gorge walking, swimming, fishing, sailing, canoeing, rowing, diving and others<sup>4</sup>. Many land-based recreational activities are also linked with the water environment due to the rural corridors they provide and the variety of landscapes they pass through. The Pembrokeshire Coast Path National Trail covers 186 miles (299km) of spectacular coastal scenery and is one of 15 premier long-distance National Trails in England and Wales. There are also National Cycle Network routes such as the Lôn Teifi, which runs along the valley of the River Teifi.

There are 220,000 properties at risk of flooding from rivers and the sea in Wales. 97,000 of these are also susceptible to surface water flooding with a further

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<sup>3</sup> Wales's population – A Demographic Overview 2010. Welsh Assembly Government.

<sup>4</sup> Source: A Better Place to Play in Wales – Wales' Strategy for Water Related Recreation 2008-2012. Environment Agency Wales.

137,000 properties susceptible to surface water flooding alone. In all, around 357,000 properties in Wales, or one in six properties, are at risk of flooding<sup>5</sup>. In addition to residential properties, many key industrial developments and other key infrastructure like power supplies, transport links and schools are situated on land at risk of flooding. The expected annual damages to residential and non-residential properties in Wales at risk of flooding from rivers and the sea is estimated to be £200 million<sup>6</sup>. Flooding can undermine the viability of communities and have a significant impact on the local economy.

## **Relation to National FCERM Strategy**

Evidence shows that people and property are at risk of flooding and coastal erosion. This is likely to be exacerbated by climate change, with predicted sea level rise, increased storminess and increased peak river flows, and also by the pressures of population growth over the next twenty years.

Early strategic involvement in, and influence on the planning process, for example through the effective application and integration of national planning policy on flood risk (Technical Advice Note (TAN) 15: Development and Flood Risk) can help to manage flood risk implications, and contribute to sustainable communities / reduce inequalities.

Good flood risk and coastal erosion management infrastructure, through strategic application and integration, has the potential to deliver wider benefits. For example, it can increase recreational opportunities thereby contributing to improving people's health, as well as protecting people and property from flooding and coastal erosion. Working to enhance the environment in the most deprived areas can deliver social justice at the same time as protecting people and property, and therefore contribute to sustainable communities.

### **2.5.3 Biodiversity, flora and fauna**

#### **Overview and trends**

There is considerable legislation in Wales covering the protection of important habitats and species, and there are numerous associated national policies, plans programmes and legislation aimed at delivering biodiversity improvements and enhancement. International legislation designates significant areas of Wales as protected conservation sites. These comprise Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. The 90 SACs, 20 SPAs, and 10 Ramsar sites in Wales cover a significant proportion of the Welsh coastline and its estuaries. There are also designations under UK law, which protect over 1,000 Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs). The Welsh Assembly Government has set out a new Natural Environment Framework (NEF)<sup>7</sup>, which advocates the move to an ecosystem approach, focusing the environment being considered as a system recognising that all components are interrelated. The aim of interventions should therefore be to optimise the functioning of ecosystems as a whole rather than

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<sup>5</sup> Flooding in Wales: A National Assessment of Flood Risk. 2009. Environment Agency Wales.

<sup>6</sup> *Ibid.*

<sup>7</sup> WAG Natural Environment Framework: A living Wales – a new framework for our environment, our countryside and our seas.

focusing on specific parts. The approach will build on and comply with the principles set out in EU legislation including the Water Framework Directive, Habitats and Birds Directives.

Many of Wales' international and national designations are located along the coastline and estuaries. Inland, many of the designations cover upland areas such as moorland, but also commonly closely reflect the areas of inland watercourses. The Water Framework Directive also includes specific objectives to improve the ecological status (or potential) of all surface water bodies, and to achieve compliance with any objectives for favourable condition for 'protected areas' (SAC / SPA / Ramsar sites) by 2015. These objectives include those required under the Habitats and Birds Directives.

Of the SAC features monitored in Wales by August 2005 (which included just over 50% of all terrestrial and freshwater features), 61% of SAC species features and 80% of habitat features were reported as being in unfavourable condition<sup>8</sup>. About one third of SPA features (all of which are bird species or assemblages of bird species) had been monitored by August 2005, with 86% of features reported as being in favourable condition and 14% in unfavourable condition<sup>9</sup>.

The 2008 Biodiversity Action Plan (BAP) reporting results show that of the original BAP priority habitats and species (pre-2006 review) only 39% of the those UK BAP habitats in Wales are considered to be stable, 53% are in decline, and there is no clear trend for 8% of these habitats. For the original UK BAP species within Wales, only 30% are considered to be stable or increasing in numbers.

## **Relation to National FCERM Strategy**

Biodiversity and nature conservation legislation can place significant challenges in terms of how we can manage flood and coastal erosion risk, and place statutory obligations to which we must comply. Without careful consideration, flood and coastal erosion risk management can result in threats to biodiversity, for example through habitat fragmentation. For the coastal situation, key threats are the long term inter-tidal habitat losses due to climate change and coastal squeeze, resulting from sea level rise combined with maintaining or 'holding the line' of existing hard-engineered coastal defences. Many of these habitats are designated under international and national legislation.

Flood and coastal erosion risk management can also perform an important function in the protection and conservation of biodiversity. For example, some statutorily designated sites in Wales rely on the presence of flood / coastal defences to protect them and maintain them in favourable status. The National Strategy presents the opportunity to work with natural processes in delivering flood and coastal erosion solutions, and thus deliver many biodiversity policy aims, such as habitat enhancements, improved ecological connectivity, and the opportunity to work more according to an ecosystems basis, as set out by the new Natural Environment Framework. This could for example include creation of wetlands, which create priority (Biodiversity Action Plan) habitats, improve

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<sup>8</sup> Rural Development Plan for Wales 2007-2013. 2006. Welsh Assembly Government.

<sup>9</sup> *Ibid.*

habitat connectivity for the benefit of important and protected species (and ecological status under the WFD) and wider biodiversity, while at the same time delivering flooding and / or coastal erosion solutions.

## **2.5.4 Soil and Contaminated Land**

### **Overview and trends**

Soils provide a wide range of essential functions, including food production, storage of carbon, protection of biodiversity and providing a range of ecosystem services. Soils also play a critical role in the water cycle through the storage of water and therefore are an important factor and influence in flood management.

Wales covers an area of around 20,000 km<sup>2</sup> with the predominant land uses in 2006 being agricultural (79%), woodland (14%) and urban areas or other land (8%) (WAG, 2007b). The Agricultural Land Classification (ALC) provides a method for describing the quality of farmland and soils, for agricultural production in Wales. This is described in more detail in section 2.5.7, Material assets – Agriculture.

Soils in Wales have suffered from degradation through unsustainable soil management, drainage and erosion by wind and rain, and through the impacts of climate change. Soils and soil function can also be compromised by diffuse air pollution (atmospheric deposition of contaminants arising from industry), as well as by point source and diffuse and agricultural pollution (although FCERM is not considered to be a significant contributor). Existing policy measures in relation to soils are focused on preventing soil degradation, and increasing resilience to pressures from erosion. Climate change is likely to exacerbate many of the pressures that soils already face, for example, hotter, drier conditions make soils more susceptible to wind erosion, coupled with intense rainfall incidents that can wash soil away.

Diffuse pollution from agricultural, as well as urban land is also identified as one of the key pressures affecting water quality, identified by the WFD as a priority area if objectives for water quality improvement are to be achieved. Three percent of Wales has been designated as Nitrate Vulnerable H-3 Zones, where farmers must follow an action programme to reduce nitrate pollution.

Soil particles and their associated contaminants (including pathogens, pesticides, nutrients and metals) often end up in watercourses. This can lead to smothering of river bed gravels and the harming of invertebrates, fish and aquatic plants (EA, 2004). The latest *State of the Environment Report for England and Wales* (EA, 2005) indicates that intensive eroded soils have degraded trout and salmon spawning beds in a number of rivers.

Acidification is a particular problem in Wales, particularly in the uplands, as the bedrock is slow weathering and the soils have little or no acid neutralising capacity. It is estimated that 34% of soils in Wales are affected by acidic deposition and in these areas about 50% of the first to third order streams may have been damaged. In terms of nature conservation, Wales is the worst

affected region in the UK with more than 40% of the total area of Sites of Special Scientific Interest (SSSIs) potentially damaged by freshwater acidification<sup>10</sup>.

A survey in the 1980s identified more than four thousand hectares of potentially contaminated land in Wales. The long industrial history in Wales has resulted in a substantial legacy of land contamination. The Environment Agency Wales and others are working to bring land that has already been contaminated back into use, but new contamination is still a risk. Flooding of past and present industrial areas can mean the mobilisation of contaminants and pollution of watercourses through urban diffuse pollution. Population growth will mean increasing pressures to redevelop riverside locations for residential or commercial properties.

## **Relation to National FCERM Strategy**

Innovative flood risk management, through land management, has the potential to deliver multiple benefits, through protected soils and improved management, and reduced diffuse pollution, which is also a key pressure on our ability to achieve WFD objectives. Consideration of soils in relation to future flood risk management is therefore an important element, particularly if we are to look to work with natural processes in delivering flood and coastal erosion risk management solutions, with wider environmental benefits.

### **2.5.5 Water**

#### **Overview and trends**

There is a wide range of legislation in Wales concerning the protection of the water environment, each of which with a slightly different focus, be it different water bodies (marine/coastal, ground, surface waters etc), or a focus on a particular sector (abstraction, water supply, fish, bathing waters etc). The purpose of the legislation in each case is ultimately for the protection, and where possible improvement, of the water environment (quality or quantity), for the benefit of the human and / or natural environment.

The Water Framework Directive (WFD) rationalises and updates existing water legislation and introduces a co-ordinated approach to water management, based on the concept of river basin planning. The WFD provides a strategic approach in Wales to preventing the deterioration of all water bodies, and provides a mechanism to improve and enhance their status over time. The WFD includes objectives to reduce pollution of water, to lessen the effects of floods and droughts, and improve the chemical, biological and ecological status of water bodies. The WFD sets a target of achieving at least 'good status' in all water bodies by 2015, with provision to delay the achievement of good status (until 2021 or 2027), provided that certain conditions are satisfied.

The WFD has enabled a comprehensive characterisation of the ecological health of the water environment in Wales, to inform setting of challenging targets to improve the ecological status of all waters (rivers, lakes, estuaries, coasts and groundwaters). Water quality has improved significantly in rivers over recent

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<sup>10</sup> Recover: 2010 - Predicting recovery in acidified freshwaters by the 2010 and beyond". 2003. Ferrier.

decades, as demonstrated by the old GQA assessment. Under the new standards set by the WFD, 33% of all Wales water bodies are at good or better ecological status (as published in the River Basin Management Plans, 2009). Many watercourses have been modified, through straightening, engineering, flood and coastal erosion risk management, measures to improve navigation and drainage. These water bodies are defined under the WFD as artificial or heavily modified water bodies, and make up approximately 22% of all Wales water bodies; only 33% of which are currently at good ecological potential or better. The WFD also classifies water-dependant European designated conservation sites (designated under the Habitats Directive) as 'protected areas', and sets timescales for these sites to achieve favourable conservation status. The water bodies play a critical role in the functioning of the habitat and species that these sites support.

## **Relation to the National FCERM Strategy**

The WFD requires the prevention of the deterioration of the status of all water bodies, and sets aims to improve their status (chemical, biological and physical). This provides significant potential challenges for flood and coastal erosion risk management, which needs to be considered in the development of the National Strategy. Development of the strategy also presents significant opportunities for the flood and coastal erosion risk management to help in delivering the aims and objectives of the WFD, particularly in relation to physical (hydromorphology) improvements, where flood and coastal erosion risk management solutions can work with natural processes.

Given the wide range of policies and legislation covering the management and protection of the water environment, the strategy will need to take into account the differing, and sometimes potentially conflicting, objectives for water. For example coastal erosion management, working with natural processes to improve natural coastal morphology, may exacerbate the effects of saline intrusion on sensitive groundwater bodies.

### **2.5.6 Climatic factors**

#### **Overview and trends**

Climate change is mostly caused by burning fossil fuels, deforestation and land use change. Through the Climate Change Act, 2008, the UK has set itself a target of reducing greenhouse gas emissions by at least 80% compared to 1990 levels, by 2050; and aims to meet 15% of final energy consumption from renewable sources by 2020. The Welsh Assembly Government is committed to achieving at least a 40% reduction in all greenhouse gas emissions in Wales by 2020, against a 1990 baseline.

Based on the assumption that greenhouse gas emissions continue to increase, Wales is likely to experience temperature increases of between 2.0 and 2.5°C by 2050. Annual average rainfall in Wales is predicted to remain roughly the same as present, but there is likely to be a large difference in the patterns of summer and winter rainfall in the future. Increased winter rainfall is expected as a result of increased storminess, leading to intense, but short-lived, rainfall

events. The projected increases in winter average rainfalls in Wales are 7% by the 2020s, 11% by the 2040s, and 19% by the 2080s.

Future sea level rise along Wales' coast is likely to result in more severe, and more frequent, coastal erosion and inundation events in low-lying coastal areas, and coastal storm surges are predicted to increase in magnitude and frequency. The relative sea level rise around Wales (taking into account land level changes) is predicted to be 36cm by the 2080s. By 2040, the estimated sea level rise for all emissions scenarios is around 15cm. However, by 2080 the scenarios diverge significantly with potential sea level rise increases of between 31cm for the low emissions scenarios and 43cm for the high emissions scenarios<sup>11</sup>.

## **Relation to the National FCERM Strategy**

The climate change predictions have significant implications for the National FCERM Strategy. Climate change will place increased pressure on existing flood risk and coastal erosion management regimes, requiring flood and coastal erosion risk management to be flexible and adaptable, to be able to accommodate future increases in rainfall, increased river flows, rising sea levels, increasingly frequent and larger coastal storm surges.

Climate change is also expected to exacerbate many existing environmental problems, and people and ecosystems need to be able to adapt to these additional pressures. Flood and coastal erosion risk management should seek, wherever possible, to help facilitate the ability of both the human and natural environment to adapt over time.

### **2.5.7 Material assets**

#### **Overview and trends**

##### *Residential and commercial property*

In all, approximately 357,000 properties in Wales, or one in six properties, are at risk of flooding at risk of flooding<sup>12</sup>. 220,000 properties are at risk of flooding from rivers and the sea, of which 97,000 are also susceptible to surface water flooding. Another 137,000 properties are susceptible to surface water flooding alone.

There are also properties at risk of coastal erosion and, although the overall number is considerably smaller compared to flood risk, the local impact can be severe.

The Welsh coastline has approximately 415km of man-made sea defence structures that protect over £8 billion of assets from coastal erosion and tidal flooding. Coastal erosion is occurring along 346km (23%) of the Welsh coastline<sup>13</sup>. Estimates show that about 9,000 properties are at risk of coastal

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<sup>11</sup> Climate Change: its impacts for Wales (Nov 09), Welsh Assembly Government

<sup>12</sup> Flooding in Wales: A National Assessment of Flood Risk, Environment Agency Wales 2009.

<sup>13</sup> Marine Climate Change Impacts Partnership, Plymouth University, 2008.

erosion over the next 100 years. Coastal erosion and landslides are progressive, and cause permanent irreversible loss to property and infrastructure. Such losses can undermine the viability of coastal communities and have significant impacts on the local economy.

Over the next twenty-five years, the number of households in Wales is projected to rise by about 25%, with population growth being a key driver (see section 3.2). In 2008 the Welsh Assembly Government committed to delivering 6,500 new affordable homes by 2011<sup>14</sup>.

### *Transport network and utilities*

Floods can cause serious indirect impacts, including damage to important energy, water, communications and transport infrastructure. They can also interfere with basic public services such as schools and hospitals. A sizeable part of our important infrastructure and public services are in flood risk areas. Over 80% of water and sewage pumping stations / treatment works are in flood risk areas, with 67% at significant risk. 22% of electricity infrastructure sites in Wales are located in areas of flood risk. In addition, nearly 800 police, fire and ambulance stations, and about 11% of main roads and 33% of railways are within fluvial/coastal flood zones.

### *Agriculture*

Welsh farming covers the whole range of agricultural production, however the main produce is sheep (28% of the UK flock), Beef (14% of the UK herd), milk (Wales produces about 10% of the UK total) and arable (mainly potatoes, barley and wheat). The area of arable land in Wales has been reasonably static over recent years at 4% of total agricultural area. A high proportion of agricultural land in Wales is classed as poor quality according to the Agricultural Land Classification (ALC) and is therefore suitable only for grazing. In a large part of the south east and north Wales (six different local authority areas), grade 5 land (very poor ALC) accounts for more than 50% of the total. Large areas of agricultural lowlands in Wales are within the floodplain. Since the last ice age ended 10,000 years ago, sea levels have risen some 60 metres, flooding lowland plains and valleys<sup>15</sup>.

Although Wales has a higher proportion of grazing land than arable crops, the most productive areas tend to be within fertile lowlands subject to flooding. This could have an implication for agricultural productivity and cereal production in Wales. 11% of agricultural land in England and Wales is at high or moderate flood risk and climate change will make flood events increasingly likely. Three quarters of the land most susceptible to run-off and flooding is intensively managed.

Population growth will place an increasing demand for arable crops from the food, feed and fuel sectors, which will further increase the pressure on agricultural land. UK farmers may respond to market demand and bring areas of

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<sup>14</sup> Wales Spatial Plan 2008 Update.

<sup>15</sup> Caring for Coastal Heritage (Cadw) [http://www.cadw.wales.gov.uk/upload/resourcepool/coastal\\_heritage\\_e5957.html](http://www.cadw.wales.gov.uk/upload/resourcepool/coastal_heritage_e5957.html)

non-arable land into production, such as the ploughing up of grassland for biofuels and the use of more marginal land for cereal production<sup>16</sup>.

Trees and woodlands occupy about 14% of Wales, compared with the European Union average of 32%<sup>17</sup>. 'Better Woodlands for Wales' is the Forestry Commission Wales (FCW) grant scheme aimed at delivering the Woodland Strategy Vision in Wales. It places greater emphasis on good quality woodland management which, amongst other things, promotes catchment management planning to develop the role that woodlands can play in the management of water and the reduction of flood risks.

#### *Flood and Coastal Defence Infrastructure*

The Welsh coastline has approximately 415 kilometres of man-made sea defences. The length of rivers protected by defences is much longer. The Environment Agency is responsible for managing some 2,900 kilometres of flood defence systems, both coastal and inland, along with and about 5,500 sluices, outfalls, floodgates and barriers in Wales. The assets that the Environment Agency and other authorities maintain totals 74% (by length) of all assets that are relied on to protect properties from flooding in Wales. The remaining 26% (by length) of flood defences in Wales are maintained by "third parties", and include highways, railways, other embankments, boundary and garden walls and buildings. These have a flood risk management function in practice, without being formal flood defences.

### **Relation to the National FCERM Strategy**

Only 6.7% of land in Wales is at risk from flooding from even a rare extreme flood event of up to a 1 in 1,000 (0.1%) chance in any year. This emphasises the importance of controlling flood risk by keeping inappropriate development away from the floodplain, and coastal areas identified as being at risk from coastal erosion and/or flooding. Future approaches to flood and coastal erosion risk management must consider the potential impact on material assets, be that infrastructure related to residential, commercial, transport / utilities or the agricultural sector. Managing flood and coastal erosion risk to material assets from one sector, may present conflicts with other sectors.

Substantial home building targets will need supporting infrastructure, with potential to exacerbate flood risk, and may require additional investment in flood and coastal erosion risk management infrastructure. Through the strategic approach / high level planning, there may be opportunities to develop good environmental and sustainable infrastructure that can deliver wider benefits (e.g. increased recreational opportunities, habitat improvements), in addition to protecting people, property and material assets from flooding and coastal erosion.

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<sup>16</sup> Source: EA Corporate Strategy 2010-2015. Evidence: land and farming. [http://www.environment-agency.gov.uk/static/documents/Research/Land\\_FINAL.pdf](http://www.environment-agency.gov.uk/static/documents/Research/Land_FINAL.pdf)

<sup>17</sup> Woodlands for Wales (Welsh Assembly Governments Woodlands Strategy).

## 2.5.8 Cultural Heritage

### Overview and trends

The historic environment is both unique and irreplaceable and contributes greatly to the Welsh sense of identity and culture<sup>18</sup>. There are three World Heritage Sites within Wales: the Castles and Town Walls of King Edward in Gwynedd, the Blaenavon Industrial Landscape and Pontcysyllte Aqueduct and Canal.

The Register of Landscapes of Historic Interest in Wales was developed by Cadw, CCW and ICOMOS in 1998. They record evidence of past human activity in the present landscape, considering individual sites or monuments and also the larger patterns and spaces in-between. This has resulted in 58 areas of Wales being included on the register for landscapes of outstanding or special historic interest. The Register is primarily used in relation to development control.

Although not included on the register, historic seascapes and inter-tidal areas are equally significant around the Welsh Coast, reflecting the use of the sea for fishing, transport and trade over many centuries, and include many examples of ancient structures associated with these industries around the coasts of Wales. The inter-tidal area in particular is of huge significance with inter-tidal heritage including submerged landscapes, formerly dry land, usually dating from early prehistoric periods. The sea was not always where it is now and therefore what is now sea, was dry land in the earliest prehistoric period. Artefacts that survive may be exposed by an eroding coastline. The Welsh coastline was the subject of a rapid archaeological assessment in 1999, and 3,000 sites and monuments of interest were recorded<sup>19</sup>. The seas beyond the coast are littered with the wrecks of ships of all ages<sup>20</sup>. Some of these are protected through the Protection of Wrecks Act or Protection of Military Remains Act.

Inland cultural heritage in Wales is protected through a number of different formal designations. There are numerous Scheduled Ancient Monuments (SAM) (approximately 4,000), Listed Buildings (approximately 30,000), Conservation Areas (approximately 500), Historic Parks and Gardens (approximately 370) and other heritage assets in Wales. These continue to be vulnerable to disturbance, issues related to drainage, land management, and water quality. There are also many other sites in Wales, that although not designated, are important to preserve as a record of Wales' heritage.

The regional Historic Environment Records (HERs) compiled and maintained by the four Welsh Archaeological Trusts provide a comprehensive record of archaeological and historical sites, landscapes and finds of all periods throughout Wales. The HERs fulfil a wide variety of functions including assisting in the positive management and presentation of the historic landscape, planning control, and as a source for input to local history, conservation and tourism projects<sup>21</sup>. Rural initiatives / agri-environment schemes such as Glastir use this information by encouraging sensitive land management that is sympathetic to historic features of the landscape.

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<sup>18</sup> The Welsh Historic Environment Report: Position statement 2006, Cadw.

<sup>19</sup> [http://www.cadw.wales.gov.uk/upload/resourcepool/coastal\\_heritage\\_e5957.html](http://www.cadw.wales.gov.uk/upload/resourcepool/coastal_heritage_e5957.html)

<sup>20</sup> [www.cadw.wales.gov.uk](http://www.cadw.wales.gov.uk)

<sup>21</sup> The Historic Environment Records of the Welsh Archaeological Trusts: <http://www.archwilio.org.uk/>

The influence of climate change may exacerbate problems and risks to heritage assets and features. Rising sea levels and possible increases in storminess may endanger historic landscapes, structures and archaeology in the coastal and intertidal zones. More frequent intense rainfall, leading to increased extremes of wetting and drying can cause increased erosion of archaeological sites. Cadw maintains a register of buildings at risk in Wales, and in 2008 approximately 10% of Listed Building (all grades) were considered at risk.

## **Relation to the National FCERM Strategy**

Heritage assets, many of which lie adjacent to water bodies or lie within flood / coastal zones, present potential challenges to flood and coastal erosion risk management. They may also be at risk from erosion / flooding, or changes in the water table, which may affect the preservation of archaeological remains in soils.

Heritage assets are a fragile resource requiring stringent protection as, although they can be preserved by record, lost heritage features cannot be recreated.

Flood and coastal erosion risk management can protect important heritage assets from flooding, although policies / strategies / schemes to re-connect floodplains, make space for water, or regimes in the coastal zone for managed realignment can also conflict with heritage protection and conservation.

### **2.5.9 Landscape**

#### **Overview and trends**

Wales is characterised by a beautiful and rugged landscape, which ranges from the mountains and lakes of Snowdonia and the estuaries of the mid-Wales coast, to the beaches and cliffs of Pembrokeshire, and the industrial heritage of the South Wales valleys. The river systems drain radially off the upland interior. Some of the larger catchments are the Tawe in the south, the Tywi and Teifi in the south west and the Conwy and Clwyd in the north.

Wales is generally a predominantly pastoral landscape with agriculturally improved grassland being the single most extensive habitat type, followed by semi-improved grassland.

The Welsh seascape is characterised by a mix of open sea with many small rocky islands and sandy bays with steep cliffs alongside sheltered areas of sand dunes, mudflats and saltmarsh.

There are a number of landscape designations in Wales. Areas of Outstanding Natural Beauty (AONBs) and National Parks are statutorily protected landscapes, designated to conserve and enhance the natural beauty of the Welsh landscape. Nearly 66,000 hectares are designated as AONB. These sites are the Lleyon AONB, Gower AONB, Anglesey AONB, part of the Clwydian Ranges AONB and the Wye Valley AONB, which straddles the Wales-England border. There are 3 National Parks covering nearly 288,000 hectares (20% of

Wales - Pembrokeshire Coastal, Snowdonia and Brecon Beacons National Parks) and nearly 300,500 hectares of historic landscape. Approximately 500km of the coast of Wales has been (non-statutorily) designated as Heritage Coast, with the aim of conserving its natural beauty and improving accessibility. Other areas are designated as Special Landscape Areas by local authorities, and recorded within the Register of Landscapes of Historic Interest in Wales (developed by Cadw / CCW / ICOMOS).

LANDMAP is the national information system, devised and managed by the Countryside Council for Wales, for taking landscape into account in decision-making.

## **Relation to the National FCERM Strategy**

Flood and coastal erosion risk management can have a positive effect on landscape features within Wales, from reverting floodplains back to their natural states, to enabling coastal processes to naturally shape our coastline. However, flood and coastal erosion risk management may also have a negative effect upon landscape features when changing the ways our flood and coastal zones function, and needs to take account of all landscape sensitivities, in particular important and protected landscapes.

## **3. Assessment Methods**

### ***3.1 Approach to assessing the National FCERM Strategy***

Regulation 12 of the SEA Regulations requires that the assessment process identifies, describes and evaluates the likely significant effects on the environment of implementing the plan and reasonable alternatives taking into account the objectives and the geographical scope of the plan.

Given the high level nature of the strategy and the strategic nature of the actions it is not possible to assess the impacts with significant accuracy or precision. The assessment has therefore focused on the likely changes resulting from the strategy, but has not attempted to quantify them. Assessment criteria have been developed to focus the assessment on key environmental outcomes.

#### ***3.1.1 Assessment of Alternatives***

The strategy is giving effect to the requirements of the Flood and Water Management Act 2010, and it provides a framework for more specific actions to be implemented by the Risk Management Authorities. Given the constraints of the need to comply with the requirements of the Act, the stated objectives of the strategy, and the 'high level' framework provided by the strategy, we consider that there are no other alternatives that would result in materially different environmental effects. However, a comparison with the 'do nothing' alternative will be undertaken.

The consideration of alternatives will be a significant factor in the SEAs of local strategies that are developed in accordance with the requirements of the

National Strategy. Monitoring of the effects of the National Strategy may help to identify other alternatives that should be considered in subsequent reviews.

### 3.2 Defining Significance in the Assessment

The assessment process identifies the significant environmental effects of the Strategy. Due to the national strategic nature the draft plan, effects on local environmental issues were not considered significant within the context of this assessment, and are not considered further.

At this high level of assessment all impacts are considered to have a significant level of uncertainty associated with them and we have therefore only considered whether the impacts are likely to be significantly positive or negative. We have not sought to define levels of significance.

The national and high level nature of this strategy means that it is not possible to provide definitive criteria to determine the significance of an impact. However, an indication of the characteristics of significant impacts can be provided:

- Impacts that are likely to result in an adverse effect on the integrity of features of national or international value or will demonstrably increase the extent or improve the value of such features
- Impacts that are likely to conflict with environmental legal objectives, targets or duties
- Impacts that are likely to result in a demonstrable change in the health and/or social or economic well being of communities.

### 3.3 Assessment Criteria

Assessment criteria (or assessment objectives) are typically used in strategic environmental assessment to systematically identify the positive and negative effects a plan could have on individual environmental issues.

We proposed a series of assessment criteria as part of the SEA scoping report, against each of the environmental topics. As a result of the scoping consultation responses received, some of the assessment criteria have been amended and additional ones added (see table in Appendix 1 for details of changes).

The assessment criteria used in the assessment of the National FCERM Strategy are presented in Table 3.1 below.

**Table 3.1 SEA Assessment Criteria for the draft National FCERM Strategy**

SEA Environmental topic	Assessment Criteria <i>Does the proposed objective...</i>
Population and human health	<ul style="list-style-type: none"> <li>• Improve and enhance the health and wellbeing of communities?</li> <li>• Reduce inequality and social deprivation?</li> </ul>
Biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>• Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?</li> </ul>

	<ul style="list-style-type: none"> <li>• Conserve, and where possible enhance important, protected and priority habitats and species?</li> </ul>
Soil and contaminated land	<ul style="list-style-type: none"> <li>• Protect and conserve soils and soil function, and increase resilience to degradation?</li> <li>• Reduce the risk to waters from diffuse pollution?</li> </ul>
Water	<ul style="list-style-type: none"> <li>• Protect and improve the water environment, in terms of water quality and quantity, for the benefit of the human and/or natural environment?</li> <li>• Maintain and enhance hydromorphological function of the water environment by working with natural processes?</li> </ul>
Air	N/A – scoped out*
Climatic factors	<ul style="list-style-type: none"> <li>• Contribute to the mitigation of factors contributing to climate change?</li> <li>• Contribute to the country’s ability to adapt to climate change?</li> </ul>
Material assets	<ul style="list-style-type: none"> <li>• Conserve and protect important new and existing material assets and infrastructure?</li> <li>• Conserve and protect the best and most productive agricultural land?</li> </ul>
Cultural heritage	<ul style="list-style-type: none"> <li>• Conserve, and where possible enhance, protected and important cultural heritage assets?</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• Ensure the landscape character of Wales is conserved and, where possible, enhanced?</li> <li>• Maintain and enhance regional distinctiveness in landscapes?</li> </ul>
Waste	N/A – scoped out*

\* See section 2.2 Scoping of environmental issues, for reasoning for scoping out these issues.

## 4. Significant Environmental Effects of the National FCERM Strategy

### 4.1 Actions proposed within the National FCERM Strategy

The National FCERM Strategy proposes actions to manage flood and coastal erosion risk. The objectives of the strategy are set out section 1.1 of this report. The main actions of the National FCERM Strategy that are to be assessed are grouped under a series of objectives, or elements, these are:

- Reducing the impacts on individuals, communities and businesses from flooding and coastal erosion.
- Raising awareness of and engaging people in the response to flood and coastal erosion risk.
- Providing an effective and sustained response to flood and coastal erosion events.
- Prioritising investment in the most at risk communities.

Further detailed description of these actions can be found in section 3 (Flood Risk Management Objectives) of the draft National FCERM Strategy.

The assessment first considered the impacts on the environmental issues, covered by the assessment criteria, of the actions under each of these strategy objectives / elements. This is considered in detail in the assessment tables presented in Appendix 3 of this report. When scoping the SEA we identified that not all of these elements are likely to result in significant environmental effects, specifically, the element focused on raising awareness and engaging people (see section 2.3). This strategy element was not therefore included in the assessment tables.

There are considerable overlaps between the likely impacts of the strategy, and therefore to avoid repetition, the impacts of the strategy as a whole are reported on in the following sections.

## **4.2 Assessment of the significant environmental effects of actions proposed in the Strategy**

The results of the assessment indicate that the strategy is likely to have effects that are predominantly neutral or positive in nature. However, while FCERM can play a significant role in protecting sites of nature conservation value that would otherwise be at risk from flooding or coastal erosion and therefore contributing to biodiversity enhancements, it can also result in significant adverse effects. This is discussed in more detail below.

### **4.2.1 Population and human health**

*Does the proposed objective...*

- Improve and enhance the health and wellbeing of communities?
- Reduce inequality and social deprivation?

The purpose of the strategy is to manage flood and coastal erosion risk, reduce the impacts and consequences and aid rapid recovery, for individuals, communities and businesses, prioritising investment in the areas at highest risk. The assessment confirms that significant positive impacts on population and human health are therefore likely as a result.

Effective management of flood and coastal erosion risk, with communities benefiting from higher resilience and improved emergency response and recovery will make a significant contribution to reducing the psychological stress of coping with a flood or coastal erosion. As a result an anticipated significant positive impact of the strategy is that it will contribute to the improved health and wellbeing of communities at risk of flooding or coastal erosion. There may also be financial benefits to individuals and organisations as improved risk management and awareness may contribute to reducing the costs of recovery following an event.

The emphasis within the strategy on prioritising investment areas of greatest risk is considered to have a potentially significant positive effect on reducing inequalities and social deprivation within communities. Areas of deprivation and social inequality are sectors of communities most vulnerable to flood risk and least able to cope with the consequences of flooding. Measures proposed within

the strategy to improve resilience and provide quicker and more effective recovery, can have significant benefits for the health and wellbeing of communities, particularly as the most disadvantaged can suffer more from the adverse impacts on health of flooding and coastal erosion. Work on avoiding development in flood risk, and embedding this within the land use planning system will also avoid placing future communities at risk.

## Mitigation and enhancement

Steps to be taken to enhance the positive outcomes of the strategy should focus on the need for risk management authorities to develop an understanding of the vulnerabilities and social inequalities of communities affected, to be taken into account during the development of FCERM solutions.

Where new FCERM interventions or infrastructure are proposed, this can also provide opportunities to provide enhancements that benefit the health and wellbeing of communities such as improvements to recreation and access to waterside environments. Such enhancement measures should be informed by an understanding of the key determinants of health and wellbeing within the local community. For example, the integration of improved amenity, green space and recreational opportunities into FCERM can contribute to, or tap into wider programmes or initiatives, such as Green Infrastructure, to promote exercise for improved health and wellbeing.

### 4.2.2 Biodiversity

*Does the proposed objective...*

- Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?
- Conserve, and where possible enhance important, protected and priority habitats and species?

FCERM can make a significant contribution to the protection and maintenance of sites valued for nature conservation that would otherwise be at risk from flooding or coastal erosion. For example, coastal defences may protect freshwater sites from saline inundation, pumping and storage can be optimised to contribute to nature conservation objectives. Innovative catchment-based solutions such as land management can result in biodiversity improvements as well as slowing rates of runoff into rivers. FCERM frequently delivers enhancements to improve the environment where works are taking place often benefiting biodiversity. The National FCERM Strategy will support and strengthen these initiatives by:

- Stating that wherever practicable FCERM will work with natural processes
- Aligning FCERM policies with wider environmental concerns and requirements, and committing to meeting legal obligations, such as those under the Habitats Directive and Water Framework Directive
- Recognising the potential impacts of risk management schemes and the need to protect and carefully manage European and nationally designated sites that are located alongside the coast, rivers and reservoirs

- Recognising and taking up opportunities where FCERM can deliver environmental benefits, for example, changing land management practices and increasing the use of wetlands
- Increasing the use of sustainable drainage, to improve water quality and therefore benefit biodiversity while also contributing to improved runoff management.

However, conflicts between the objectives of FCERM and the maintenance and improvement of biodiversity can and may arise. For example, the creation of traditional hard-engineered flood defences can result in the reduction or fragmentation of habitat, or reduction in quality of valuable habitat along river corridors and in the coastal zone. This is particularly true for coastal areas where the defence structures combined with sea level rise, can result in the loss of ecologically important intertidal habitat. Much of this habitat is internationally designated, particularly for its vegetation and the bird life that it supports. Identifying opportunities where defence structures can be realigned can help avoid or minimise these adverse effects. However, there are few and diminishing opportunities in some parts of Wales, and it may be necessary in some cases to compensate some distance away from where the impact occurs.

Flood management structures and measures also have a significant impact on many rivers and wetland areas. FCERM infrastructure can also interfere with natural hydromorphological processes, leading to a significant degradation of important habitats and the species they support, and loss of overall ecological connectivity. If measures are not taken to mitigate or offset these effects, the adverse impacts are likely to outweigh the benefits that FCERM can have on biodiversity.

Prioritising of investment in light of increased pressure on public finances may result in lack of funding and therefore neglect of biodiversity issues, particularly wider biodiversity (beyond protected or priority sites and species). The potential for adverse impacts depends to some extent on the nature of solutions proposed.

There is potential for positive outcomes for biodiversity where more innovative solutions are proposed that work with natural processes, both on a catchment and a coastal basis; for example set back of defences to create inter-tidal habitat, and reconnecting floodplains and creation of wetland storage areas.

Actions to improve resilience and emergency response are unlikely to have a significant impact on biodiversity, although resilience measures focused on potentially polluting infrastructure can reduce water quality implications of flood events, with subsequent reduced impact on aquatic ecology.

## **Mitigation and enhancement**

Solutions that work with natural processes or have biodiversity benefits integrated into them should be prioritised. Potential synergies between FCERM solutions and Water Framework Directive measures should be identified to enable solutions to contribute to improving the ecological status of water bodies. Regional habitat creation programmes provide a cost effective means of offsetting the overall impacts of FCERM on biodiversity where it is not possible to

fully mitigate the effects locally. The introduction of Sustainable Drainage Systems SuDS into new or existing development should offer further opportunities for both water quality improvements and biodiversity enhancements.

### **4.2.3 Soil and contaminated land**

*Does the proposed objective...*

- Protect and conserve soils and soil function, and increase resilience to degradation?
- Reduce the risk to waters from diffuse pollution?

No significant effects on soil or contaminated land arising from the strategy are anticipated. FCERM solutions can play an important role in determining whether soils, and the contaminants within them, are mobilised and discharged into water bodies. Traditional engineered solutions, such as walls close to river banks or on the coast may restrict or cut-off the pathway between contaminated ground and water bodies.

Managing catchment run off better and promoting innovative land management solutions will help reduce potential erosion of soils, release of contaminants, and therefore also contribute to reducing diffuse pollution. However, solutions that involve setting back of defences, or reduced flood risk management are likely to result in increased frequency in inundation in agricultural areas, potentially meaning reduced protection of soils / soil function in some areas.

Avoiding inappropriate development in the flood plain could also help to protect soil function. For example, contribute to maintaining buffer areas along river corridors, and not increasing impervious areas adjacent to water bodies. Improved drainage and the use of sustainable drainage systems (SuDS) may also play a similar role in an urban context by reducing diffuse pollution resulting from unconstrained urban runoff. Such improvements to soil degradation and reduced diffuse pollution should result in subsequent benefits for the chemical and ecological status of water bodies.

However, there is insufficient certainty at this stage on the nature of solutions proposed, the degree to which catchment solutions will be implemented, the scale of implementation of these measures and their effectiveness. There is therefore considered to be insufficient evidence or certainty to consider the impacts to be significantly positive at a national scale.

### **Mitigation and enhancement**

Taking account of the location of contaminated land during the development of FCERM solutions will help to ensure that any adverse effects are minimised. FCERM solutions and intervention may also provide opportunities for key parties to work together to remediate contaminated land and bring land that has already been contaminated back into use.

Promoting the use of land management to slow down the flow of water from the land, will also contribute to improved soil function, reduced soil erosion and

reduce diffuse pollution, which will also help contribute to WFD objectives for water quality and ecological status. Linking land management solutions, with both flood risk management and soils benefits, to agri-environment schemes or woodland management schemes such as Glastir or Better Woodlands for Wales, may help to provide incentives for land owners to adopt the necessary measures.

#### **4.2.4 Water**

*Does the proposed objective...*

- Protect and improve the water environment, in terms of water quality and quantity, for the benefit of the human and/or natural environment?
- Maintain and enhance hydromorphological function of the water environment by working with natural processes?

The extent to which FCERM solutions proposed as part of the strategy can contribute to improving the water environment is dependent on the geographic area, the exact nature of the measure taken and the sensitivity of the water bodies affected. Solutions that work with natural processes, both on a coastal cell and river catchment basis, that are aligned with WFD objectives or contribute to the implementation of WFD measures (detailed within the relevant Welsh River Basin Management Plans (RBMPs)) are likely to make a more significant contribution. Benefits to the hydromorphological functioning of the water body, the ecological status and potentially water quality can all result.

FCERM interventions can potentially result in benefits in terms of water quality or quantity. For example, new flood defences may cut off of contaminant pathways to sensitive water bodies, or coastal defences may act to prevent saline intrusion of important groundwater bodies for freshwater supply. Avoiding inappropriate development in flood risk areas, and incorporating SUDS as part of land use planning will help protect the water environment, helping to reduce urban diffuse pollution and benefit water quality.

Conversely, FCERM solutions can adversely affect hydromorphology and have subsequent adverse effects on the status or potential of water bodies. For example, the supply and transport of sediment, both in river catchments and along the coast, can be affected by the introduction of hard structures and the introduction of barriers designed to control flow.

Given the above, there are potential for conflicts between the many different objectives for water bodies. For example, proposed solutions to work with natural coastal processes / improve coastal morphology by re-aligning coastal defences, but may potentially result in saline intrusion of groundwater bodies on the coast, thereby conflicting with groundwater quality objectives.

Due to uncertainty of the impacts of the strategy on a national basis, neither an overall significant positive or negative effect has been considered appropriate. There are likely to be a mixture of beneficial and adverse effects, the significance of which depends on the nature of solutions proposed.

## Mitigation and enhancement

Mitigation and enhancement proposals primarily focus on the benefits of establishing links with WFD objectives to maximise the benefits to the water environment. This should be established by the risk management authorities and partners, through reference to the relevant River Basin Management Plans (RBMPs) in Wales, and their supporting annexes<sup>22</sup>. The potential for conflicts between different water bodies and their objectives should be considered.

When developing FCERM solutions, the options and opportunities for working with natural processes, both in catchment and coastal context, should be considered, which will maximise to potential for hydromorphological improvements.

Innovative catchment-based solutions should be promoted where this can also contribute to reducing flooding or erosion damages. This could be progressed through linkages with land management initiatives, such as agri-environment schemes (Glastir) or woodland management schemes (Better Woodlands for Wales), which may help to provide incentives for land owners to adopt the necessary measures.

Adverse effects on water quality will partly be determined by the extent of polluting activities that are at flood and coastal erosion risk. These risks may be reduced by high level engagement with operators (e.g. water and sewerage companies) to identify and develop long term solutions for the protection and/or location of these activities.

### 4.2.5 Climatic factors

*Does the proposed objective...*

- Contribute to the mitigation of factors contributing to climate change?
- Contribute to the country's ability to adapt to climate change?

The strategy is anticipated to have a significant positive impact on the ability of the country to adapt to climate change. However, the potential for FCERM to contribute to mitigation of climate change factors is considered to be limited, and also depends on the nature of solutions proposed.

Traditional hard-engineered defences will have a carbon footprint associated with their construction, resulting from emissions during the construction process and the embodied energy contained in the materials. Although not significant in an overall national context, this will result in a negative effect on climate change mitigation. However, alternative, innovative solutions that work with natural processes have potential for positive mitigation effects. For example, the creation of wetlands for flood storage, or woodland planting to reduce runoff, can have benefits from carbon sequestration. Adopting such solutions that work with natural processes may also help natural systems to adapt to the effects of climate change.

<sup>22</sup> The Western Wales, Dee and Severn RBMPs can be accessed from the Environment Agency website: <http://www.environment-agency.gov.uk/research/planning/33106.aspx>

Prioritising the highest risk areas for protecting vulnerable communities from flooding and coastal erosion will result in significant positive effects on the country's ability to adapt to climate change. Through advanced planning, flood warning, improving resilience to flood inundation and managing its consequences, this will also have significant benefit in helping communities adapt to climate change and its effects.

Avoiding inappropriate siting of developments within the floodplain, implementing sustainable drainage, and integrating this, taking into account climate change predictions within the land use planning system will ensure that new and future development is sustainable and climate-proof in the longer term.

Overall therefore, in relation to climatic factors, the strategy is considered to result in significant positive effects. However, opportunities to contribute significantly to mitigation are likely to be limited.

## **Mitigation and enhancement**

Adopting solutions that work with natural processes, wherever possible, such as wetland creation or woodland planting, can provide some degree of carbon sequestration and therefore contribute to mitigating climate change factors, and also help enable natural systems to adapt to the effects of climate change. Where traditional 'hard' engineering solutions are adopted, steps can be taken, such as re-use of materials, minimising transport requirements, to ensure that the associated greenhouse gas emissions are minimised.

Future development and infrastructure will need to be designed to accommodate increased rainfall / storm events exacerbated by climate change. This applies to the development of FCERM solutions and to the location and nature of future development. The use of SuDS will help to ensure that these local environments are adapted to coping with the more intense rainfall events anticipated as a result of climate change. Design of FCERM solutions need to take into account the latest climate change predictions and guidance. For influence on infrastructure and development, the most effective control mechanism is likely to be the land use planning system, which should integrate climate change policy aims.

Consideration can be given to whether FCERM measures can contribute to adapting to other effects of climate change, e.g. by considering the effect on a river of low flows or contributing to reducing urban heat island effects.

### **4.2.6 Material assets**

*Does the proposed objective...*

- Conserve and protect important new and existing material assets and infrastructure?
- Conserve and protect the best and most productive agricultural land?

The impacts of the strategy on material assets are considered to be predominantly positive, with the management of risk to properties and businesses being one of the fundamental objectives of the strategy.

Prioritised investment is likely to result in significant beneficial effects for the protection of the most important new and existing material assets. Increasing the resilience of infrastructure may also aid in reducing the adverse effect / consequences of flooding, albeit to a lesser extent, since it may not necessarily avoid all inundation of assets. However, the strategy recognises that the Welsh Assembly Government investment in flood and coastal erosion risk management will need to be more rigorously prioritised, taking into account increased pressure on the public finances. Focusing first on the areas of greatest risk, may therefore leave other material assets at increasing risk if the beneficiaries of flood and erosion risk management are not enabled or empowered to mitigate their own risk.

Furthermore, the focusing on the infrastructure at greatest risk from flooding and coastal erosion, is considered likely to result in the a shift in focus away from, and therefore negative effect on the protection of agricultural land. Similarly, some solutions, such as flood storage or managed realignment, could adversely affect agricultural land if the impacts were not fully compensated for.

Siting development outside the floodplain and away from areas at risk of coastal erosion, will help ensure that new material assets are protected, and the existing risk of flooding is not exacerbated by development. This may also have some benefit favouring agricultural land within the floodplain in rural areas. Although there may be uncertainty to the level of protection to material assets that managing catchment run off may provide, such measures may also help to conserve agricultural land, for example by reducing the erosion of soils in agricultural catchments.

## **Mitigation and enhancement**

Prioritisation of investment and exerting influence to secure other sources of funding for FCERM, wherever possible, will be essential to make the most effective use of finances available and ensuring protection for the areas at greatest risk of flooding and coastal erosion.

Investment in the protection from flood and coastal erosion risk will need to take into account long term influences such as climate change, for example increased storminess / storm surges, increased river flows, and other influences such as development pressure and land use change. The strategy also recognises the increasing costs anticipated in relation to managing surface water flooding for the protection of infrastructure, as climate change increases the intensity of rainfall and places greater pressure on existing drainage systems.

Alternative, lower-cost, approaches for flood risk management will need to be considered where locations do not meet the criteria for priority funding but remain at risk. For example focus on flood warning and property resilience, as opposed to capital FCERM infrastructure.

The strategy acknowledges that future investment decisions for flood and coastal risk management will reflect a sustainable development approach, which will include an assessment of costs and benefits to the economy, wider social costs and benefits as well as specific consideration of risk to life and environmental impacts, and identifies a range of factors that need to be considered to guide FCERM investment. The Welsh Assembly Government has begun a period of consultation on future investment in flood and coastal erosion risk management. Central to this will be the discussion of arrangements for prioritising investment and the development of a single set of assessment criteria which will be used to consider all applications for funding from the Welsh Assembly Government.

Linking alternative land-management based FCERM measures focused on reducing catchment run-off with agri-environment schemes (Glastir) may provide incentives to adopt agricultural management regimes that are more adapted to the likely changes resulting from climate change, including increased frequency of flooding of agricultural land.

#### **4.2.7 Cultural heritage**

*Does the proposed objective...*

- Conserve, and where possible enhance, protected and important cultural heritage assets?

Measures taken to manage flood and coastal erosion risks can have significant benefits to the historic environment, by improving the level of protection, enhancing the longevity of features and reducing the costs of maintenance. Although cultural heritage assets may not necessarily be the principal focus of prioritised FCERM investment, there are likely to be secondary benefits where heritage assets / important features lie within those areas prioritised for protection. Conversely, areas of heritage interest away from prioritised investment areas may become more exposed to flood and coastal erosion risk. However, the strategy states that the potential impact on wider cultural heritage should be a key factor in guiding flood and coastal erosion risk interventions.

The strategy supports approaches that work with natural processes, which can result in benefits of managing flood risk at the landscape level, and also potentially benefit or complement important historic landscapes.

Flood and coastal erosion management can also have adverse effects on important heritage features. Depending on the nature of FCERM solutions, there is potential conflict where new flood and coastal defence infrastructure is proposed in areas of high cultural / archaeological sensitivity. Heritage assets such as listed buildings, scheduled monuments, bridges, weirs, or important undiscovered archaeology can often be adjacent to rivers or on the coast, and can be directly affected by FCERM construction works. Building new and maintaining existing defences could have an impact on, or present conflicts with the conservation of such heritage assets.

Where decisions are taken to provide more space for water by realigning defences, there may be historic sites that were once behind defences, but would now lie in front of the new line. This can particularly be the case where coastal

defence schemes affect the inter-tidal area, which can be of great importance historically, for example often the location of submerged historic landscapes. Setting back existing defences can expose heritage features, which may be designated, or as yet undiscovered, and leave them exposed to coastal erosion.

The overall effect of the strategy on the cultural heritage is not possible to determine at this strategic level. Assessing impacts (either positive or negative) requires a greater level of detail of the options being considered within a particular locality. There is therefore insufficient certainty at this level to identify any significant effects. Because of the uncertainty at this national level, in terms of the nature and location of interventions, potential cultural heritage impacts, and associated mitigation, will need to be assessed at the project level.

## **Mitigation and enhancement**

The strategy states that the potential impact on wider cultural heritage is a key factor, in determining the type of flood and coastal erosion risk intervention, and in guiding investment in FCERM. Particular attention should be given to the design of measures that directly affect historic assets or their setting, but this is most appropriately considered at the project level.

The strategy promotes approaches that work with natural processes, which may help to manage flood risk in a way that is less damaging to the historic environment. Where it isn't possible to avoid significant flood risk, the implementation of resilience measures can also potentially be applied to heritage assets, for example, for listed structures / buildings, and is therefore likely to help to reduce the damage caused by floods. Any specific design requirements taking into account the sensitivity of the features affected will need to be considered.

Prioritising flood and coastal erosion risk management actions and interventions, through the shoreline and catchment flood management process, does provide the benefit of helping to prioritise important heritage sites at risk from flooding and erosion for recording before they are lost. This is particularly important on the coast because of coastal erosion, where preservation of sites by recording them before they are lost might be the only realistic option in some instances.

### **4.2.8 Landscape**

*Does the proposed objective...*

- Ensure the landscape character of Wales is conserved and, where possible, enhanced?
- Maintain and enhance regional distinctiveness in landscapes?

Flood and coastal erosion risk management activities can contribute to the enhancement of landscape character. The strategy supports FCERM that works with natural processes, which is more likely to be compatible with the existing character of the landscape, and is also likely to enhance it where this is replacing a previously heavily modified system. In urban areas, if sensitively designed, flood or coastal erosion risk management features can contribute to the

continuity and character of a local townscape, thereby maintaining or even enhancing regional or local distinctiveness.

The strategy also supports approaches sensitive to landscape character through by embedding the need to avoid development in flood or coastal erosion risk areas within the land use planning system.

However, there are risks that some forms of management will detract from the character of the landscape. For example, to provide adequate protection against the effects of climate change on sea level rise or the frequency of high flows in a river, could require walls of a height that is considered to be intrusive and cannot be fully mitigated, regardless of the sensitivity of the design. Prioritising investment in light of increased pressure on public finances could potentially result in a focus only on basic FCERM infrastructure, with lack of sufficient funding meaning neglect of landscape issues and lack of sufficiently sensitive design taking into account the regional / local landscape character.

Other flood risk management measures can result in changes to the character of a landscape that are not easily categorised as adverse or beneficial. For example, managed realignment or reconnecting a river to its flood plain could have significant effects on land use.

The overall effect of the strategy on landscape is not possible to determine at this strategic level. Assessing impacts (positive or negative) requires a greater level of detail of the options being considered within a particular locality. There is therefore insufficient certainty at this level to identify any significant effects.

## **Mitigation and enhancement**

Promoting solutions that work with natural processes, minimise damage to the environment and seek to provide environmental benefits are all consistent with minimising adverse effects on the landscape. Particular attention will be required where work is taking place within or within the vicinity of the designated landscapes in Wales, including the AONBs, National Parks, areas of Heritage Coast, and areas designated as Special Landscape Areas by local authorities (see section 2.5.9 for more details).

In addition, strategic environmental assessments and project level environmental assessments should all address the effects of any measures on the landscape and identify opportunities for contributing to enhancing the character of an area.

### ***4.3 Cumulative effects of the Strategy with other policies, plans and programmes***

This section presents the likely cumulative and synergistic effects on the environment of the interaction between the draft National FCERM Strategy and other relevant policies, plans, programmes and legislation (see section 2.4). The relationship of the strategy to some of these is discussed in the assessment above (for example, the Water Framework and Habitats Directives) and therefore this section only identifies additional cumulative effects:

- The strategy has been assessed as having a significant positive impact on the country's ability to adapt to climate change. This supports and will enhance wider policy initiatives to adapt to the impacts of climate change.
- Actions to manage flood risk and coastal erosion risk for the benefit of communities and businesses, and support rapid recovery from incidents will support policies for sustainable economic development by minimising disruption and the impact on local economies. Similarly, these actions will support policies to reduce inequalities and promote healthy communities.
- The strategy advocates the development of FCERM solutions that work with natural processes wherever possible. The strategy therefore presents the opportunity to deliver many biodiversity policy aims, such as habitat enhancements and improved ecological connectivity, but also potentially wider environmental improvements, such as positive outcomes for the conservation of landscape features within Wales. However, without careful consideration and planning, or sympathetic design, flood and coastal erosion risk management can result in outcomes that conflict with policies that promote the protection and enhancement of biodiversity (for example cumulative losses / fragmentation of habitat).
- The National FCERM Strategy for Wales is being developed in parallel with the English FCERM Strategy. There are flood and coastal erosion risks and issues that occur across the Wales-England border, particularly in view of the coastal areas common to both Wales and England (Severn and Dee Estuaries), and the cross-border rivers including the Dee, Wye and Severn. Catchment Flood Management Plans (CFMPs) consider all types of inland flooding, and have been developed on a river catchment basis (rather than according to administrative boundaries). Three CFMPs cover the catchments that cross the Wales-England border: the River Dee, River Severn, Wye and Usk. Similarly Shoreline Management Plans (SMPs) have been developed according to areas of coastline within a littoral sediment cell, (Severn Estuary SMP2 and North West and North Wales SMP2 cover both Wales and England). The National Strategy will require future FCERM planning arrangements to build on the work already done in relation to CFMPs and SMPs, and FCERM will therefore continue to be based on the catchment and coastal sediment cell approach. Given that both CFMPs and SMPs require the carrying out of strategic environmental assessment, any potential cross-border issues, including wider environmental impacts (adverse or beneficial) should be captured by these cross-border FCERM plans. It is also crucial during the preparation of local FCERM strategies that cross-border flood and coastal erosion risks, and wider environmental impacts with cross border implications are taken into account by the risk management authorities operating in both Wales and England.
- The Marine Plan for Wales<sup>23</sup> will implement the requirements of the Marine and Coastal Access Act 2009 and the UK Marine Policy Statement (MPS). Area-specific marine plans will provide detailed policy guidance and set out a

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<sup>23</sup> Sustainable Development for Welsh Seas: Our Approach to Marine Planning in Wales', WAG, 2011 (currently in consultation).

spatial planning approach to the management of the inshore marine area<sup>24</sup>, to help ensure that decisions within these areas contribute to delivery of UK, national and any area-specific policy objectives. The Marine Plan has the potential to give rise to cumulative effects with the National FCERM Strategy, particularly the elements of the strategy considering coastal erosion and flood risk. Cumulative effects on coastal processes, the water environment, biodiversity and material assets in the coastal zone are likely (adverse or beneficial), although cumulative effects on any of the environmental disciplines are possible. However, given that both plans / strategies lack a spatial basis at this national scale, and the area-based marine plans have not yet commenced preparation, it is not possible to accurately predict any potential cumulative effects. Cumulative effects are likely to occur at the level of the respective strategy / plan's lower-tier, area-specific plans. Given that SEA will be incorporated in the assessment of the marine plans, and is also a requirement of the SMP process, the cumulative assessment component of the respective SEAs should consider the interactions of these plans.

- The strategy has the potential to result in cumulative effects with national infrastructure developments, particularly those related to the water sector. An overview of some of the major development proposals has been provided. However, given the lack of a spatial basis to the strategy, we have not considered in any detail the interactions of the strategy with these proposals. No significant national developments in the water, waste water, waste or transport sectors are currently planned in Wales<sup>25</sup>. However, there are a number of current / proposed developments in the energy sector, comprising a number of new wind farm developments, electricity power connections, and new energy generating / power stations. Where new FCERM interventions or infrastructure are proposed in proximity to such developments, there is potential for cumulative impacts on any of the environmental disciplines. However, given that the National FCERM Strategy doesn't have a spatial basis; it is not possible to accurately predict the cumulative effects of the strategy with these developments. It is therefore important that lower-tier plans and projects arising from the strategy consider potential cumulative impacts with relevant planned national infrastructure, but also significant relevant developments at the regional or local level.

#### **4.4 Assessment of Alternatives**

The SEA Regulations require that an environmental report includes an evaluation of the likely significant effects of the strategy and reasonable alternatives.

Given the high level nature of the strategy and the associated difficulty with predicting likely environmental effects, we consider that detectable differences in environmental outcomes would only result from strategies that had significantly different priorities. For example, a strategy that prioritised environmental outcomes over the protection of people and property. However, serious consideration has only been given to a strategy that meets the principles set out

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<sup>24</sup> The inshore region covers the marine area from the high water spring tide mark to 12 nautical miles from the coast. Marine plans will also cover the offshore region (12 - c.200 nautical miles) but are not considered relevant in relation to cumulative effects with the strategy.

<sup>25</sup> Source: Infrastructure Planning Committee website: <http://infrastructure.independent.gov.uk> (accessed 3<sup>rd</sup> May 2011).

by the Welsh Assembly Government (see section 1.1). The strategy is giving effect to the requirements of the Flood and Water Management Act 2010. Given the constraints of the need to comply with the requirements of the Act, we consider that there are no other alternatives that would result in materially different environmental effects.

An assessment of the current arrangements was considered, but we took the decision not to include this. This is because we anticipate that the significant impacts would not be materially different from those predicted to result from the proposed strategy. Much of the policy context encouraging the using natural processes and innovative solutions already exists.

The strategy does provide a greater emphasis on developing a local understanding of FCERM and taking account of all sources of flooding<sup>26</sup>. We would therefore anticipate that the strategy should result in more focused local solutions addressing locally understood risks.

Furthermore, given that this strategic environmental assessment is being undertaken retrospectively on a strategy that has already been published in draft and has been consulted on, it is inappropriate to assess alternatives that have not been genuinely considered. We have, however, included an assessment of the 'do-nothing' alternative to provide a 'benchmark' against which the effects of the proposed strategy can be considered.

The consideration of alternatives will be a significant factor in the SEAs of Shoreline Management Plans, Catchment Flood Management Plans, and local flood risk management strategies that are developed in accordance with the requirements of the National Strategy.

#### **4.4.1 The 'do-nothing' alternative**

The 'do-nothing' alternative assumes that no further action is taken by the government, the Environment Agency Wales or other risk management authorities to manage flood and coastal erosion risks. In the event of this, it might be anticipated that private individuals and organisation would undertake their own risk management activities. However, the level of activity and the affordability of is uncertain and therefore the assessment assumes that no further action is taken. The assessment indicates that this alternative would result in predominantly significant negative effects (see also Table A4 in Appendix 3):

- Communities would experience an increase in the risk (likelihood and consequences) of floods and coastal erosion. This would have subsequent impacts on the health and wellbeing of communities with deprived communities being disproportionately affected.
- The economic impacts of 'no-action' are likely to be significant as businesses and infrastructure are increasingly disrupted and recovery

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<sup>26</sup> The Environment Agency will represent the Welsh Assembly Government in local delivery arrangements, retaining their existing responsibilities for flooding from main rivers and the sea, and will take on additional responsibilities for coastal erosion together with Local Authorities. In parallel to this Local Authorities in Wales will be responsible for 'local flood risks' which includes flooding from ordinary watercourses, surface water runoff and groundwater.

periods would be lengthy as a result of an absence of resilience measures. These effects would be exacerbated over time by the effects of climate change.

- Adaptation to the effects of climate change would occur in an unmanaged way with some sections of the community managing the changes in flooding and coastal erosion risks much better than others and vulnerable people suffering disproportionately. The lack of awareness and preparedness would exacerbate negative effects on the health and wellbeing of communities.
- Whilst there would be no conflicts between FCERM activities and the historic environment, this would be more than offset by the increase in risk of damage to historic assets on the coast and within the flood plain of rivers. Some assets are likely to be lost entirely to coastal erosion while others will suffer significant damage as a result of flooding. We consider that these impacts are likely to be significant.
- The absence of FCERM interventions would result in flooding and erosion of contaminated land resulting in the mobilisation of contaminants and subsequent impacts on water quality and the health and wellbeing of communities that use the water resources. Similarly, with absence of FCERM, it may be expected in some areas for there to be gradual saline intrusion of groundwater bodies in coastal locations. However, it isn't clear that this would be of such a scale as to be considered to be a significant negative impact.
- No FCERM interventions would mean a gradual return to natural processes in river and coastal environments. It is anticipated that this would result in significant positive impacts on biodiversity over time in some areas. However, ad hoc private measures to respond to the increasing flood risk are likely to offset potential positive effects in many areas. Sites that rely on FCERM measures for their maintenance would be adversely affected. Unconstrained development in the flood plain and coastal zone would have adverse impacts on the ecological status of water bodies.
- Landscape benefits would occur as a result of the absence of no new FCERM infrastructure. The wider landscape would undergo gradual change to a landscape shaped by natural fluvial or coastal processes rather than manmade interventions. This may benefit rural landscapes, but could also result in detrimental impacts to valued and historic townscapes.
- The absence of FCERM interventions would provide a more naturalised water environment over time. There would be few direct benefits to water quality and some negative effects may occur as a result of the mobilisation of contaminants, previously mentioned.

## **5. Role of the SEA in finalising the National FCERM Strategy**

### **5.1 *Additional environmental mitigation and enhancement opportunities***

This assessment has identified the significant effects on the wider environment likely to occur as a result of implementation of the National FCERM Strategy. The assessment process also identified opportunities to enhance the positive and mitigate any negative significant environmental effects of actions proposed in the strategy.

A number of these opportunities are incorporated directly within the proposed actions within the strategy. For example, the requirement for greater alignment between FCERM actions and the wider action required to protect and enhance the environment, and working with natural processes provides an opportunity to address flood and coastal erosion risks sustainably, using techniques that are visually and practically more sympathetic to the local environment. Additional safeguards exist to ensure that the environmental implications are addressed in related decision making processes:

- The strategy requires risk management authorities to ensure that their actions are sustainable and must explicitly include an assessment of the likely impacts of climate change.
- Sustainability Appraisal will be undertaken during the development of Local Development Plans. These are required to comply with the SEA Regulations and should take into account the objectives of the National FCERM Strategy and associated plans or strategies.
- The implementation of planning decisions in accordance with the provisions of Technical Advice Note 15<sup>27</sup> will help to ensure that inappropriate development is not constructed in flood risk areas.
- Habitats Regulations Assessments are undertaken to determine whether a proposed, plan, strategy or scheme is likely to adversely affect the integrity of a European designated site.
- Water Framework Directive assessments are undertaken to assure compliance with WFD objectives where this is feasible.

### **5.2 *Outline of proposed monitoring for significant environmental effects***

Once the draft National FCERM Strategy is finalised and adopted, Article 10(1) of the Strategic Environmental Assessment Directive requires its significant environmental effects to be monitored. This section presents an outline of the actions we expect to undertake in relation to monitoring the significant environmental effects of the strategy.

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<sup>27</sup> Welsh Assembly Government (2004), Technical Advice Note 15: Development and Flood Risk.

Whilst it is feasible to monitor the significant effects of the strategy, it will not be possible to determine whether any changes in these factors can be attributed to the strategy. There are too many other influences on environmental outcomes for a direct relationship to be identified. Nevertheless, it is reasonable to monitor environmental outcomes to determine whether changes to the strategy are required to further reduce conflicts or make a greater contribution to achievement of environmental objectives.

This report does not propose new monitoring specifically linked to this strategy. A more practical, efficient and effective process is to link to monitoring that is already undertaken and used in the development of policy and FCERM actions. No specific monitoring is proposed to address 'soil and contaminated land' or 'landscape' as no significant effects were identified for these topics. Assessment of impacts (positive or negative) for these issues requires a greater level of detail of the options being considered within a particular locality, and is therefore considered appropriate instead to be assessed as part of strategic environmental assessments or project level environmental assessments.

**Table 5.1: Proposed monitoring of the effects of the National FCERM Strategy**

<b>Environmental Topic</b>	<b>Proposed monitoring</b>
Population and human health	The Environment Agency is required to report to the Welsh Assembly Government on flood and coastal erosion and the strategy recommends this is undertaken annually. The content of the report is not outlined, but it is anticipated that it will include data on the number of households and businesses for which flood and coastal erosion risk has been reduced or for which the management of risk has significantly improved. We recommend that this data should specifically address improvements in flood and coastal erosion risk for deprived communities.
Water / Biodiversity	Annual monitoring is undertaken to determine progress towards meeting WFD objectives for water body status, including ecological status. Additional data could be gathered on the extent to which FCERM schemes either conflict with or contribute to the achievement of environmental objectives.
Climatic factors	As one of the purposes of FCERM is to enable adaptation to the effects of climate change, we anticipate that the annual reporting to the Welsh Assembly Government will adequately address this issue.
Material assets	Annual reporting will include risk management activities undertaken. As the risks to agriculture and the management of them are shown by the assessment to differ from assets associated with the urban environment, we propose that this addressed under a separate heading.
Cultural Heritage	Annual reporting will include reporting on the extent of flood and coastal erosion risk to cultural heritage in Wales.

### **5.3 Future Strategic Environmental Assessment activities**

This environmental report concludes the main stage of the strategic environmental assessment process for the National FCERM Strategy. A Strategic Environmental Assessment 'Statement of Particulars' will be published alongside the adopted strategy, explaining how consultation responses and the findings of this environmental report have influenced the strategy-making process and how monitoring requirements have been finalised. Table 5.1 sets out monitoring that can be used to be taken into consideration in future reviews of the National FCERM Strategy.

## Appendix 1: Summary of Consultation on Scope of the SEA

Organisation consulted	Subject / issue	Comment/s	Response	Report section ref.
Cadw	Inclusion of inter-tidal areas / issues as part of cultural heritage.	Reference needs to be made to the inter-tidal area, which is of huge significance with submerged landscapes etc., as well as off and on-shore.	Noted, and included within the description of the environmental baseline – cultural heritage.	s2.5.8
		Text to include recognition, particularly on the coast because of coastal erosion, that preservation of sites by recording them before they are lost might be the only realistic option in some instances.	Text amended in environmental baseline – cultural heritage – relation to the National FCERM Strategy; and assessment of cultural effects of the strategy – mitigation.	s2.5.8 s4.2.7
	Addition to plans, policies and programmes to be considered.	Two additional policies / legislation to be added: Planning Policy Wales, Edition 3, July 2010; The Merchant Shipping Act 1995.	The additions to the policies, plans and programmes review have been included	Table in Appendix 2
	Assessment criteria.	Confirm whether the phrase [in cultural heritage assessment criterion] ‘protected and important’ is intended to convey that not all important assets will be designated.	To confirm that the assessment criterion was developed as ‘protected and important’ so as to consider important heritage assets beyond those which are statutorily designated.	s3.3
Countryside Council for Wales (CCW)	Cross border implications of Welsh and English FCERM Strategies	Crucial that ‘for cross border’ [flood] hazards and risks, an integrated strategy is developed and that assessment recognises and considers the consequences of flood risk and coastal erosion policies and strategies in different administrations. Reference should be made to the equivalent FCERM Strategy for England, and for compatibility between the two documents in coastal areas common to both Wales and England, and to consider issues relating to ‘cross border’ rivers.	Acknowledgement of English and Welsh FCERM Strategies in introductory text to this environmental report. Assessment of potential cumulative impacts across the borders in the cumulative effects assessment part of this report.	s1.1 s4.3
		Environmental baseline.	Suggest a map indicating relevant designated sites (international and national) would be useful.	A reference to the relevant page of the CCW website showing the designated sites maps has been included.
		Reference should be made to Ramsar assemblages for relevant sites.	Given the national basis of the strategy, it is not considered appropriate to specify assemblages of individual designated sites within this SEA. However, the Habitats Regulations Assessment (HRA) will describe International sites in more detail, including overview of the site assemblages.	HRA Report
		Baseline section should incorporate references to Wales Natural Environment Framework (NEF).	Environmental baseline – biodiversity, flora and fauna section includes references to Wales NEF where relevant.	S2.5.3

Organisation consulted	Subject / issue	Comment/s	Response	Report section ref.
CCW	Environmental baseline.	Reference to the Habitats Directive in the context of water management.	Included.	S2.5.5
		Suggest baseline – material assets section makes reference to potential impacts of storm surges (increased magnitude and frequency).	Included.	S2.5.7
		Suggest some reference needs to be made to soils / soil function compromised by diffuse air pollution, as well as by point source and diffuse and agricultural pollution.	This has been considered within the review of the environmental baseline – soils and contaminated land, although it is considered that FCERM will not be a significant contributor to diffuse air pollution of soils.	S2.5.4
	Additions / amendments to plans, policies and programmes to be considered.	<p>Recommend the addition / amendment of the following documents to the policies, plans and programmes review:</p> <ul style="list-style-type: none"> <li>• WRMPs for United Utilities and Severn Trent</li> <li>• Relevant Shoreline Management Plans</li> <li>• The Habitats Directive 92/42/EEC</li> <li>• The Birds Directive 2009/47/EC</li> <li>• The Bern Convention</li> <li>• Salmon Action Plans and Eel Management Plans</li> <li>• National FCERM Strategy for England</li> <li>• The Flood Directive 2007/60/EC</li> <li>• Wales Transport Plan</li> <li>• Register of Landscapes of Historic Importance</li> <li>• Relevant development plans in Wales, including cross border LDFs</li> <li>• 1996 version of TAN5 has been replaced by 2009 version</li> <li>• Recent update to Conservation of Habitats and Species Regulations 2011</li> <li>• 2010 version of Planning Policy Wales which includes increased consideration of climate change and planning for climate change impacts.</li> </ul>	<p>The additions / amendments to the policies, plans and programmes review have been made, unless specifically mentioned below.</p> <p>Individual development plans / LDFs have not been reviewed as, given the national basis of the strategy, it is not considered appropriate to review plans down to this local level of detail.</p>	Table in Appendix 2

Organisation consulted	Subject / issue	Comment/s	Response	Report section ref.
CCW	Consideration of additional, or changes to proposed assessment criteria.	Suggested an additional criterion be inserted in respect of wider biodiversity issues, not just those for 'protected and priority habitats and species'.	The existing criterion has been amended to include important as well as protected and priority habitats and species, to reflect that the assessment criterion does not focus solely on the statutorily protected sites or species. Furthermore, it is considered that the assessment criterion: ' <i>Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?</i> ' represents wider biodiversity and the ecosystem functioning / connectivity that underpins it, rather than simply the protection of protected habitats / species in isolation.	S3.3
		Additional criterion be added in respect of maintaining and enhancing regional distinctiveness in landscapes.	An additional assessment criterion has been added to reflect this comment.	S3.3
		Assessment criterion for water should include proactive consideration to maintain and improve both water quality and quantity. An additional criterion in respect of maintaining and enhancing water environment function would also be welcomed.	The existing assessment criterion has been amended to be more specific, taking into account this comment. An additional assessment criterion has been added in relation to the functioning of the water environment / working with natural processes.	S3.3
Environment Agency Wales	Consideration of additional, or changes to proposed assessment criteria.	Recommended that the impacts of disposing of waste or using waste in construction operations should be considered as part of the assessment and therefore included as an assessment criterion/ environmental topic (suggestions for criteria included).	This environmental topic (and therefore assessment criteria) have not been scoped in to the assessment. Although lower-tier strategies, and FCERM projects will generate waste streams, their contribution to the overall generation of waste in Wales is minor, therefore on a national basis is not considered significant enough to merit assessment at this national level. However, the 'waste' environmental discipline should not be discounted from lower-tier strategies, plans or projects, where regional or local air quality issues may occur, and must therefore be considered as part of the SEA / EIA process at that level.	N/A
		'The protection and improvement of the water environment' appears to relate to water quality only. Water quantity should be included in assessment criteria generally, and specifically with respect to the assessment of potential increases in saline intrusion.	Existing assessment criterion amended to be more specific, taking water quantity and quality into account. Saline intrusion considered too specific an issue to merit its own assessment criterion at this national scale, but is still addressed as part of the assessment.	S3.3 s2.5.5

Organisation consulted	Subject / issue	Comment/s	Response	Report section ref.
Environment Agency Wales	Consideration of additional, or changes to proposed assessment criteria.	A further assessment criterion should be added to cover effects on existing natural coastal processes, and the protection of new assets from the impacts of coastal processes.	A specific assessment criterion for natural <u>coastal</u> processes has not been added; however, a more generic additional assessment criterion for natural hydromorphological processes (therefore covering both inland and coastal waters) has been added under the 'water' environmental discipline.	s3.3
		A further assessment criterion should be added to include the protection of new assets from the impacts of coastal processes.	The existing 'material assets' assessment criterion has been amended to reflect new and existing assets; this criterion is considered to include protection from coastal processes, since the strategy consider both flood and coastal erosion risk. As per the response above, an assessment criterion has been included within the 'water' environmental topic in relation to working with natural processes, but kept generic so as to be applicable to both inland and coastal waters.	s3.3
	Scoping of environmental issues or strategy elements in the SEA.	Prefer 'raising awareness and engaging people' to be scoped in, but if it is not, then clear justification would be helpful.	This element of the strategy has not been scoped in to the assessment. While it is acknowledged that awareness and engagement activities will have associated travel and therefore associated CO <sub>2</sub> emissions, involve use of resources and disposal of materials, the associated volumes and quantities are not significant enough to justify assessment as part of this SEA. It is maintained that significant environmental effects will not arise from this element of the strategy, therefore this element remains outside the scope of the assessment.	N/A
		Prefer for 'air' to be scoped in (for example construction and repairs of flood defences could have adverse impact on air quality); but if it is not, then clear justification of its removal provided. If the topic can be scoped out, we would expect any SEAs or EIAs to plans or projects emerging from the National Strategy to consider assessing impacts on air quality.	This has been considered, but it was determined that the National FCERM Strategy will not contribute to significant impacts on air quality, and has therefore remained scoped out of the assessment. Acknowledged that FCERM activity can potentially result in impacts on air quality (e.g. construction / repairs of flood defences may generate air emissions / dust), but this is a local issue and therefore best addressed at this local level. The 'air quality' environmental discipline should therefore not be discounted from lower-tier strategies, plans or projects, where local air quality issues may occur, and must therefore be considered as part of the SEA / EIA process at that level.	N/A
		Consider the impacts of disposal of waste, and potential to re-use waste as part of flood risk management activities or during or after flood events.	These issues have not been scoped in to the assessment because they are not considered significant at a national scale.	N/A

Organisation consulted	Subject / issue	Comment/s	Response	Report section ref.
Environment Agency Wales	Additions / amendments to plans, policies and programmes to be considered.	<p>Recommend the addition / amendment of the following documents to the policies, plans and programmes review:</p> <ul style="list-style-type: none"> <li>• Updated version of TAN5 nature Conservation and Planning (2009) – amend to reflect update.</li> <li>• WAG Natural Environment Framework: ‘A Living Wales – a new framework for our environment, our countryside and our seas’</li> <li>• Include reference to Environment Agency document Groundwater Protection: Policy and Practice (GP3).</li> <li>• Add the ‘Low Carbon Evolution – the Welsh Assembly Government (WAG) Energy Policy Statement (March 2010).</li> <li>• Add the Air Quality (Wales) Regulations (2000).</li> <li>• Add WAG’s policy, ‘Economic Renewal: a new direction’ (July 2010).</li> <li>• Reference to ‘Wales, a Better Country’ removed and reference to ‘One Wales’ retained.</li> <li>• SEA should take into account that a new government’s strategic agenda is likely to emerge post May 2011.</li> <li>• Planning Policy Wales update in 2010.</li> <li>• ‘Towards Zero Waste’ no longer in consultation – amend to reflect full title of published document.</li> <li>• Include ‘One Wales, One Planet: A new Sustainable Development Scheme for Wales’ (2009), and ‘Our Healthy Future’ WAG, 2009.</li> <li>• Include updated version of ‘Creating Sustainable Places’ if published when finalising the environmental report.</li> <li>• Include ‘Wales Fisheries Strategy’ (2008).</li> </ul>	<p>The additions / amendments to the policies, plans and programmes review have been made, unless specifically mentioned below.</p> <p>The SEA ER has been issued for consultation on 10 May 2011, prior to a new strategic agenda emerging.</p> <p>The SEA ER has been issued for consultation on 10 May 2011, prior to the updated version being published.</p>	Table in Appendix 2

Organisation consulted	Subject / issue	Comment/s	Response	Report section ref.
Environment Agency Wales	Assessment of cumulative effects	Cumulative and in-combination effects of the National Strategy should be assessed.	Assessment of cumulative impacts of the National FCERM Strategy has been included within the assessment.	S4.3
		SEA should assess whether any measures taken to manage flood and coastal erosion risk could have a cumulative effect with other major plans or projects; recommend consult Infrastructure Planning Committee website for any planned Nationally Significant Infrastructure Projects; should consider the in-combination effects with the Marine Plan 'Sustainable Development for Welsh Seas: Our Approach to Marine Planning in Wales', WAG, 2011.	Assessment of cumulative impacts of the National Strategy with other major plans or projects has been included within the assessment, the IPC website was consulted to inform this assessment, and the Marine Plan has also been considered. Given that the National FCERM Strategy doesn't have spatial basis, the cumulative assessment has been focused at the national scale. However, lower-tier plans and project will need to consider potential cumulative impacts at the regional or local level.	S4.3
	Inclusion of particular environmental issues within the assessment.	The SEA should assess the effects of activities that could worsen the extent of saline intrusion.	Considered within assessment of effects on water.	S4.2.4
		Consideration of how coastal processes such as coastal erosion may have an effect on or may be affected by the National Strategy.	Considered within assessment of effects on water.	S4.2.4

## Appendix 2: List of Policies, Plans, Programmes and Legislation considered

Category of Policy / Plan / Programme	Policies, plans, programmes, legislation of relevance
Water and flood risk management	<ul style="list-style-type: none"> <li>• River Basin Management Plans (Western Wales; Severn; Dee)</li> <li>• Technical Advice Note TAN15: Development and Flood Risk 2004</li> <li>• The Flood Directive 2007/60/EC</li> <li>• National FCERM Strategy for England</li> <li>• Catchment Flood Management Plans (various)</li> <li>• DCWW Surface Water Management Strategy</li> <li>• DCWW Water Resources Management Plan and Drought Management Plan</li> <li>• United Utilities / Severn Trent Water Resources Management Plans</li> <li>• Catchment Abstraction Management Strategies (CAMS) (various)</li> <li>• Water for People and the Environment: Water Resources Strategy for Wales</li> <li>• The Water Supply (Water Quality) Regulations / Water Act / Water Resources Act / Water Resources Regulations / Drinking Water Directive / Water Industry Act / Groundwater Regulations / Bathing Waters Regulations / Surface Waters Regulations / Protection of Water Against Agricultural Nitrate Pollution Regulations / Urban Wastewater Treatment Regulations</li> <li>• Water for People and the Environment – developing a water resources strategy for England and Wales 2007</li> <li>• Land Drainage Act / Land Drainage EIA regulations</li> <li>• EA Policy: Sustainable Urban Drainage Systems</li> <li>• EA Catchment Flood Management Plans – Wales</li> <li>• Eutrophication Strategy</li> <li>• Environment Agency, Groundwater Protection: Policy and Practice (GP3).</li> <li>• Water Framework Directive / Water Environment (WFD) Regulations</li> <li>• Groundwater Directive / Bathing Water Directive 2006 / Surface Water Abstraction Directive / Directive on the assessment and management of flood risks 2007 / Nitrates Directive 1991 / Freshwater Directive.</li> </ul>
Marine and Coastal	<ul style="list-style-type: none"> <li>• Shoreline Management Plans (various)</li> <li>• Technical Advice Note TAN14 – Coastal Planning 1998</li> <li>• Sustainable development for Welsh seas: Our approach to marine planning in Wales (consultation)</li> <li>• Making the Most of Wales' Coast – the Integrated Coastal Zone Management Strategy for Wales.</li> <li>• Welsh Coastal Tourism Strategy – Interim Report (2006)</li> <li>• WAG Natural Environment Framework: 'A Living Wales – a new framework for our environment, our countryside and our seas'</li> <li>• Cleaner Coasts, Healthier Seas: Working for a better marine environment 2005-2011</li> <li>• Wales Fisheries Strategy (2008)</li> <li>• The Scallop Fishery (Wales) Order 2010</li> <li>• Our seas – a shared resource – High level marine objectives</li> <li>• Site selection guidance for Highly Protected Marine Conservation Zones (consultation)</li> <li>• Marine and Coastal Access Bill 2009</li> <li>• Coast Protection Act</li> <li>• UK Marine Bill Consultation Document (Defra, 2006)</li> <li>• UK Marine Policy Statement (consultation)</li> <li>• Marine and Coastal Access Act</li> <li>• Coastal Protection (Notices) (Wales) Regulations</li> <li>• Coastal Squeeze. Implications for Flood management. The requirements of the European Birds and Habitats Directive.</li> <li>• Bathing Waters Directive / Regulations</li> <li>• European Marine Strategy Framework Directive</li> </ul>

Category of Policy / Plan / Programme	Policies, plans, programmes, legislation of relevance
Biodiversity and conservation	<ul style="list-style-type: none"> <li>• TAN 5: Nature Conservation and Planning 2009</li> <li>• Consultation on Draft Revised Technical Advice Note 5 'Nature Conservation And Planning' 2006</li> <li>• Salmon Action Plans (various); National Trout and Grayling Strategy.</li> <li>• CCW – A Better Wales: The Natural Environment of Wales in 2010</li> <li>• The State of the Welsh Environment Report</li> <li>• Environment Strategy for Wales</li> <li>• WAG Natural Environment Framework: 'A Living Wales – a new framework for our environment, our countryside and our seas'</li> <li>• CCW – Priority Habitats of Wales 2003; Wales Biodiversity Framework 2007</li> <li>• The Eels (England and Wales) Regulations 2009 / Eel Management Plans / EC Regulation 1100/2007</li> <li>• Wildlife &amp; Countryside Act 1981 (as amended) / Environment Act 1995 / NERC Act 2006 / Countryside and Rights of Way Act 2000 / Salmon and Freshwater Fisheries Act 1975 / Conservation of Habitats and Species Regulations 2010 / Conservation of Habitats and Species (Amendment) Regulations 2011</li> <li>• UK Biodiversity Action Plan – UK BAP 1994</li> <li>• Natural Environment and Rural Communities Act 2006</li> <li>• A Better Environment, Healthier Fisheries: Better Fisheries for our nations 2006-2011</li> <li>• EU Biodiversity Strategy 1998</li> <li>• Water Framework Directive / Water Environment Regulations</li> <li>• Freshwater Fish Directive / EU Birds Directive 2009/47/EC / EU Habitats Directive 92/42/EEC / Ramsar Convention on wetlands of international importance 1971 / Bonn Convention 1979 / Bern Convention 1979 / Rio Convention 1992</li> </ul>
Soils, Contaminated land and Geology	<ul style="list-style-type: none"> <li>• Food for Wales, Food from Wales 2010-2020</li> <li>• Contaminated Land (Wales) Regulations.</li> <li>• Proposed Welsh Soils Action Plan (consultation 2008)</li> <li>• National Trust: Soil Protection Strategy</li> <li>• National Trust: Geological Policy</li> <li>• Environmental Protection Act (part 2A Contaminated Land Regime)</li> <li>• SuRF-UK: A Framework for Assessing the Sustainability of Soil and Groundwater Remediation</li> <li>• EA – Soil: a precious resource – our strategy for protecting, managing and restoring soil</li> <li>• Environmental Damage (Prevention and Remediation) Regulations</li> <li>• Remediation of Contaminated Land 2001</li> <li>• Earth Science Conservation in Great Britain: A Strategy 1990</li> <li>• Wildlife and Countryside Act 1981 (as amended)</li> <li>• Environmental Liability Directive 2004</li> <li>• EU Soil Thematic Strategy 2006 (Directive not progressed)</li> <li>• European Soil Charter 2003 / World Soil Charter 1982.</li> </ul>

Category of Policy / Plan / Programme	Policies, plans, programmes, legislation of relevance
Climate / climatic factors	<ul style="list-style-type: none"> <li>• Climate Change Strategy for Wales</li> <li>• Wales Changing Climate, Challenging Choices: The impacts of climate change in Wales from 2000 to 2080</li> <li>• Energy Wales – Route Map: Consultation Document (2005)</li> <li>• Low Carbon Evolution – the Welsh Assembly Government (WAG) Energy Policy Statement (March 2010).</li> <li>• Climate Change Act 2008</li> <li>• Building resilience to climate change: Approach to exercising powers to issue guidance and directions under Part 4 of the Climate Change Act 2008</li> <li>• Climate Change: The UK Programme 2006</li> <li>• Planning Policy Wales 2010</li> <li>• Our Energy Future – Creating a Low Carbon Economy</li> <li>• The Stern Review on the Economics of Climate Change (2006).</li> <li>• Environment 2010: Our Future, Our Choice – EU Sixth Environment Action Programme 2002</li> <li>• Kyoto Protocol on Climate Change 1997</li> <li>• EU Clean Air for Europe Programme (CAFÉ) 2001 / EU Climate Change Programme / Convention on Long Range Transboundary Air Pollution 1979 / Air Quality (Wales) Regulations (2000)..</li> </ul>
Economy and sustainable development	<ul style="list-style-type: none"> <li>• Technical Advice Note (TAN) 6 – Planning for Sustainable Rural Communities 2010</li> <li>• TAN 4: Retailing and Town Centres 1996</li> <li>• TAN 8: Renewable Energy 2005</li> <li>• TAN 13: Tourism 1997</li> <li>• TAN 22: Sustainable Buildings 2010</li> <li>• A Winning Wales: The National Economic Development Strategy of the Welsh Assembly Government</li> <li>• WAG Policy, ‘Economic Renewal: a new direction’ (July 2010)</li> <li>• Ministerial Interim Planning Policy Statement Planning for Sustainable Buildings</li> <li>• One Wales: One Planet: A new Sustainable Development Scheme for Wales’ (2009)</li> <li>• Wales: A Vibrant Economy 2005</li> <li>• People, Places and Futures- The Wales Spatial Plan (2004) and update (2008)</li> <li>• Ministerial Interim Planning Policy Statement – Planning for Retailing and Town Centres</li> <li>• WDA - Learning to work differently: Sustainable Development</li> <li>• Our Energy Future – Creating a Low Carbon Economy White Paper 2003</li> <li>• One future: different paths – UK Shared Framework for Sustainable Development 2005</li> <li>• Securing the Future: Delivering the Sustainable Development Strategy 2005</li> <li>• Valuing our Environment: Economic Impact of the Environment of Wales 2003</li> <li>• Changing Patterns: UK Government Framework for Sustainable Consumption and Production</li> <li>• EU Sustainable Development Strategy 2006</li> <li>• EU Directive to promote Electricity from Renewable Energy</li> <li>• World Summit on Sustainable Development - Earth Summit leading to the Johannesburg Plan of Implementation 2002.</li> </ul>

Category of Policy / Plan / Programme	Policies, plans, programmes, legislation of relevance
Planning, transport and infrastructure (material assets)	<ul style="list-style-type: none"> <li>• TAN 2: Planning And Affordable Housing 2006</li> <li>• TAN 6 Agricultural and Rural Development 2000</li> <li>• TAN 18: Transport 2007</li> <li>• TAN 21: Waste 2001</li> <li>• Planning Policy Wales 2010</li> <li>• The Future of Transport – a Network for 2030 (some aspects cover Wales)</li> <li>• The Wales Transport Strategy: One Wales: Connecting the Nation</li> <li>• National Transport Plan, WAG, 2010</li> <li>• Ministerial Interim Planning Policy Statement Housing</li> <li>• Ministerial Interim Planning Policy Statement Planning for good design</li> <li>• Wise about waste – The National Waste Strategy for Wales 2002</li> <li>• Towards Zero Waste. One Wales: One Planet. The Overarching Waste Strategy Document for Wales, WAG, 2010</li> <li>• Mineral Planning Policy Wales (2000)</li> <li>• Minerals Technical Advice Note (MTAN) 1 - Aggregates 2004</li> <li>• Town and Country Planning Act / EIA Regulations.</li> <li>• Tir Gofal Agri-Environment Scheme 1999 / Glastir from 2012</li> <li>• Farming for the Future: A new direction for farming in Wales 2001</li> <li>• Woodland for Wales - WAG, 2001</li> <li>• Better Woodlands for a Better Wales - FCW, 2005</li> <li>• UK Forestry Standard: The Governments Approach to Sustainable Forestry - FC, 2004</li> <li>• EU Waste Framework Directive / EU Waste to Landfill Directive</li> <li>• European Commission White Paper on the European Transport Policy 2001.</li> </ul>
Population and human health	<ul style="list-style-type: none"> <li>• TAN 11 Noise 1997</li> <li>• TAN 16: Sport, Recreation and Open Space 2009</li> <li>• Achieving Our Potential 2006 - 2013: Tourism Strategy for Wales, Mid Term Review</li> <li>• Better Health, Better Wales</li> <li>• WAG - Race Equality Scheme 2005-2008</li> <li>• 'Iaith Pawb' Welsh Language strategy (Under review)</li> <li>• WAG -Health, social care and well-being strategies : policy guidance 2003</li> <li>• Improving Health in Wales: A Plan for the NHS with its Partners 2001</li> <li>• Our Healthy Future, WAG 2009</li> <li>• Walking and Cycling Strategy for Wales 2003</li> <li>• The Strategy for Older People in Wales 2003</li> <li>• WAG - Community First Guidance 2001</li> <li>• Beyond Boundaries: Citizen-Centred Local Services for Wales 2006</li> <li>• Well Being in Wales (Consultation document WAG 2003) / Health Challenge Wales / Designed for Life 2005 / Climbing Higher: The Welsh Assembly Government Strategy for Sport &amp; Physical Activity 2005 / Healthy and Active Lifestyles in Wales: A Framework for Action 2002</li> <li>• Sustainable Development Action Plan / Starting to Live Differently – The Sustainable Development Scheme 2004</li> <li>• Creating Sustainable Places 2005</li> <li>• Building a future for Wales – A Strategy for Sustainable Housing 2005</li> <li>• National Parks and Access to the Countryside Act</li> <li>• Fair Society, Healthy Lives: The Marmot Review</li> <li>• Securing the Future: Delivering the Sustainable Development Strategy</li> <li>• EA – A Better Place to Play, The Environment Agency's Strategy for water-related sport and recreation 2006-2011</li> <li>• British Waterways - Waterways Access for All – 2003 / Waterways for Wales (2003) Consultation Draft</li> <li>• EU Noise Directive.</li> </ul>

Category of Policy / Plan / Programme	Policies, plans, programmes, legislation of relevance
Cultural Heritage	<ul style="list-style-type: none"> <li>• The Welsh Historic Environment Strategic Statement: Action Plan</li> <li>• Creative Future - A Culture Strategy for Wales 2002</li> <li>• CCW Seas, Shores and Coastal Areas: Maritime policy 1996</li> <li>• Planning Policy Wales, Edition 3, July 2010</li> <li>• Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology</li> <li>• Welsh Office Circular 61/96 Planning and the Historic Environment: Historic Buildings and Conservation</li> <li>• Welsh Office Circular 1/98 Planning and the historic environment: directions by the Secretary of State for Wales</li> <li>• 2004 Green Paper Review of Heritage Protection: The Way Forward and the recent White Paper Heritage Protection for the 21st Century</li> <li>• Draft Heritage Protection Bill (shelved)</li> <li>• Planning (Listed Buildings and Conservation Areas) Act 1990</li> <li>• Ancient Monuments and Archaeological Areas Act 1979</li> <li>• The Historic Buildings and Ancient Monuments Act 1953</li> <li>• Ancient Monuments and Archaeological Areas Act 1979</li> <li>• Protection of Wrecks Act 1973</li> <li>• The Merchant Shipping Act 1995</li> <li>• National Heritage Act 2002 (section 3 extends to Wales)</li> <li>• UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage 1972 / Athens Charter 1931/ Venice Charter 1964 / Charter for the Conservation of Historic Towns and Urban Areas 1987 / Charter for the Protection of and Management of Archaeological Heritage 1990 / Charter on the Protection and Management of Underwater Cultural Heritage 1996 / Florence Charter 1981</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• AONB Management Plans / National Park Management Plans (various)</li> <li>• CCW - National Park Management Plans Guidance 2007</li> <li>• WAG - Working Together for Wales 2007</li> <li>• Rural development plan for Wales 2007-2013</li> <li>• Landscape Character Map for Wales</li> <li>• Register of Landscapes of Historic Importance</li> <li>• National Parks and Access to the Countryside Act 1949</li> <li>• Countryside and Rights of Way Act 2000</li> <li>• Countryside Access Regulations</li> <li>• The European Landscape Convention 2004</li> <li>• UNESCO - World Heritage Convention 1972</li> </ul>

## **Appendix 3 Assessment Tables (A1 to A4): Assessment of actions proposed in the National FCERM Strategy and ‘Do nothing’ scenario**

The list of actions that National FCERM Strategy proposes to set in place to manage flood and coastal erosion risk is described in a greater level of detail within section 3 of the National Strategy (Flood Risk Management Objectives).

This list was reviewed as part of the SEA scoping process and only those actions considered likely to lead to significant (positive / negative) effects on the environment were assessed in detail. The list of actions considered is set out in section 2.3 of this report.

For those strategy elements likely to have significant environmental effects a series of completed action assessment tables are presented, in Tables A1 to A3, below. The tables present each of the proposed actions against the assessment criteria for each of the SEA environmental topics. A judgement is made for each action on whether it is likely to lead to significant environmental effects, adverse or beneficial, and allocates within the table the level of significance, with associated colour coding, as follows:

	Significant positive.
	Not significant / neutral
	Significant negative.

For further detailed description of how definitions of the significance of effects are defined, refer to section 3.2 of the main report.

In the final column of the tables, opportunities to mitigate any adverse effects, and potential enhancements that can contribute to maximising positive effects are described.

A separate assessment of an alternative scenario, assessing the significant environmental effects of ‘Do nothing’, i.e. if no flood and coastal erosion management (including the strategy elements, actions and measures proposed as part of the National FCERM Strategy) is presented in Table A4.

**Tables A1 to A3 Assessment of significant environmental effects of the draft National FCERM Strategy**

<b>TABLE A1: Strategy Objective / Element: Reducing the impacts</b> on individuals, communities and businesses from flooding and coastal erosion				
<b>Composition of Strategy Objective / Element:</b> Reducing the impacts will involve managing both the frequency and consequences of flood and coastal erosion events. This requires detailed understanding of the specific risks and impacts of climate change on them. Consider alternatives to flood defences and drainage systems such as improving community resilience, making buildings more resilient to flooding, enhancing emergency response and support of managing catchment run off better.				
<b>Outputs / Methods to Deliver Strategy Objective / Element:</b> In all cases, the Risk Management Authorities and others will work together to determine a management plan. Actions included under this element are issues in relation to planning policy, Local Development Plans and strategic policy. This element also includes plans for building and maintaining defences and repairing damage and increasing resilience to flooding through amendments to building regulations.				
<b>Environmental topic</b>	<b>Assessment criteria <i>Does the proposed objective...</i></b>	<b>Description of Effect</b>	<b>Significance of Effect</b>	<b>Mitigation / Enhancement</b>
Population and human health	<ul style="list-style-type: none"> <li>Improve and enhance the health and wellbeing of communities?</li> <li>Reduce inequality and social deprivation?</li> </ul>	<p>Communities with higher resilience and improved emergency response will result in significant beneficial effects on communities, in terms of improved wellbeing, reducing stress of flood events. Areas of deprivation and social inequality are sectors of communities most vulnerable to flood risk and least able to cope with the consequences of flooding, therefore improved resilience can have significant benefits. Work on planning policy will ensure that inappropriate development is not sited within the floodplain, placing future communities at risk.</p>		<p>Risk management authorities should focus on development of understanding of the vulnerabilities and social inequalities of communities affected, to take into account the most vulnerable and those least able to deal with consequences of flooding.</p> <p>Where plans for building new defences, this can provide opportunities to provide enhancements that benefit the health and wellbeing of communities such as improvements to recreation and access to waterside environments. Such enhancement measures should be informed by an understanding of the key determinants of health and wellbeing within the local community.</p>
Biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?</li> <li>Conserve, and where possible enhance important, protected and priority habitats and species?</li> </ul>	<p>Actions to improve resilience and emergency response will not have a significant impact on biodiversity.</p> <p>Avoiding inappropriate development in flood risk and coastal erosion areas, can benefit areas of high conservation value (designated sites) and will help to protect natural process and conserve habitats and species. Avoiding inappropriate development may not deliver biodiversity enhancement but allow improvements to happen / opportunities to be realised.</p> <p>Building and maintaining defences and repairing damage could have adverse impact on biodiversity, although this depends on the nature of what is proposed. Traditional hard-engineered defences can result in reduction / fragmentation / reduction in quality of valuable habitat along river corridors and in the coastal zone. Alternative solutions to traditional flood defences, e.g. catchment management, realigned defences may result in biodiversity benefits through working with natural processes, habitat gain.</p> <p>Managing catchment run off better can benefit biodiversity as SuDS features can have biodiversity enhancement included in their design.</p>		<p>Solutions that work with natural processes or have biodiversity benefits integrated into them should be prioritised.</p> <p>Potential synergies between FCERM solutions and WFD measures should be identified to enable solutions to contribute to improving ecological status of water bodies.</p> <p>Regional habitat creation programmes provide cost effective means of offsetting overall impacts of FCERM on biodiversity where not possible to fully mitigate effects locally.</p> <p>Consideration of alternative funding streams, and working closely with others (e.g. conservation bodies, wildlife trusts / organisations) when developing FCERM solutions, in order to continue to deliver sympathetic solutions / wider biodiversity gain.</p> <p>Introduction of Sustainable Drainage Systems SuDS into new or existing development should offer further opportunities for both water quality improvements and biodiversity enhancements.</p>
Soil and contaminated land	<ul style="list-style-type: none"> <li>Protect and conserve soils and soil function, and increase resilience to degradation?</li> <li>Reduce the risk to waters from diffuse pollution?</li> </ul>	<p>Actions to improve resilience and emergency response will not have a significant impact on soils or contaminated land.</p> <p>Avoiding inappropriate development in the flood plain could help to protect soil function i.e. contribute to maintaining buffer areas along river corridors, not increasing impervious areas adjacent to water bodies.</p> <p>Building and maintaining defences and drainage systems would help to prevent erosion and diffuse run off. Managing catchment run off better and innovative land management solutions will help reduce potential erosion of soils, release of contaminants, and therefore contribute to reducing diffuse pollution.</p> <p>Solutions that involve setting back of defences, or reduced flood risk management in agricultural areas likely to result in increased frequency in inundation, potentially meaning reduced protection of soils / soil function in some areas.</p>		<p>Taking account of location of contaminated land during development of FCERM solutions.</p> <p>FCERM solutions and intervention may provide opportunities for key parties to work together to remediate contaminated land and bring land that has already been contaminated back into use.</p> <p>Promotion of use of land management to slow down the flow of water from the land, will contribute to improved soil function, reduced soil erosion and reduce diffuse pollution, which will also help contribute to WFD objectives for water quality and ecological status.</p> <p>Linking land management solutions to agri-environment / woodland management schemes may provide incentives for land owners to adopt the necessary measures, benefiting both flood risk management and soils / soil function / diffuse pollution.</p>
Water	<ul style="list-style-type: none"> <li>Protect and improve the water environment, in terms of water quality and quantity, for the</li> </ul>	<p>Actions to improve resilience and emergency response are not likely to have significant impacts on the water environment, although benefits may arise where the focus of resilience is on potentially</p>		<p>Establishing links with WFD objectives to maximise the benefits to the water environment. Should be established by the risk management authorities and partners, through reference to the relevant RBMPs in</p>

	<p>benefit of the human and/or natural environment?</p> <ul style="list-style-type: none"> <li>Maintain and enhance hydromorphological function of the water environment by working with natural processes?</li> </ul>	<p>polluting sites, e.g. wastewater treatment works.</p> <p>Avoiding inappropriate development in flood risk areas will help protect the water environment, helping to improve hydromorphological function and benefit water quality. For example, reduced pollution by maintaining buffer areas along river corridors, not increasing impervious areas adjacent to water bodies, which would also facilitate natural connectivity.</p> <p>The contribution of building and maintaining defences and drainage systems to protect and improve the water environment, will depend on the nature of the solutions and the geographic area / sensitivity of the water bodies affected. Management of catchment run off better is likely to have a beneficial impact on the water environment.</p> <p>Due to uncertainties at this national scale, and the range of different effects (beneficial / adverse), ascribed as neutral.</p>		<p>Wales, and their supporting annexes.</p> <p>Consider potential for conflicts between different water bodies and their objectives.</p> <p>When developing FCERM solutions, the options and opportunities for working with natural processes, both in catchment and coastal context, should be considered, which will maximise to potential for hydromorphological improvements.</p> <p>Innovative catchment or land management-based solutions should be promoted. Could be progressed through linkages with land management initiatives, such as agri-environment or woodland management schemes, which may provide incentives for land owners to adopt necessary measures.</p>
Climatic factors	<ul style="list-style-type: none"> <li>Contribute to the mitigation of factors contributing to climate change?</li> <li>Contribute to the country's ability to adapt to climate change?</li> </ul>	<p>By developing a management plan for reducing the impacts, and coping with the consequences of flooding (and coastal erosion), which is predicted to increase over time due to climate change, this will result in a significant contribution to Wales' ability to adapt to climate change and its effects.</p> <p>Actions to improve resilience and emergency response will contribute to climate change adaptation. Avoiding inappropriate siting of developments within the flood plain and implementing sustainable drainage, will ensure that long term plans for development, and their supporting drainage infrastructure, can make a significant contribution to adapting to climate change. It will be possible to design infrastructure that can accommodate increased rainfall / storm events exacerbated by climate change, and is likely to be put under increased pressure for increased development, particularly in urban areas. Overall therefore significant positive. Opportunities to contribute to mitigation are however limited.</p>		<p>Adopting solutions that work with natural processes such as wetland creation / woodland planting, can provide carbon sequestration and contribute to mitigating climate change factors, and also benefit natural systems in adapting to effects of climate change.</p> <p>Steps can be taken, such as re-use of materials, minimising transport, to minimise associated greenhouse gas emissions where traditional 'hard' engineering solutions are adopted.</p> <p>Future development and infrastructure (including FCERM solutions) will need to be designed to accommodate increased rainfall / storm events exacerbated by climate change.</p> <p>Use of SuDS will help to ensure that local environments are adapted to coping with the more intense rainfall events anticipated as a result of climate change.</p> <p>Land use planning system should integrate climate change policy aims.</p> <p>Consideration to whether FCERM measures can contribute to adapting to other effects of climate change, e.g. effect on a river of low flows / contributing to reducing urban heat island effects.</p>
Material assets	<ul style="list-style-type: none"> <li>Conserve and protect important new and existing material assets and infrastructure?</li> <li>Conserve and protect the best and most productive agricultural land?</li> </ul>	<p>Increasing resilience and improved post-flood recovery has potential to assist in the reducing the adverse effect / consequences of flooding on important infrastructure. However, these measures may not necessarily provide full protection / conservation of important infrastructure / material assets; hence potential beneficial effects, but considered not significant.</p> <p>Siting development outside the floodplain will help ensure that new and future assets are protected, and may help to conserve agricultural land within the floodplain in rural areas.</p> <p>Managing catchment run off better may help conserve existing infrastructure (although uncertainty to the level of protection this will provide), and may also help contribute to conserve / protect agricultural land.</p>		<p>Take into account long term influences such as climate change, and other influences such as development pressure and land use change, e.g. increased storminess / storm surges, increased river flows, greater pressure on existing drainage systems.</p> <p>Future investment decisions should reflect a sustainable development approach, including wider social costs and benefits as well as specific consideration of risk to life and environmental impacts.</p> <p>Linking alternative land-management based FCERM measures focused on reducing catchment run-off with agri-environment schemes.</p>
Cultural Heritage	<ul style="list-style-type: none"> <li>Conserve, and where possible enhance, protected and important cultural heritage assets?</li> </ul>	<p>Improving resilience and emergency response, and managing catchment run off will not have a significant impact on cultural heritage assets, although improved resilience could result in some benefits, e.g. where applied to listed structures / buildings.</p> <p>Building and maintaining defences and repairing damage could have an impact on, or present conflict with the conservation of cultural heritage assets (e.g. bridges, weirs) and this will need to be assessed at the project level.</p> <p>It is not possible to say if this will have a significant impact at this strategic level, therefore neutral.</p>		<p>Particular attention should be given to the sensitive design of FCERM measures that directly affect historic assets or their setting, the development of specific mitigation for the protection / conservation of cultural heritage assets will need to be considered at the project level.</p> <p>Approaches that work with natural processes may help to manage flood risk in a way that is less damaging to the historic environment. Implementation of resilience measures can also potentially be applied to heritage assets. Any specific design requirements taking into account the sensitivity of the features affected will need to be considered.</p> <p>In the case of coastal erosion, preservation of sites by recording them</p>

				before they are lost might be the only realistic option in some instances.
Landscape	<ul style="list-style-type: none"> <li>• Ensure the landscape character of Wales is conserved and, where possible, enhanced?</li> <li>• Maintain and enhance regional distinctiveness in landscapes?</li> </ul>	<p>Improving resilience and emergency response will not have a significant impact on landscape character. Potential for some conflicts in sensitive locations, e.g. conservation areas.</p> <p>Managing catchment run off, building and maintaining defences and repairing damage could have an adverse impact on landscape character. However, some interventions such as catchment runoff management, e.g. tree planting, may present opportunities for enhancing landscape character. Not however possible to say if this will have a significant impact at this strategic level.</p>		<p>Promoting solutions that work with natural processes, minimise damage to the environment and seek to provide environmental benefits are all consistent with minimising adverse effects on the landscape.</p> <p>Particular attention required where FCERM interventions lie within or within the vicinity of the designated landscapes in Wales, including AONBs / National Parks / Heritage Coast / Special Landscape Areas.</p> <p>Where improving resilience in sensitive landscape settings, e.g. AONBs, conservation areas, consider sensitive / sympathetic design of proposed resilience measures.</p>

<b>TABLE A2: Strategy Objective / Element: Providing an effective and sustained response to flood and coastal erosion events</b>				
<b>Composition of Strategy Objective / Element:</b> Will consider short term clean up and long term support for communities affected by flooding. Where properties are affected, alternative accommodation may be required; if significant damage has been caused to local services, transport infrastructure and the physical and natural environment, recovery can take months or years. Support and engagement will be required throughout this period.				
<b>Outputs / Methods to Deliver Strategy Objective / Element:</b> Actions include research, emergency response planning, medical treatment, providing accommodation, insurance, resilience, evacuations, flood warnings, investigations, and recovery. The element also includes repairs to rivers / defences / drainage systems and continuity of services.				
<b>Environmental Topic</b>	<b>Assessment criteria Does the proposed objective...</b>	<b>Description of Effect</b>	<b>Significance of Effect</b>	<b>Mitigation / Enhancement</b>
Population and human health	<ul style="list-style-type: none"> <li>Improve and enhance the health and wellbeing of communities?</li> <li>Reduce inequality and social deprivation?</li> </ul>	Providing effective and sustained responses to flood events will also result in positive impacts on human health and wellbeing, due to quicker and more effective recovery.		Focus on development of understanding of the vulnerabilities and social inequalities of communities affected, to take into account the most vulnerable and those least able to deal with consequences of flooding.
Biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?</li> <li>Conserve, and where possible enhance important, protected and priority habitats and species?</li> </ul>	Supporting actions focus on advanced planning, research, improved resilience and response focused on communities affected by flooding. Impacts of this objective on biodiversity therefore not considered to result in significant effects for biodiversity, either positive or negative; therefore considered neutral.		Consideration of natural environmental aspects as part of plans for the clean-up and recovery process e.g. clean-up of areas at risk of polluting the aquatic environment / restoration of watercourses.
Soil and contaminated land	<ul style="list-style-type: none"> <li>Protect and conserve soils and soil function, and increase resilience to degradation?</li> <li>Reduce the risk to waters from diffuse pollution?</li> </ul>	Actions considered unlikely to result in significant effects on soils or soil function, either positive or negative. Improved, more efficient clean-up operations may have minor benefit of reducing diffuse pollution following flood events. Overall not significant / neutral.		Consideration of natural environmental aspects as part of plans for the clean-up and recovery process e.g. clean-up of areas at risk of causing diffuse pollution of the aquatic environment.
Water	<ul style="list-style-type: none"> <li>Protect and improve the water environment, in terms of water quality and quantity, for the benefit of the human and/or natural environment?</li> <li>Maintain and enhance hydromorphological function of the water environment by working with natural processes?</li> </ul>	<p>Actions considered not relevant / no effect in relation to morphological function of watercourses.</p> <p>Improved, more efficient clean-up operations, and improved resilience if / where applied to areas at risk of creating / contributing to pollution, potential for water quality benefits. However, uncertainty over this implementation.</p> <p>Overall therefore not significant / neutral.</p>		Consideration of protection / restoration of water bodies as part of the clean-up process, planning and resilience measures, e.g. focused flood resilience and clean-up of potentially polluting areas, such as wastewater treatment works, high risk diffuse pollution areas.
Climatic factors	<ul style="list-style-type: none"> <li>Contribute to the mitigation of factors contributing to climate change?</li> <li>Contribute to the country's ability to adapt to climate change?</li> </ul>	<p>Nature of actions supporting the objective mean limited capability to contribute to mitigation of factors contributing to climate change.</p> <p>The actions however will have beneficial effect on the country's ability to adapt to climate change, through advanced planning, improving resilience to flood inundation and the consequences, which would otherwise be exacerbated by climate change.</p> <p>Given limited ability to contribute to climate change mitigation, overall therefore considered not significant.</p>		Nature of actions mean limited capability to contribute to mitigation of factors contributing to climate change.
Material assets	<ul style="list-style-type: none"> <li>Conserve and protect important new and existing material assets and</li> </ul>	<p>Given the nature of the actions, considered limited ability to conserve important material assets.</p> <p>Actions not relevant / significant in terms of impacts on agricultural</p>		

	<p>infrastructure?</p> <ul style="list-style-type: none"> <li>Conserve and protect the best and most productive agricultural land?</li> </ul>	<p>land. Overall neutral.</p>		
Cultural Heritage	<ul style="list-style-type: none"> <li>Conserve, and where possible enhance, protected and important cultural heritage assets?</li> </ul>	<p>Actions will not conserve heritage assets, or lead to detrimental effect. Some potential benefit if / where resilience measures consider important heritage, such as listed structures / buildings. Overall neutral.</p>		<p>Where improving resilience, consider any specific, sensitive design requirements for heritage assets, listed structures etc. (and potential need for specific consent, such as listed building consent). Development of specific mitigation for the protection / conservation of cultural heritage assets will need to be considered at the project level.</p>
Landscape	<ul style="list-style-type: none"> <li>Ensure the landscape character of Wales is conserved and, where possible, enhanced?</li> <li>Maintain and enhance regional distinctiveness in landscapes?</li> </ul>	<p>Actions considered unlikely to result in landscape enhancements or detrimental effects. Clean-up operations / plans may help to conserve character, although not considered significant.</p>		<p>Consider sensitive / sympathetic design of proposed resilience measures where improving resilience in sensitive landscape settings, e.g. AONBs, conservation areas etc.</p>

**TABLE A3: Strategy Objective / Element: Prioritising investment** in the most at risk communities

**Composition of Strategy Objective / Element:** Considering investment options to take account of increased pressure on public finances in the future to make most effective use of the resources available, and ensuring protection for the areas at greatest risk from flooding and coastal erosion.

**Outputs / Methods to Deliver Strategy Objective / Element:** Actions include implementing a programme of improvement works in line with investment priorities.

Environmental Topic	Assessment criteria <i>Does the proposed objective...</i>	Description of Effect	Significance of Effect	Mitigation / Enhancement
Population and human health	<ul style="list-style-type: none"> <li>Improve and enhance the health and wellbeing of communities?</li> <li>Reduce inequality and social deprivation?</li> </ul>	<p>Communities at greatest risk protected from flooding and coastal erosion will result in significant beneficial effects on communities, in terms of improved wellbeing, reducing stress of flood events. Areas of deprivation and social inequality are sectors of communities most vulnerable to flood risk and least able to cope with the consequences of flooding, therefore improved prioritisation of protection can have significant benefits.</p>		<p>Consideration of areas of deprivation and social inequality / the most vulnerable communities to flood and coastal erosion risk as a critical component in the consideration of prioritisation of FCERM investment.</p> <p>Consideration of alternative means / funding sources for areas vulnerable to flood / coastal erosion risk, but do not meet the necessary criteria for prioritised investment.</p> <p>Where plans for building new defences / new FCERM intervention, this can provide opportunities to provide enhancements that benefit the health and wellbeing of communities such as improvements to recreation and access to waterside environments. Such enhancement measures should be informed by an understanding of the key determinants of health and wellbeing within the local community. Given pressure on FCERM funding, consider alternative funding sources / mechanisms for integrating wider recreational / access enhancement. For example, improved amenity, green space can potentially integrate with wider programmes or initiatives, such as Green Infrastructure.</p>
Biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?</li> <li>Conserve, and where possible enhance important, protected and priority habitats and species?</li> </ul>	<p>Prioritising of investment in light of increased pressure on public finances may result in lack of funding and therefore neglect of biodiversity issues, particularly wider biodiversity (beyond protected / priority sites / species).</p> <p>However, potential for adverse impacts depends on the nature of the solutions proposed, therefore uncertainty over significance of the effects. Traditional hard-engineered defences can result in reduction / fragmentation / reduction in quality of valuable habitat along river corridors and in the coastal zone.</p> <p>Some potential for positive effects, e.g. innovative solutions, working with natural processes may be potential alternative lower cost solutions that at the same time deliver biodiversity benefit, improve connectivity / functioning etc.</p> <p>Considered likely overall negative, although insufficient on balance to justify significant, therefore neutral.</p>		<p>Solutions that work with natural processes or have biodiversity benefits integrated into them should be prioritised.</p> <p>Potential synergies between FCERM solutions and WFD measures should be identified to enable solutions to contribute to improving ecological status of water bodies.</p> <p>Regional habitat creation programmes provide cost effective means of offsetting overall impacts of FCERM on biodiversity where not possible to fully mitigate effects locally.</p> <p>Consideration of alternative funding streams, and working closely with others (e.g. conservation bodies, wildlife trusts / organisations) when developing FCERM solutions, in order to continue to deliver sympathetic solutions / wider biodiversity gain.</p>
Soil and contaminated land	<ul style="list-style-type: none"> <li>Protect and conserve soils and soil function, and increase resilience to degradation?</li> <li>Reduce the risk to waters from diffuse pollution?</li> </ul>	<p>Potential benefits for the protection of soils and reduced risk of diffuse pollution (e.g. cut-off of contaminant pathways between contaminated land and watercourses), however if focused only on the highest risk / high priority investment areas, unlikely to be significant on a national scale.</p> <p>Depends on nature of solutions proposed, but focused investment on traditional solutions, in priority areas only may mean move away from catchment management approach, meaning less measures leading to improvements to soil function or reduction of rural diffuse pollution.</p> <p>Solutions involving setting back of defences, or reduced flood risk management in agricultural areas likely to result in increased frequency in inundation, potentially meaning reduced protection of soils / soil function in some areas.</p> <p>Overall therefore neutral, but likely to be a mixture of beneficial and adverse effects.</p>		<p>Taking account of location of contaminated land during development of FCERM solutions.</p> <p>FCERM solutions and intervention may also provide opportunities for key parties to work together to remediate contaminated land and bring land that has already been contaminated back into use.</p> <p>Promotion of use of land management to slow down the flow of water from the land, will contribute to improved soil function, reduced soil erosion and reduce diffuse pollution, which will also help contribute to WFD objectives for water quality and ecological status.</p> <p>Linking land management solutions to agri-environment / woodland management schemes may provide incentives for land owners to adopt the necessary measures, benefiting both flood risk management and soils / soil function / diffuse pollution.</p>
Water	<ul style="list-style-type: none"> <li>Protect and improve the water environment, in terms</li> </ul>	<p>Potential benefits for the water environment, in terms of water quality (e.g. cut-off of contaminant pathways, prevention of saline intrusion</p>		<p>Emphasis on the role of mitigation / influence of sensitive / natural solutions important in achieving positive benefits for water bodies,</p>

	<p>of water quality and quantity, for the benefit of the human and/or natural environment?</p> <ul style="list-style-type: none"> <li>Maintain and enhance hydromorphological function of the water environment by working with natural processes?</li> </ul>	<p>of important groundwater bodies on the coast) for the highest risk / high priority investment areas.</p> <p>However, could also mean conflict in terms of disruption to natural hydromorphological function, depending on the nature of solutions proposed.</p> <p>Overall therefore considered neutral, but likely to be a mixture of beneficial and adverse effects, the significance of which depends on the nature of solutions proposed.</p>		<p>particularly in relation to hydromorphology and WFD objectives.</p> <p>Links with WFD objectives to maximise the benefits to the water environment should be established through reference to the relevant RBMPs in Wales, and their supporting annexes.</p> <p>Consider potential for conflicts between different water bodies and their objectives.</p> <p>Emphasis on innovative, alternative solutions to traditional defences, seek to maximise opportunities to work with natural (coastal and catchment) processes and for hydromorphological improvements.</p> <p>Innovative catchment / land management solutions could be progressed through linkages with initiatives such as agri-environment or woodland management schemes, which may provide incentives for land owners to adopt necessary measures.</p>
Climatic factors	<ul style="list-style-type: none"> <li>Contribute to the mitigation of factors contributing to climate change?</li> <li>Contribute to the country's ability to adapt to climate change?</li> </ul>	<p>Depends on nature of solutions proposed. Traditional hard-engineered defences will have carbon footprint, therefore likely negative effect on contribution to mitigating climate change.</p> <p>Alternative, innovative solutions, working with natural processes have potential for positive mitigation effects, e.g. wetlands and carbon sequestration.</p> <p>Prioritising the highest risk areas / communities vulnerable to flooding and coastal erosion will result in significant positive effects on the country's ability to adapt to climate change.</p>		<p>Adopting solutions that work with natural processes such as wetland creation / woodland planting, can provide carbon sequestration and contribute to mitigating climate change factors, and also benefit natural systems in adapting to effects of climate change.</p> <p>Steps can be taken, such as re-use of materials, minimising transport, to minimise associated greenhouse gas emissions where traditional 'hard' engineering solutions are adopted.</p> <p>Future development and infrastructure, including FCERM solutions, will need to be designed to accommodate increased rainfall / storm events exacerbated by climate change.</p> <p>Consideration to whether FCERM measures can contribute to adapting to other effects of climate change, e.g. effect on a river of low flows / contributing to reducing urban heat island effects.</p>
Material assets	<ul style="list-style-type: none"> <li>Conserve and protect important new and existing material assets and infrastructure?</li> <li>Conserve and protect the best and most productive agricultural land?</li> </ul>	<p>Prioritised investment likely to result in significant beneficial effects on protection of the most important new and existing infrastructure.</p> <p>However, taking account of increased pressure on public finances, and focusing on areas at greatest risk from flooding and coastal erosion, likely to result in reduced protection of agricultural land, therefore negative effect.</p>		<p>Exerting influence to secure other sources of funding for FCERM, wherever possible, will be essential to make the most effective use of finances available and ensuring protection for the areas at greatest risk of flooding and coastal erosion.</p> <p>Alternative, lower-cost, approaches for FCERM where locations do not meet criteria for priority funding but remain at risk.</p> <p>Take into account long term influences such as climate change, and other influences such as development pressure and land use change, e.g. increased storminess / storm surges, increased river flows, greater pressure on existing drainage systems.</p> <p>Future investment decisions should reflect a sustainable development approach, including wider social costs and benefits as well as specific consideration of risk to life and environmental impacts.</p> <p>Linking alternative land-management based FCERM measures focused on reducing catchment run-off with agri-environment schemes.</p>
Cultural Heritage	<ul style="list-style-type: none"> <li>Conserve, and where possible enhance, protected and important cultural heritage assets?</li> </ul>	<p>Although heritage assets unlikely to be principal focus of prioritised investment, likely to be secondary benefit where heritage assets / important features lie within those areas prioritised for protection.</p> <p>However, potential negative effect on heritage assets located away from priority investment areas. Also, depending on nature of solutions, potential conflict where new flood and coastal defence infrastructure proposed in areas of high cultural / archaeological sensitivity.</p> <p>Overall therefore neutral, but likely to be a mixture of beneficial and adverse effects.</p>		<p>Prioritising FCERM actions should provide the benefit of helping to prioritise important heritage sites at risk from flooding and erosion for recording before they are lost.</p> <p>Particular attention should be given to the design of FCERM measures that directly affect historic assets or their setting, most appropriately considered at the project level.</p> <p>Approaches that work with natural processes may help to manage flood risk in a way that is less damaging to the historic environment.</p> <p>Implementation of resilience measures can also potentially be applied to heritage assets. Any specific design requirements taking into account the sensitivity of the features affected will need to be considered.</p> <p>In the case of coastal erosion, preservation of sites by recording them before they are lost might be the only realistic option in some instances.</p>

Landscape	<ul style="list-style-type: none"> <li>• Ensure the landscape character of Wales is conserved and, where possible, enhanced?</li> <li>• Maintain and enhance regional distinctiveness in landscapes?</li> </ul>	<p>Potential for adverse impacts depends on the nature of the solutions proposed, therefore uncertainty over significance of effects.</p> <p>Prioritising of investment in light of increased pressure on public finances may result focus only on basic FCERM infrastructure, with lack of funding and therefore neglect of landscape issues and design sensitive to the regional / local landscape character.</p> <p>Some potential for positive effects, e.g. innovative solutions, working with natural processes may be potential alternative lower cost solutions that at the same time deliver landscape benefit.</p>		<p>Promoting solutions that work with natural processes, minimise damage to the environment and seek to provide environmental benefits are all consistent with minimising adverse effects on the landscape.</p> <p>Particular attention required where FCERM interventions lie within or within the vicinity of the designated landscapes in Wales, including AONBs / National Parks / Heritage Coast / Special Landscape Areas.</p> <p>Consideration of alternative innovative solutions in optioneering, working with natural processes and sympathetic design to deliver solutions sensitive to landscape character.</p>
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**Table A4 Assessment of significant environmental effects of 'Do nothing'**

<b>TABLE A4: 'Do Nothing'</b>				
<b>Summary:</b> 'Do nothing' is the scenario of not continuing with the implementation of any FCERM strategies, measures or actions, including those proposed as part of the National FCERM Strategy (as identified in tables A1 to A3 above).				
<b>Environmental Topic</b>	<b>Assessment criteria Does the proposed scenario...</b>	<b>Description of Effect</b>	<b>Significance of Effect</b>	<b>Mitigation / Enhancement</b>
Population and human health	<ul style="list-style-type: none"> <li>Improve and enhance the health and wellbeing of communities?</li> <li>Reduce inequality and social deprivation?</li> </ul>	<p>No / significantly reduced protection of communities from all sources of flooding and coastal erosion, and lack of awareness / preparedness (with no flood warning / responses measures / plans), thereby resulting in reduction in the health and wellbeing of communities. Existing problems of flood risk and coastal erosion continue, and exacerbated over time as new development inappropriately located / drained – communities increasingly exposed.</p> <p>Increased exposure to flood and coastal erosion risk will exacerbate problems of inequality and social deprivation – poorer / disadvantaged likely to suffer most.</p>		N/A.
Biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>Work with natural processes, improve ecological connectivity and promote healthy functioning ecosystems?</li> <li>Conserve, and where possible enhance important, protected and priority habitats and species?</li> </ul>	<p>No FCERM would mean no intervention with natural processes, which would prevail over time, resulting in significant beneficial effects for biodiversity associated with the water environment over time and possibly improved connectivity and function.</p> <p>Possible adverse impacts on biodiversity due to uncontrolled development on floodplains / coastal zone areas – encroachment (uncertainty over significance).</p>		N/A.
Soil and contaminated land	<ul style="list-style-type: none"> <li>Protect and conserve soils and soil function, and increase resilience to degradation?</li> <li>Reduce the risk to waters from diffuse pollution?</li> </ul>	<p>No FCERM intervention would mean the continued erosion of soils by water to contribute to diffuse pollution of the water environment, with mobilisation of contaminants and associated diffuse pollution of water. Risk of diffuse pollution increased due to uncontrolled development / insufficient drainage.</p>		N/A.
Water	<ul style="list-style-type: none"> <li>Protect and improve the water environment, in terms of water quality and quantity, for the benefit of the human and/or natural environment?</li> <li>Maintain and enhance hydromorphological function of the water environment by working with natural processes?</li> </ul>	<p>No FCERM intervention would mean the move to a more naturalised water environment over time. Water quality issues not necessarily significantly affected (other controls beyond FCERM a more significant influence on water quality). Overall, considered neutral / not significant.</p>		N/A.
Climatic factors	<ul style="list-style-type: none"> <li>Contribute to the mitigation of factors contributing to climate change?</li> <li>Contribute to the country's ability to adapt to climate change?</li> </ul>	<p>No pumped / engineered (carbon-embodied) flood and coastal defences / systems would mean minor beneficial effect on climate change mitigation.</p> <p>No adaptation to the impacts of climate change through increased flood risk, coastal erosion, significant increase in flood risk / coastal erosion over time due to climate change effects – no FCERM measures in place to be able to adapt. Also lack of awareness / preparedness (with no flood warning / responses measures / plans). Overall therefore significant adverse effects.</p>		N/A.
Material assets	<ul style="list-style-type: none"> <li>Conserve and protect important new and existing material assets and infrastructure?</li> <li>Conserve and protect the best and most productive agricultural land?</li> </ul>	<p>No FCERM intervention would result in significant adverse impacts on all material assets, exacerbated over time by climate change. Both new and existing assets and infrastructure at risk of flooding / coastal erosion without intervention.</p>		N/A.

Cultural Heritage	<ul style="list-style-type: none"> <li>Conserve, and where possible enhance, protected and important cultural heritage assets?</li> </ul>	<p>No FCERM intervention would mean that there would be no disturbance to cultural heritage features as a result of construction, and no impact on any feature's setting. However, without intervention, some features may be lost due to coastal erosion, or be at risk from flooding. No opportunity for enhancements and loss of secondary benefits for protection of important heritage assets that FCERM provides.</p> <p>Lack of FCERM intervention result in return of natural catchment and coastal processes of benefit for conservation of historic landscapes.</p>		N/A
Landscape	<ul style="list-style-type: none"> <li>Ensure the landscape character of Wales is conserved and, where possible, enhanced?</li> <li>Maintain and enhance regional distinctiveness in landscapes?</li> </ul>	<p>No FCERM intervention would mean no introduction of new infrastructure, likely to result in a positive effect on landscape character.</p> <p>Landscape likely to undergo gradual change over time as a result of increased flooding and coastal erosion, representing return of natural catchment and coastal processes and naturalisation of landscape.</p> <p>Overall considered beneficial for landscape character.</p>		N/A

