



Draft National Flood and Coastal Erosion Risk Management Strategy for England:

Draft Habitats Regulations Assessment Main Report

Consultation Draft

24 MAY 2019

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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1. Introduction

1.1. The draft updated national flood and coastal erosion risk management strategy

1.1.1. Background

The Flood and Water Management Act 2010 requires the Environment Agency to develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management (FCERM) in England (the national strategy).

The first national strategy was published in May 2011. It provided the overarching framework for action by all risk management authorities (RMAs) to tackle all sources of flooding and coastal change.

The government committed in its 25 Year Environment Plan that the Environment Agency would revise the national strategy in 2019. The Environment Agency has been leading a conversation with people and organisations who are affected by or work to manage flooding and coastal change. These conversations have formed the basis of proposals for a new national strategy, to be delivered in collaboration and to benefit us all. The draft strategy is a review of the strategy published in 2011.

This report contains a draft Habitats Regulations Assessment (HRA) to accompany the draft of the national strategy, formulated to be appropriate for the non-spatial, high level nature of that document.

This report is one of the supporting technical documents published as part of the public consultation on the draft strategy. A Strategic Environmental Assessment (SEA) environmental report has also been published. The SEA report has taken into account the findings of this HRA.

Throughout this HRA we refer to the 'draft strategy', which should be read as a reference to the draft updated national strategy published for consultation. The HRA will be finalised in light of consultation responses and alongside finalising the draft strategy for adoption by the Secretary of State. A final HRA report will be published alongside the final strategy.

1.1.2. Ambitions, strategic objectives and measures

The draft strategy explains a new philosophy for managing flooding and coastal change in England. It recognises the challenge of climate change and a significant increased risk of flooding and coastal change. Climate change will also affect European sites.

The draft strategy sets a 'vision' of 'a nation ready for, and resilient to, flooding and coastal change', with associated target timescales.

The draft strategy also specifies three high level 'ambitions':

- climate resilient places
- today's growth and infrastructure – resilient to tomorrow's climate
- a nation of climate champions, able to adapt to flooding and coastal change through innovation

The delivery of these ambitions is achieved through a series of 'strategic objectives' each supported by 'measures'. These are set out in the draft strategy and explained in its

supporting consultation document. The strategic objectives and measures are also presented in section 3.2.

1.2. Need for Habitats Regulations Assessment

Appendix 1 to this report contains more detail on the Habitats Regulations. This legislation provides the legal framework for the protection of habitats and species of European importance in England. The protected sites comprise:

- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- candidate SACs (cSACs)
- Sites of Community Importance (SCIs)

As a matter of government policy, protected sites also comprise:

- potential Special Protection Areas (pSPAs)
- Ramsar sites (sites designated under the 1971 Ramsar Convention for their internationally important wetlands)
- sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites (NPPF 2019).

These sites are referred to collectively in this report as ‘European sites’.

The Habitats Regulations require that before authorising a plan or project which is not directly connected with or necessary to the management of a European site but is likely to have a significant effect on a European site a competent national authority must make an Appropriate Assessment of the implications for the site of that plan or project.

The draft strategy implements the requirements of section 7 of the Flood and Water Management Act 2010, and sets out the national approach to flood and coastal erosion risk management, describing long-term goals and how these will be achieved. The draft strategy is therefore concerned with flooding and coastal change and not directly connected with, or necessary for, the nature conservation management of European sites.

The draft strategy is also a high-level document without a spatial basis or the capacity to directly affect European sites. However, the draft strategy influences other plans and projects which have the potential to significantly affect European sites. This influence includes through:

- a) all RMA's being required to exercise their flooding and coastal change functions in a manner which is consistent with the national strategy and associated guidance
- b) Lead local flood authorities being required to produce local FCERM strategies that are consistent with the national strategy
- c) Lead local flood authorities and internal drainage districts only being permitted to carry out FCERM works where they are desirable having regard to the relevant local FCERM strategy
- d) the Environment Agency only being permitted to carry out FCERM works where they are desirable having regard to the national strategy
- e) coast protection authorities only being permitted to carry out coast protection works where they are desirable having regard to the national strategy.

Consequently, the draft strategy is treated as a 'plan or project' subject to HRA.

1.3. Stages of Habitats Regulations Assessment

There are four potential stages to carrying out an HRA as summarised below. More detail of these stages is provided in Appendix 1 of this report.

Stage One: Screening

Screening identifies whether the draft strategy is required for management of European sites. If it is not then the significance of potential impacts upon European site/s of the draft strategy receives preliminary assessment to determine whether it is likely to significantly affect such sites.

It is vital to understand that the effects, and their causes, can take place outside of the European site boundary. The effect does not have to be apparent immediately, and it can occur as part of a chain of events.

Our interpretation is always precautionary meaning that if we have reasonable, scientific doubt that there might be an effect then we need to progress to stage 2.

Stage Two: Appropriate Assessment

The Appropriate Assessment involves the consideration of the potential implications of the draft strategy for European sites, taking account of their conservation objectives. The draft strategy may impact in synergy with other plans and projects, which then influences our conclusions.

The purpose of the Appropriate Assessment is to assess the effect on European sites' integrity. Where adverse impacts are identified, an assessment of the potential mitigation of those impacts is undertaken.

Stage Three: Assessment of feasible alternative solutions

If after the Appropriate Assessment we cannot be certain that the draft strategy will not adversely affect the integrity of a European site, the next stage is to examine alternative ways of achieving the draft strategy's objectives that better respect the integrity of the European site(s) affected.

Stage Four: IROPI test and consideration of Compensatory Measures

If no feasible alternative solutions exist then determination of whether the draft strategy should proceed is by the test of imperative reasons of overriding public interest (IROPI). If there are imperative reasons of overriding public interest, compensatory measures must be taken to ensure that the overall coherence of the network of European sites is protected.

Monitoring

Monitoring is not a component of HRA. However, monitoring will form part of the national strategy implementation. Section 8 of this report therefore recommends monitoring criteria that might be appropriate to test whether each of the draft strategy's objectives has been met in connection with European sites.

It is important to note that the purpose of including monitoring is not to support any of the conclusions of the HRA but to provide feedback on the implementation of the national strategy to inform future decision making.

Strategic objectives, monitoring and actions

The draft strategy's 'strategic objectives' support its 'ambitions' by describing the direction of travel towards the ambition. Therefore the strategic objectives are not subject to assessment. The obvious parallel is at scheme level HRA; the scheme objectives are not subject to HRA, only the activities that are being undertaken in order to realise the objectives. Monitoring should be relevant to the strategic objectives in order to provide information on how close we are to achieving the objective. In the draft strategy the measures are the activities that will be implemented in order to achieve the strategic objectives. The strategic objectives do not constitute measures nor prescribe actions, they are the status that the measures are intended to realise.

The measures summarise the types of input that will be required in order to achieve the strategic objective. There will be outputs, of which guidance is a good example, and also outcomes, which refer to tangible works 'on the ground', such as a flood defence scheme, or change to maintenance. A project can lead to an output (for example the purpose of the project is to research and write guidance) or an outcome (a project to deliver a flood defence scheme). So for the purposes of this report we are looking for management actions and decisions that directly affect the environment as relevant to the HRA. In other words both schemes and guidance that directs or influences scheme delivery and management decisions. The HRA has been applied to the measures, by making a series of conservative but generic assumptions about the types of outputs and outcomes that might result. Some outputs are clearly specified in the measure: to produce guidance or to update a spatially specific strategy. Some outputs are harder to extrapolate, such as those to change funding rules and sources. These could ultimately affect the types of schemes that receive funding. The outcomes have required a large degree of extrapolation, for example, a measure requiring improvement to FCERM infrastructure resilience could result in programmes of schemes, but at this stage we don't know what criteria will be applied to define resilience. The likelihood is that in the future European sites could potentially be affected, but the mode and degree of effect is as yet unspecified. This uncertainty all contributes to the precautionary approach of the HRA.

The draft HRA findings will inform the final national strategy, and a final HRA will be produced.

2. Identification of European sites

2.1. European sites that could be affected by the draft strategy

2.1.1. Treatment of European sites at the higher strategic level

The draft strategy does not specify where in England any measure it contains will be implemented. Consequently, in principle and adopting a precautionary approach, we consider that the draft strategy could affect European sites anywhere within England, as well as Scottish or Welsh European sites situated within trans-boundary catchments. The draft strategy could also affect European sites in the UK's territorial waters, bar those far offshore. As many as 250 European sites could therefore be affected by the draft strategy.

It is not practicable to assess the implications of the draft strategy for all such potentially affected European sites, taking account of their individual conservation objectives. However, the conservation objectives of European sites is decided by the protected habitats and species they contain. We have therefore assessed the potential implications of the draft strategy by reference to these protected habitats and species.

Given the high-level nature of this assessment, it is also not practical to provide detailed information about each of the European sites potentially affected. A précis of the relevant European sites is presented in sections 2.1.2 to 2.1.4 below. Further information about the European site features is available on the Joint Nature Conservation Committee website (www.jncc.gov.uk), and interactive maps of European sites can be accessed from Defra's mapping service <https://magic.defra.gov.uk/>.

Special protection areas

Special Protection Areas (SPAs) are classified for the protection of areas which have been identified as being of international importance for the breeding, feeding or wintering of certain native or regularly occurring migratory birds. SPAs can comprise a variety of different habitat types, ranging from areas of fen, peat or moorland, to coastal and estuarine habitat and marshland. In England, many of the SPAs are associated with marine/ coastal or estuarine waters and associated areas of marshland, with these classified areas covering a substantial proportion of England's estuarine and coastal areas. Although less extensive, there are also a number of inland terrestrial and freshwater SPAs, comprising areas of upland / moorland, heath, and inland water bodies and associated habitats. These can be either natural or artificial water bodies, such as gravel pits, reservoirs or washlands.

There are 88 Special Protection Areas in England, of which three are cross-border between England and Wales and one is cross-border between England and Scotland. Some are also designated as SACs.

Special areas of conservation

Special Areas of Conservation (SACs) are areas designated for the conservation of a variety of important or threatened habitats, animals and plant species. England's SACs include extensive areas of offshore, coastal and estuarine areas as well as a diverse range of inland habitat types, upland and lowland, aquatic and terrestrial.

There are 254 SACs, SCIs or cSACs in England, 8 are cross-border between England and Wales and three cross-border SACs between England and Scotland. Some are also designated as SPAs.

Ramsar sites

Ramsar sites are designated wetlands of international importance for their ecology or other features, and are designated under the Ramsar Convention. Ramsar sites can comprise areas of marsh, fen, peatland or areas of water that are static or flowing, fresh, brackish or areas of marine water. Ramsar sites may also incorporate riparian (banks of a river, pond or watercourse) and coastal zones adjacent to the wetlands. In England, many of the Ramsar sites are associated with marine/ coastal or estuarine waters and associated areas of marshland, with these designated areas covering a substantial proportion of England's estuarine and coastal areas. Although less extensive, there are also a number of inland and freshwater Ramsar sites, associated with river valleys and floodplains, heathland or fens, and also includes artificial water bodies and associated habitats such as gravel pits, reservoirs or washlands.

There are 72 Ramsar sites in England, of which three are cross-border between England and Wales and one is cross-border between England and Scotland. Most of the English Ramsar sites are also designated SACs or SPAs.

Further details about the Ramsar sites are available on the Ramsar Convention website (<http://www.ramsar.org>).

2.2. European sites unlikely to be affected by the draft strategy

Because of the high-level nature of the draft strategy and lack of a spatial framework, it is difficult to completely rule out any of the European sites to which this HRA may apply, other than those that are found sufficient distance offshore to not be affected by coastal processes, at the tops of mountains, or underground in caves.

Upland designated European sites located away from urban locations and flood risk zones are more likely to be affected by land use, land management and natural flood management (NFM) interventions than engineering works.

Appendix 3 lists all European sites that contain the habitats that could potentially be affected by FCERM.

2.3. Qualifying interests of European sites

Further information about the European site features is available on the Joint Nature Conservation Committee website (www.jncc.gov.uk). Further details about the Ramsar sites are available on the Ramsar Convention website (<http://www.ramsar.org>). The HRA of the draft strategy has not used this level of detail as part of the methodology, although we have checked this information for the purposes of our conclusions.

Special protection areas

SPAs are protected sites classified for rare and vulnerable birds, and for regularly occurring migratory species. The UK's geographic position – a north temperate island close to a major continental land-mass – results in its particular European importance for a number of groups of birds. The UK is particularly important for many populations of breeding seabirds, and is the wintering area for many waterbirds (ducks, geese, swans, waders) that breed throughout Arctic and sub-Arctic areas. Most of these waterbirds gather in winter in UK wetlands in dense aggregations. For many other waterbirds, the UK is not their final destination but is a stepping-stone on their migratory flyways to ultimate

winter destinations in Africa. For many wading birds, such as Ringed Plover, Black-tailed Godwit, Redshank, Sanderling, Dunlin and Knot, the coast of the UK is of crucial importance during the spring and autumn passage periods.

For the purposes of this HRA we have assumed that the needs of the species will be provided for if the habitat conditions are met. In expanding the scope of the HRA beyond the site boundaries we assume that the most mobile species are likely to spend appreciable amounts of time outside of the designated site, so requiring the appropriate habitat conditions for this.

Special areas of conservation

In England, the reasons for designation, or qualifying interests of SACs are varied, with a wide range of different habitats and species listed for each site's qualifying features and / or reasons for selection of the site. Details of the SAC site descriptions including details of qualifying interest features can be viewed from the JNCC website (<http://jncc.defra.gov.uk/page-23>).

For the purposes of this HRA we have reviewed all the 77 habitat accounts on the JNCC website (referred to as the Annex 1 habitats) and selected those features that have the capacity to be affected by the draft strategy. This list is wide-ranging and inclusive, because of the planned use of working with natural processes (WWNP) and NFM. Whilst we did not assess the draft strategy against all the site accounts, we did consult certain site accounts to inform our assumptions.

Ramsar sites

In defining sites that qualify as Ramsar sites, this is guided by the criteria set out in the Ramsar Convention, of which there are nine criteria in total. Of particular relevance for the Ramsar site designations in England, are the criteria of: a site regularly supporting 20,000 or more water birds; a site regularly supporting 1% of the individuals in a population of one species or subspecies of water bird. Ramsar sites may also be designated if a site contains a representative / rare / unique example of a natural or near-natural wetland type; if it supports populations of plant and / or animal species important for maintaining biological diversity; supports vulnerable / endangered species or threatened ecological communities; if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species. The initial emphasis for the designation of Ramsar sites in England was on selecting sites of importance to waterbirds, consequently many Ramsar sites are also SPAs. For more recent designations, non-bird features have increasingly been taken into account, both in the selection of new, and in reviewing of existing sites. Further details and the full list of criteria for designation of Ramsar sites can be viewed on Natural England's website (www.naturalengland.org.uk/ourwork/conservation/designatedareas/ramsars/default.aspx).

We have not specifically focussed on Ramsar sites in this assessment, on the basis that similar principles apply as to the Annex 1 habitats.

Conservation objectives for European sites

All European sites have conservation objectives. The conservation objectives do not aim to prevent all change to a site's qualifying interests / interest features, but aim to maintain or achieve favourable conservation status. Any proposals that are likely to affect the conservation objectives of a European site are therefore also likely to affect the overall integrity of the site.

Information on status, condition and conservation objectives for European sites is available from Natural England (www.naturalengland.org.uk). Conservation objectives for Welsh sites can be accessed from: <http://www.NRW.gov.uk/landscape--wildlife/protecting->

our-landscape/special-sites-project.aspx and for Scottish sites from:
www.snh.org.uk/snhi/.

Whilst we have not tested the draft strategy against site conservation objectives, we did consult the conservation objectives to better inform our summary of the potential effects of plan implementation.

3. Habitats Regulations Assessment: stage 1 screening

3.1. Screening introduction

The 'screening' stage is a filter intended to identify which proposed plans or projects require further assessment. It is the first stage of the Habitats Regulations Assessment process, and is distinct from the subsequent 'Appropriate Assessment' of adverse effect on integrity (which is described in section 4).

Flood and coastal erosion risk management has a high potential risk of directly and indirectly impacting on European sites. Using the standard risk matrix from the Environment Agency HRA handbook we concluded that the test of likely significant effect was satisfied. This standard practice component of the HRA analysis is explained in greater detail in Appendix 2.

Balanced against this is the ethos of the draft strategy, which aligns with the 25 Year Environment Plan. The overall intention is for the environment to be improved by FCERM activity.

We have screened all the measures, retaining those we could create a logical link with management intervention on the ground. These were assembled into groupings in order to create a manageable number on which to apply the assessment. Their grouping relates to their probable modes of impact on the European sites (see section 4.1.1 below).

3.2. Screening the measures

The draft strategy is split into 3 high level ambitions:

- Climate resilient places
- Today's growth and infrastructure – resilient to tomorrow's climate and
- A nation of climate champions, able to adapt to flooding and coastal change through innovation.

Strategic objectives then describe the state that the draft strategy recommends that FCERM needs to head towards. Measures define the activity required in order to fulfil the strategic objectives. The relationship between ambitions, strategic objectives and measures is as shown in figure 3.1.

The ambitions and strategic objectives, in merely describing the desired state, are not considered likely to significantly affect European sites so are not subject to further assessment.

Figure 3.1 The timescales and elements that make up the draft strategy



In contrast, the measures indicate what action will be taken to reach a desired end point. It is therefore the measures that will influence FCERM activity, such as subsequent levels of guidance, plans and schemes, to potentially affect European sites. We have therefore screened each of the measures.

We present below the screening of the measures in the same sequence as the draft strategy, presenting them under the relevant ambitions and strategic objectives for clarity's sake.

Ambition 1: Climate resilient places

Strategic Objective: 1.1 Between now and 2050 the nation will be resilient to future flood and coastal risks. Over the next year the Environment Agency will work with partners to explore and develop the concept of standards for flood and coastal resilience

Measure : 1.1.1 By 2021 the Environment Agency will enhance the appraisal guidance for flooding and coastal change projects, so that investment decisions support a range of climate change scenarios

Screening: Global temperature increase will also have the capacity to influence:

- Species range and distribution
- Hydrology and hydroecology (drought and flood)
- Sea level rise

Investment decision making will need to include guidance to ensure that flood and coastal erosion risk management will promote and not prejudice future activity aimed at securing

resilience of European sites, and the habitats and species that they support. This includes new FCERM infrastructure, maintenance and withdrawal of active management. The latter includes phased withdrawal.

Although the appraisal guidance will not have any direct effect on European sites, this measure is screened in. The guidance will influence the way that all schemes are delivered.

Measure: 1.1.2 By 2022 the Environment Agency will work with partners to explore and develop the concept of standards for flood and coastal resilience and will consider the pros and cons of all options. This will feed into the government's flood policy statement in 2019. The Environment Agency will also develop a national suite of tools that can be used in combination to deliver flood and coastal resilience in places

Screening: Standards that inform or direct decision making will need to ensure that flood and coastal erosion risk management will promote and not prejudice future activity aimed at securing resilience of European sites, and the habitats and species that they support.

Resilience tools and standards will not have any direct effects on European sites, but they will have the potential for indirect effects through their influence upon other FCERM activities – screened in.

Strategic Objective: 1.2 Between now and 2050 risk management authorities will help places plan and adapt to flooding and coastal change across a range of climate futures

Measure: 1.2.1 By 2021 the Environment Agency and risk management authorities will identify frontrunner places for developing adaptive approaches for a range of different scales and social contexts, working with local places and partners.

Screening: This measure is about identifying actions and places, that will influence future actions at further places. Even though we do not know now what the actions or places are likely to be, the probability that actions of widescale significance are highly likely means that this measure is screened in.

Measure: 1.2.2 By 2024 the Environment Agency will publish a new picture and evidence of current and future flood risk that will help places better plan and adapt for climate change.

Screening: The planning and adapting for climate change will be improved with evidence, but there is no indication within the measure about the extent or coverage of the new picture and evidence. If it is deficient in relation to the requirements to sustain or restore the ecological functioning necessary for habitats and species then the consequent plans and adaptations may increase risk to European sites. With the added uncertainty of climate change effects on habitats and species, which will need to be taken into account in future HRA of plans and schemes to implement the adaptation, this measure is screened in.

Measure: 1.2.3 By 2024 the Environment Agency will develop a national framework to help risk management authorities, people, businesses and public bodies identify the steps and decisions needed to take an adaptive approach to planning for flood and coastal resilience in a place.

Screening: This measure is screened in because it has the direct capacity to influence adaptive interventions which could significantly affect European sites.

Measure: 1.2.4 By 2025 the Environment Agency will produce a new set of long term investment scenarios to inform future policy and investment choices for delivering flood and coastal resilience.

Screening: The production of these scenarios is screened out. Whilst investment is obviously essential to fund management actions, the production of scenarios pertaining to investment does not directly determine the actions. The requirements of the European sites will have already informed policy, plan and scheme development via other routes and other measures, such as the measure 1.2.3. So for this reason it is more likely that the requirements of European sites and species will comprise a component of the data informing the investment scenarios, and so this measure is screened out.

Measure: 1.2.5 By 2026 lead local flood authorities will update their local flood risk strategies to incorporate adaptive approaches to planning for flood and coastal resilience in a place.

Screening: We assume that further HRA will be undertaken when updating local FCERM strategies. However, we have screened into the HRA because the measure requires the incorporation of adaptive approaches which have the potential to significantly affect both the integrity and resilience of European sites and species. .

Strategic Objective:1.3 Between now and 2030 all those involved in managing water will embrace and embed adaptive approaches to enhance the resilience of our environment to future flooding and drought

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities.

Screening: NFM has significant potential to benefit European sites and the associated habitats and species. Inappropriately sited it can also damage the habitats and so is screened in.

Measure: 1.3.2 From 2021 the Environment Agency will work with farmers, landowners and others to identify opportunities for using agricultural practices (through funding, advice and regulation) to manage flooding and coastal change.

Screening: It is possible that this measure will be a vehicle to achieve natural flood management (NFM) and working with natural processes (WWNP). It is screened in on this basis.

Measure: 1.3.3 From 2020 risk management authorities will seek to better align long term planning for flood and coastal change with water company business planning cycles to identify opportunities for managing both floods and droughts.

Screening: Screened in. This measure is screened in because it has the direct capacity to influence adaptive interventions which could significantly affect European sites. Measures

could include sustainable drainage systems (SUDS) and catchment management respectively.

Strategic Objective: 1.4 Between now and 2030 risk management authorities enhance the natural, built and historic environments so we leave it in a better state for the next generation

Measure: 1.4.1 From 2021 risk management authorities will contribute to improving the natural, built and historic environment through their investments in flood and coastal projects.

Screening: Screened in – even if outside of the European sites, if using scientifically based predictions to locate the improved stock of natural capital could provide buffering or resilience to European sites. This measure could be applied anywhere on a spectrum from serendipitously to strategically planned (see the next measure) in relation to the natural environment. Theoretically this measure will be most effective if the FCERM contribution accords with the needs identified in the Nature Recovery Network.

Measure: 1.4.2 From 2021 we will work with government to identify how the Nature Recovery Network, the Northern forest and new woodland creation will be creating and restoring habitats that reduce flood and coastal change.

Screening: Screened in – even if outside of the European sites, if using scientifically based predictions to locate the improved stock of natural capital could provide buffering or resilience to European sites. Properly located in this context means that the location of habitat restoration and creation will be chosen according to a range of relevant, potentially weighted criteria. This measure, correctly applied, and taking account of the effects of climate change on habitats, could inform the implementation of all the other measures.

Measure: 1.4.3 From 2021 risk management authorities will help to ensure that 75% of all waterbodies are in natural or near natural condition within 25 years.

Screening: Screened in – even if outside of the European sites, if using scientifically based predictions to locate the improved stock of natural capital could provide buffering or resilience to European sites. Properly located in this context means that the location of habitat restoration and creation will be chosen according to a range of relevant, potentially weighted criteria. This measure, correctly applied, and taking account of the effects of climate change on wetland and aquatic habitats, could inform the implementation of all the other measures. The assumption is that the waterbodies that are components of European sites are intrinsically part of the 75% (since natural and near natural are not terms that have a precise definition).

Strategic Objective: 1.5 Between now and 2030 risk management authorities will use funding and financing from new sources to invest in making the nation resilient to flooding and coastal change

Measure: 1.5.1 By 2021 the Environment Agency will work with the government on its green finance strategy to explore new options for funding and financing flooding and coastal change that deliver more private funding in the future.

Screening: This measure is screened into the HRA on the basis that working with government on its green finance strategy could influence the consideration of options that could include mitigation banking, biodiversity net gain deals and other options that are capable of significantly affecting European sites.

Measure: 1.5.2 By 2025 risk management authorities will test whether it is feasible to use upfront financing to deliver an adaptive approach in a place which will need very significant investment in future.

Screening: Screened out because this measure refers to testing a very specific policy approach for funding. That does not mean that this funding route would never be used to finance interventions that affect European sites. But the source and timing of funding for FCERM interventions is not considered likely to significantly affect European sites.

Ambition 2: Today's growth and infrastructure – resilient to tomorrow's climate

Strategic Objective: 2.1 Between now and 2030 all new development will contribute to achieving place based resilience to flooding and coastal change

Measure: 2.1.1 From 2021 risk management authorities will invest in planning skills and capabilities to ensure they can advise planners and developers effectively to enable climate resilient places.

Screening: Screened out – the link between improving planning skills and the capacity to significantly affect European sites is tenuous. This measure relates to communications between the RMAs and planners and developers. Ultimately planning authorities are the competent authority undertaking HRAs when determining planning applications. Whilst having the necessary skills is desirable, it is not considered to be a primary mechanism for influencing how development affects European sites.

Measure: 2.1.2 From 2025 the Environment Agency and lead local flood authorities will advise local planning authorities on how adaptive approaches should inform strategic local plans.

Screening: Screened in - those giving the advice, which needs to be nationally consistent, should be fully cognisant of how to optimise adaptive approaches for the benefit of European sites. In practice local flood authorities could well already be aware of the requirements of European sites. It is screened in to ensure plan objectives are fully integrated.

Strategic Objective: 2.2 Between now and 2030 all new development will seek to support environmental net gain in local places

Measure: 2.2.1 From 2021 all risk management authorities will achieve biodiversity net gain in all programmes and projects.

Screening: Screened in especially in relation to creating buffer zones or nearby sub-optimal habitat or other measures that might increase resilience for European sites. This measure will in practice be related to 2.1.1.

Measure: 2.2.2 From 2021 all risk management authorities will seek to work with developers and planners to achieve environmental net gain as part of strategic development proposals.

Screening: Screened in especially in relation to creating buffer zones or nearby sub-optimal habitat or other measures that might increase resilience for European sites. This measure will in practice be related to 2.1.2.

Strategic Objective: 2.3 Between now and 2030 all risk management authorities will contribute positively to local economic regeneration and sustainable growth through their investments in flooding and coastal change projects

Measure: 2.3.1 From 2021 the Environment Agency will identify ways in which flood and coastal infrastructure projects can better contribute to local economic regeneration and sustainable growth.

Screening: Screened in because to be sustainable the growth should contribute to the resilience of European sites. Without European site requirements at the heart of sustainable growth, the converse is that economic regeneration and growth will put additional pressure on European sites, by definition reducing sustainability.

Strategic Objective: 2.4 Between now and 2050 places affected by flooding and coastal change will be 'built back better' and in better places

Measure: 2.4.1 By 2025 the Environment Agency will work with government, insurers and financial institutions to review the legal, policy and behavioural changes needed to 'build back better and in better places' and improve the resilience of homes and business.

Screening: Screened in because despite being a cultural change, amendments to law and policy will be essential to the future of European sites if their integrity is integral to the objectives of the legislation and policy. Conversely, legislation and policy that does not take the requirements of European sites into account could lead to conflicting priorities in the future. This measure could have particular relevance in coastal situations.

Measure: 2.4.2 By 2021 coast protection authorities and the Environment Agency will refresh the Shoreline Management Plans and keep them under review.

Screening: Screened in as the Shoreline Management Plans (SMPs) will require their own HRA, particularly to address coastal squeeze. SMPs will be essential to the strategic management of coastal issues. We cannot say for certain what the refresh will involve, but this could include monitoring alongside improved consideration of sea level rise forecasts.

Strategic Objective: 2.5 Between now and 2030 all flooding and coastal infrastructure owners will understand the responsibilities they have to support resilience standards for places

Measure: 2.5.1 By 2021 the Environment Agency will work with lead local flood authorities and other expert bodies to develop guidance setting out best practice on local flood infrastructure management and record keeping.

Screening: Screened in – best practice needs to include environmental considerations at its heart. Best practice guidance will inform how things are done. Best practice in relation to the scientifically informed management of European site integrity would need to be included.

Measure: 2.5.2 By 2024 the Environment Agency will require risk management authorities to report on the resilience of their flood and coastal change infrastructure in a nationally consistent way.

Screening: Screened out – Consistency in reporting only tenuously has the capacity to influence FCERM activities so is unlikely to affect European sites. This measure refers to infrastructure and not the wider place. Infrastructure that is inherently linked in some way to European sites will already have the necessary planned and documented safeguards pertaining to planned improvement and maintenance in place.

Measure: 2.5.3 By 2025 the Environment Agency will work with risk management authorities to develop recommendations for flooding and coastal change infrastructure owners that enable greater collaboration, sharing and monitoring between them.

Screening: Screened out – collaboration, sharing and monitoring between FCERM infrastructure owners only tenuously has the capacity to influence FCERM activities so is unlikely to influence European sites. The strategic co-ordination of management of the coast is delivered through measure 2.4.2, which was screened in. For systems, measure 1.2.6, also screened in, is directly more relevant to realising effects on European sites.

Strategic Objective: 2.6 Between now and 2050 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change

Measure: 2.6.1 By 2021 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change.

Screening: Screened in – this measure has the capacity to directly impact European sites through influencing how infrastructure works are designed and implemented.

Measure: 2.6.2 By 2021 the Environment Agency will establish a Flood and Coastal Infrastructure Task Force to better align the long term investment planning of publicly funded infrastructure bodies.

Screening: Screened out – aligning long term investment planning only tenuously has the capacity to influence FCERM activities in ways that may affect European sites, especially at the programme level.

Ambition 3: A nation of climate champions, able to adapt to flooding and coastal change through innovation.

Strategic Objective: 3.1 Between now and 2030 young people at 16 should understand the impact of flooding and coastal change, but also recognise the potential solutions for their place, and opportunities for career development

Measure: 3.1.1 By 2021 flooding and coastal change materials will be provided to help teachers deliver existing elements of the national curriculum.

Screening: Screened out – the production of educational materials only tenuously and serendipitously (with very low probability) influences FCERM activities so, in this context, will not affect the integrity of European sites.

Strategic Objective: 3.2 Between now and 2030 people will understand the potential impact of flooding and coastal change on them and take action

Measure: 3.2.1 By 2022 government and risk management authority research programmes will identify how best to help people and businesses understand, accept and take responsibility for their risk to flooding and coastal change. This will help all risk management authorities better shape the way they work with people and businesses.

Screening: Screened in – this measure could encourage more community projects relating to NFM, or more community ownership of flood risk management solutions and potentially managed adaptive approaches. As with other measures, the degree to which the importance of European sites is conveyed will result in a community better able to take informed action.

Measure: 3.2.2 By 2021 all risk management authorities will develop and use digital tools to better communicate flooding and coastal change. This will help achieve greater awareness and responsibility of the risks people face.

Screening: Screened in – the development of digital tools to communicate coastal change to communities, could in turn influence community co-operation. Community engagement is an essential component of scheme and strategy development – tools that incorporate the requirements of European sites will contribute to community acceptance of the relevant issues.

Strategic Objective: 3.3 Between now and 2030 people will receive a consistent and coordinated level of support from all those involved in recovery from flooding and coastal change

Measure: 3.3.1 By 2021 the Environment Agency will work with government and risk management authorities to clarify roles in relation to surface water flooding.

Screening: Screened out – clarification of roles is unlikely to influence management on the ground and consequently effects upon European sites are unlikely.

Measure: 3.3.2 By 2022 the Environment Agency will have expanded their flood warning service to all places at a high risk of flooding from rivers and the sea.

Screening: Screened out – flood warning will have no direct or indirect effect upon European sites.

Measure: 3.3.3 By 2025 the Environment Agency will work with Government to better join up the organisations involved in providing incident response and recovery to provide a consistent and coordinated service.

Screening: Screened in - This measure is screened in on the basis that how organisations interact in undertaking emergency works could affect the integrity of European sites, for example if the sharing of information and responsibilities omits relevant considerations for European sites and consultations with Natural England. This is particularly relevant where the European site features are also flood or coastal erosion risk management assets.

Strategic Objective: 3.4 Between now and 2030 the nation will be recognised as world leader in managing flooding and coastal change, as well as developing and attracting talent to create resilient places

Measure: 3.4.1 By 2022 the Environment Agency will continue to work with standards setting organisations to encourage flood resilience requirements to be incorporated into the building and materials standards for homes and businesses built in places at risk of flooding.

Screening: Screened in – by including features such as better combined sewage management, SUDS and NFM into developments then the pollution entrained in run-off is less likely to reach European sites in the vicinity of the development, or downstream of such development.

Measure: 3.4.2 By 2025 the flooding and coastal change sector, including risk management authorities, will influence universities and colleges to ensure they develop the capabilities and skills required for both the public and private sectors.

Screening: Screened out – this measure is screened out for the reasons given for measure 3.1.1.

Measure: 3.4.3 By 2025 all public and private organisations in the flooding and coastal change sector including risk management authorities will support development programmes that enable their professionals to continue to develop their flood and coastal risk management knowledge.

Screening: Screened out – continued professional development of staff only tenuously and serendipitously has the capacity to influence FCERM activities so does not directly or indirectly affect European sites.

3.3. Overview of potential impacts

Local level risk management plans and projects

Generic impacts on integrity of European sites resulting from the draft strategy (for example through its influence upon local flood risk management strategies, plans or projects) may include:

- loss of, fragmentation of or physical damage to habitat
- changes in physical regime
- changes to turbidity
- simplification of habitats / communities
- noise or visual disturbance
- competition from non-native species
- changes to flow and velocity regimes
- altered surface water flooding
- changes to water chemistry

Each of the above activities, or a combination of them, may lead to a significant effect on a European site. Appendix 2 considers these impact types in more detail, and associates the impacts with a range of different FCERM activities (Table A2.1 in Appendix 2). Appendix 2 then identifies the range of SAC / SPA / Ramsar habitats and species that could be affected by these impact types.

Conclusion

In conclusion, we have screened out 11 of the measures. For the remaining 25 measures it cannot be determined that they will not result in likely significant effects to European sites. Even though the ethos of the draft strategy is supportive of the broader objectives of the 25 Year Environment Plan, we cannot be certain how exactly the measures will translate into action. So an Appropriate Assessment of the implications of the draft strategy for European sites must be undertaken. This is set out in section 4, the appropriate assessment.

4. Habitats Regulations Assessment: stage 2 appropriate assessment

THIS SECTION CONTAINS ONLY A SUMMARY OF THE OUTPUTS OF THE APPROPRIATE ASSESSMENT. THE FULL ACCOUNT OF THE METHODS INFORMING THE APPROPRIATE ASSESSMENT IS PRESENTED IN APPENDIX 2. IT IS ESSENTIAL TO CONSULT APPENDIX 2 IN ORDER TO UNDERSTAND THE PROVENANCE OF THE CONCLUSIONS PRESENTED IN THIS SECTION OF THE HRA REPORT.

4.1 Introduction

At stage 1 we have screened in 25 of the 36 measures contained in the draft strategy as we are unable to be certain that those measures would not significantly affect European sites. These measures are subject to further assessment to determine their implications for European sites in view of the sites' conservation objectives ('appropriate assessment'). This is to determine whether any of the measures, alone or in combination with other measures and/or other plans or projects, could adversely affect the integrity of any European sites.

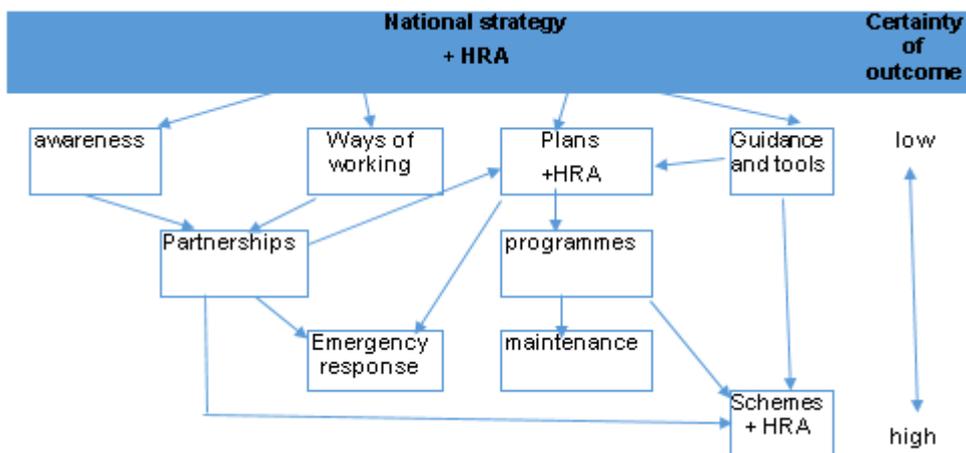
We summarise our methodology for appropriate assessment in this sub-section. In sub-section 4.2 we set out the conclusions of our assessment of the measures individually. Assessment of potential 'in-combination' effects is described in the sub-section 4.3. We describe proposed mitigation measures to avoid or reduce any possible adverse effects of the draft strategy's measures in sub-section 4.4. In each case we only provide a summary; further detail on appropriate assessment is contained in Appendix 2.

To create the link between the measures and the salient ecological functions of the habitats we could not assume how a measure would be put into action, because these are not specified in the draft strategy. Instead we considered the generic pathways by which FCERM planning and implementation is effected. At this stage we did not exclude the potential for any type of physical management consequences.

We developed and applied the following logic, specific to this HRA, to guide our considerations:

1. Whilst we assume that draft HRA associated with each level will ensure a compliant strategy or project, we cannot rely on that mechanism at this draft strategy stage. We need to be confident, despite the uncertainty inherent in high level strategic planning, that the draft strategy is not setting up situations that will create avoidable deleterious effects on European site integrity further down the hierarchy.
2. There should be a cascade of information from the plan, through strategies and eventually into projects, supplying sequentially greater certainty with each level to the issues and opportunities raised at the level above (figure 4.1)

Figure 4.1 relationship between the national strategy and subsequent tiers



3. If guidance and tools do not incorporate the appropriate emphasis on integrating the needs of nature conservation, then the risk of effects on integrity of European sites is increased when compliance with the regulations is restricted to assessment of the preferred option.
4. The wider countryside interacts with the European sites by many processes, such as lifecycle and behavioural movements, hydrology, nutrient input, pollution, for example, which we describe for each habitat type. And we are also uncertain about how species ranges may in future be affected by climate change, but we know that the places outside of the European site boundaries are going to be progressively more important to the future achievement of integrity, functioning and resilience.
5. FCERM solutions to manage flood and coastal risk can be inherently capable of providing nature conservation improvement. Examples include schemes that:
 - create a more natural river form and function
 - reconnect the river with the floodplain,
 - retain or reinstate coastal processes,
 - protect and enhance natural defences such as fringing reed, saltmarsh, mudflat, beaches and sand dunes,
 - promote catchment processes, including holding water in the catchment, encouraging infiltration and slowing run-off rate,
 - contribute to ecological networks
 - create oases of functioning semi-natural habitat in urban areas, using SUDS techniques

The draft strategy specifically refers to the intention to promote positive outcomes. Adopting the necessary precautionary principle we have not relied upon this stated objective in forming our conclusions. We have undertaken high level analysis to identify potentially damaging unintended consequences.

6. Outcomes to benefit nature conservation in general, including European sites, does not have to include habitat creation, it can include actions that increase resilience to perturbation or facilitate species to increase their range. This includes the changes to environmental conditions that will happen as a consequence of climate change. All decisions will need to be informed by best available scientific understanding.

7. Damaging actions can occur outside of the boundary of the European site, where the natural processes are connected. There is cross-over with WFD assessment procedures in respect of the hydroecological relationships, which we have maintained awareness of in order to better inform our conclusions.
8. We have also assumed that habitat that has been created or restored will take time to develop full ecological quality; so conservation in situ is the preferred option to loss and mitigation habitat creation, but habitat restoration and creation is an important route to the achievement of resilience.
9. We have not taken into account condition assessments nor conservation objectives at site level, in order to determine whether particular habitats are in general more at risk than others of degradation, because this level of detail is more appropriate to lower tier planning, so we do not prioritise any habitat types in this assessment
10. The draft strategy ultimately informs all FCERM decisions, and these will be made in a way that conforms with the wider aspirations of the Defra 25 Year Environment Plan.

4.1.1 Grouping the measures of the draft strategy

The draft strategy applies to the whole of England and could potentially have effects upon European sites beyond this via trans-boundary catchments, or species movement, with Scotland and Wales. There are therefore more than 250 European sites ('receptors') that could potentially be affected by one or more of the 25 measures screened in for assessment. Consequently, so that our assessment can be manageable and reportable, we have undertaken appropriate assessment on a simplified number of receptors and categorised the measures into three groupings.

We grouped the measures according to the potential type of impact they could have on European sites, using assumed pathways. This grouping was solely for the purposes of HRA, and is not part of the draft strategy. The groups were:

Group 1 - measures that promote and do not to prejudice the achievement and maintenance of favourable condition of European sites

Guidance and tools

Measure: 1.1.1 By 2021 the Environment Agency will enhance the appraisal guidance for flooding and coastal change projects, so that investment decisions support a range of climate change scenarios

Measure: 1.1.2 By 2022 the Environment Agency will work with partners to explore and develop the concept of standards for flood and coastal resilience and will consider the pros and cons of all options. This will feed into the government's flood policy statement in 2019. The Environment Agency will also develop a national suite of tools that can be used in combination to deliver flood and coastal resilience in places

Measure: 2.4.1 By 2025 the Environment Agency will work with government, insurers and financial institutions to review the legal, policy and behavioural changes needed to 'build back better and in better places' and improve the resilience of homes and business.

Measure: 2.5.1 By 2021 the Environment Agency will work with lead local flood authorities and other expert bodies to develop guidance setting out best practice on local flood infrastructure management and record keeping.

Measure: 3.3.3 By 2025 the Environment Agency will work with Government to better join up the organisations involved in providing incident response and recovery to provide a consistent and coordinated service.

Plan and strategy level, that also inform programmes and projects

Measure: 1.2.1 By 2021 the Environment Agency and risk management authorities will identify frontrunner places for developing adaptive approaches for a range of different scales and social contexts, working with local places and partners.

Measure: 1.2.2 By 2024 the Environment Agency will publish a new picture and evidence of current and future flood risk that will help places better plan and adapt for climate change.

Measure: 1.2.5 By 2026 lead local flood authorities will update their local flood risk strategies to incorporate adaptive approaches to planning for flood and coastal resilience in a place.

Measure: 2.4.2 By 2021 coast protection authorities and the Environment Agency will refresh the Shoreline Management Plans and keep them under review.

Frameworks, that also inform programmes and projects

Measure: 1.2.3 By 2024 the Environment Agency will develop a national framework to help risk management authorities, people, businesses and public bodies identify the steps and decisions needed to take an adaptive approach to planning for flood and coastal resilience in a place

Measure: 2.4.1 By 2025 the Environment Agency will work with government, insurers and financial institutions to review the legal, policy and behavioural changes needed to 'build back better and in better places' and improve the resilience of homes and business.

Coordinated plans and combined effects

Measure: 1.3.3 From 2020 risk management authorities will seek to better align long term planning for flood and coastal change with water company business planning cycles to identify opportunities for managing both floods and droughts.

Measure: 2.6.1 By 2021 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change.

Group 2 - measures capable of creating buffer zones, sub-optimal habitat or sustainable hydrology and water quality

Habitat

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities.

Measure: 1.4.1 From 2021 risk management authorities will contribute to improving the natural, built and historic environment through their investments in flood and coastal projects.

Measure: 1.4.2 From 2021 we will work with government to identify how the Nature Recovery Network, the Northern forest and new woodland creation will be creating and restoring habitats that reduce flood and coastal change.

Measure: 1.4.3 From 2021 risk management authorities will help to ensure that 75% of all waterbodies are in natural or near natural condition within 25 years.

Measure: 2.1.2 From 2025 the Environment Agency and lead local flood authorities will advise local planning authorities on how adaptive approaches should inform strategic local plans.

Measure: 2.2.1 From 2021 all risk management authorities will achieve biodiversity net gain in all programmes and projects.

Measure: 2.2.2 From 2021 all risk management authorities will seek to work with developers and planners to achieve environmental net gain as part of strategic development proposals.

Sustainable growth

Measure: 2.3.1 From 2021 the Environment Agency will identify ways in which flood and coastal infrastructure projects can better contribute to local economic regeneration and sustainable growth.

Measure: 3.2.1 By 2022 government and risk management authority research programmes will identify how best to help people and businesses understand, accept and take responsibility for their risk to flooding and coastal change. This will help all risk management authorities better shape the way they work with people and businesses.

Coastal squeeze

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities.

Measure: 3.2.1 By 2022 government and risk management authority research programmes will identify how best to help people and businesses understand, accept and take responsibility for their risk to flooding and coastal change. This will help all risk management authorities better shape the way they work with people and businesses.

Floods

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities. 1.3.3 From 2020 risk management authorities will seek to better align long term planning for flood and coastal change with water company business planning cycles to identify opportunities for managing both floods and droughts.

Measure: 2.6.1 By 2021 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change.

Droughts

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities. 1.3.3 From 2020 risk management authorities will seek to better align long term planning for flood and coastal change with water company business planning cycles to identify opportunities for managing both floods and droughts.

Measure: 2.6.1 By 2021 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change.

Climate change resilience

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities.

Measure: 1.4.1 From 2021 risk management authorities will contribute to improving the natural, built and historic environment through their investments in flood and coastal projects.

Measure: 1.4.2 From 2021 we will work with government to identify how the Nature Recovery Network, the Northern forest and new woodland creation will be creating and restoring habitats that reduce flood and coastal change.

Measure: 1.4.3 From 2021 risk management authorities will help to ensure that 75% of all waterbodies are in natural or near natural condition within 25 years.

Measure: 2.1.2 From 2025 the Environment Agency and lead local flood authorities will advise local planning authorities on how adaptive approaches should inform strategic local plans.

Measure: 3.4.1 By 2022 the Environment Agency will continue to work with standards setting organisations to encourage flood resilience requirements to be incorporated into the building and materials standards for homes and businesses built in places at risk of flooding.

Via:

Sustainable drainage systems

Measure: 3.4.1 By 2022 the Environment Agency will continue to work with standards setting organisations to encourage flood resilience requirements to be incorporated into the building and materials standards for homes and businesses built in places at risk of flooding.

Natural flood management (NFM) and working with natural processes (WWNP)

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities.

Measure: 3.2.1 By 2022 government and risk management authority research programmes will identify how best to help people and businesses understand, accept and take responsibility for their risk to flooding and coastal change. This will help all risk management authorities better shape the way they work with people and businesses.

Measure: 3.4.1 By 2022 the Environment Agency will continue to work with standards setting organisations to encourage flood resilience requirements to be incorporated into the building and materials standards for homes and businesses built in places at risk of flooding.

Group 3 - alternative finance actions and alternative delivery routes

Biodiversity net gain

Measure: 2.2.1 From 2021 all risk management authorities will achieve biodiversity net gain in all programmes and projects.

Measure: 2.2.2 From 2021 all risk management authorities will seek to work with developers and planners to achieve environmental net gain as part of strategic development proposals.

Grants and payment mechanism

Measure: 1.3.2 From 2021 the Environment Agency will work with farmers, landowners and others to identify opportunities for using agricultural practices (through funding, advice and regulation) to manage flooding and coastal change.

Measure: 1.5.1 By 2021 the Environment Agency will work with the government on its green finance strategy to explore new options for funding and financing flooding and coastal change that deliver more private funding in the future.

Community led response

Measure: 3.2.1 By 2022 government and risk management authority research programmes will identify how best to help people and businesses understand, accept and take responsibility for their risk to flooding and coastal change. This will help all risk management authorities better shape the way they work with people and businesses.

Measure: 3.2.2 By 2021 all risk management authorities will develop and use digital tools to better communicate flooding and coastal change. This will help achieve greater awareness and responsibility of the risks people face.

Development

Measure: 3.4.1 By 2022 the Environment Agency will continue to work with standards setting organisations to encourage flood resilience requirements to be incorporated into the building and materials standards for homes and businesses built in places at risk of flooding.

4.1.2 Grouping the European sites

There are inherent difficulties and uncertainties in carrying out an appropriate assessment for a high level plan such as the draft strategy. The draft strategy lacks a spatial basis, therefore the locations where its measures may influence lower-tier plans, strategies and actions cannot be identified at this stage. As a result, it is not possible to provide detailed consideration of the potential effects of the draft strategy's measures upon the integrity of any particular European site with respect to the site's structure, function and conservation objectives.

However, European sites potentially affected by the draft strategy are each designated for 'qualifying features' which comprise one or more of 77 'Annex 1' habitat types, one or more of 38 'Annex 2' species and/or one or more bird populations of national significance. The 'integrity' of a European site is also determined by reference to the lasting preservation of such qualifying features.

We therefore adopted an approach of assessing the implications of the draft strategy for European sites based upon the habitat accounts for all 77 Annex 1 habitat types. By considering the implications of the draft strategy upon protected habitats of importance to the conservation of Annex 2 species and birds, we also took account of these species through our appropriate assessment.

Studying each habitat account, we summarised those defining habitat features that could potentially be affected, directly or indirectly, by the operation of flood and coastal erosion risk management works. This included WWNP and NFM interventions that could occur in a catchment away from watercourses. We also consulted a range of European site accounts, although this was primarily to understand the scale and dynamics of habitat mosaics and other possible interdependencies.

The scientific conclusions of the appropriate assessment apply to the undesignated habitats of similar type to the Annex 1 habitats. For this reason we consider that the appropriate assessment is sufficiently capable of addressing the requirements of the populations of Annex 2 species that occur outside of the European sites.

4.2 Interim conclusions of appropriate assessment

We have assessed the implications of the draft strategy for Annex 1 habitats as summarised above (and described in more detail in appendix 2) on the basis of two scenarios:

- that the draft strategy is consistently implemented with the requirements of European sites taken into account as part of the core objectives
- the converse scenario - the requirements of the European sites are considered only at future HRA (if applicable) or at an equivalent stage

We set out our conclusions based on these scenarios in tables 4.2 and 4.3 below. Whilst the first scenario is more probable, given the stated intentions of the draft strategy, for the purposes of HRA we have adopted a precautionary approach. It is therefore the second of these scenarios (table 4.3 below) that informs our conclusions for appropriate assessment. The key to the symbols used is shown in table 4.1.

Tables 4.1 (a) and (b): Key for interpreting interactions between the measures and the Annex 1 habitats.

(a)	Highly certain	Moderately certain	Uncertain
Highly positive	✓✓✓✓	✓✓✓	✓✓
Moderately positive	✓✓✓	✓✓	✓
Slightly positive	✓✓	✓	0
neutral	000	00	0

(b)	Highly certain	Moderately certain	Uncertain
Highly negative	XXXX	XXX	XX
Moderately negative	XXX	XX	X
Slightly negative	XX	X	0
neutral	000	00	0

It should be noted that wherever the symbol 'X' is used this indicates that we consider a measure has the potential for negative effects for a habitat type. Where a single '0' is used, our conclusion is that effects are at least neutral but that this is uncertain.

n/a is entered for all measures that were screened out before appropriate assessment.

Table 4.2: Potential effects of the draft strategy upon habitat types in the event it is consistently implemented with the requirements of European sites taken into account as part of the core objectives

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
ambition									
1	Ambition 1: Climate resilient places								
objective									
1.1	Between now and 2050 the nation will be resilient to future flood and coastal risks. Over the next year the Environment Agency will work with partners to explore and develop the concept of standards for flood and coastal resilience								
measure									
1.1.1	✓✓✓	✓✓✓	✓✓✓	✓✓✓	0	✓✓✓	✓✓✓	000	✓✓✓
1.1.2	✓✓✓	✓✓✓	✓✓✓	✓✓✓	0	✓✓✓	✓✓✓	000	✓✓✓
objective									
1.2	Between now and 2050 risk management authorities will help places plan and adapt to flooding and coastal change across a range of climate futures								
measure									
1.2.1	✓✓	✓✓	✓✓	✓✓	0	✓✓	✓✓	000	✓✓
1.2.2	✓✓✓	✓✓✓	✓✓✓	✓✓✓	0	✓✓✓	✓✓✓	000	✓
1.2.3	✓✓	✓✓	✓✓	✓✓	0	✓✓	✓✓	000	✓
1.2.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.2.5	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	000	✓✓✓
objective									
1.3	Between now and 2030 all those involved in managing water will embrace and embed adaptive approaches to enhance the resilience of our environment to future flooding and drought								
measure									
1.3.1	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
1.3.2	✓✓	✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓
1.3.3	✓✓✓	✓✓✓	✓✓✓✓	0	0	0	✓✓✓	000	0
objective									

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
1.4	Between now and 2030 risk management authorities enhance the natural, built and historic environments so we leave it in a better state for the next generation								
measure									
1.4.1	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
1.4.2	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
1.4.3	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓✓	✓✓	✓✓✓✓	000	✓✓
objective									
1.5	Between now and 2030 risk management authorities will use funding and financing from new sources to invest in making the nation resilient to flooding and coastal change								
measure									
1.5.1	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	000	✓✓✓
1.5.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ambition									
2	Today's growth and infrastructure – resilient to tomorrow's climate								
objective									
2.1	Between now and 2030 all new development will contribute to achieving place based resilience to flooding and coastal change								
measure									
2.1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.1.2	✓✓	✓	✓✓	0	0	0	✓	000	✓
objective									
2.2	Between now and 2030 all new development will seek to support environmental net gain in local places								
measure									
2.2.1	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
2.2.2	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
objective									

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
2.3	Between now and 2030 all risk management authorities will contribute positively to local economic regeneration and sustainable growth through their investments in flooding and coastal change projects								
measure									
2.3.1	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	000	✓✓✓
objective									
2.4	Between now and 2050 places affected by flooding and coastal change will be 'built back better' and in better places								
measure									
2.4.1	✓	✓	✓	0	0	0	0	000	0
2.4.2	✓✓✓✓	✓✓✓✓	0	0	0	0	0	000	0
objective									
2.5	Between now and 2030 all flooding and coastal infrastructure owners will understand the responsibilities they have to support resilience standards for places								
measure									
2.5.1	✓✓	✓✓	✓✓	0	0	0	0	000	✓
2.5.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.5.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
objective									
2.6	Between now and 2050 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change								
measure									
2.6.1	✓✓	✓✓	✓✓	0	0	0	0	000	0
2.6.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ambition									
3	A nation of climate champions, able to adapt to flooding and coastal change through innovation								
objective									

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
3.1	Between now and 2030 young people at 16 should understand the impact of flooding and coastal change, but also recognise the potential solutions for their place, and opportunities for career development								
measure									
3.1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
objective									
3.2	A nation of climate champions, able to adapt to flooding and coastal change through innovation								
measure									
3.2.1	0	0	0	0	0	0	0	000	0
3.2.2	0	0	0	0	0	0	0	000	0
objective									
3.3	Between now and 2030 people will receive a consistent and coordinated level of support from all those involved in recovery from flooding and coastal change								
measure									
3.3.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.3.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.3.3	✓	✓	✓	✓	✓	✓X	✓	000	0
objective									
3.4	Between now and 2030 the nation will be recognised as world leader in managing flooding and coastal change, as well as developing and attracting talent to create resilient places								
measure									
3.4.1	✓	0	✓	0	0	0	0	000	0
3.4.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.4.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 4.3: Potential effects of the draft strategy upon habitat types in the event that the requirements of European sites are considered only at future HRA (if applicable) or at an equivalent stage

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
ambition									
1	Ambition 1: Climate resilient places								
objective									
1.1	Between now and 2050 the nation will be resilient to future flood and coastal risks. Over the next year the Environment Agency will work with partners to explore and develop the concept of standards for flood and coastal resilience								
measure									
1.1.1	0	0	0	0	0	0	0	000	0
1.1.2	0	0	0	0	0	0	0	000	0
objective									
1.2	Between now and 2050 risk management authorities will help places plan and adapt to flooding and coastal change across a range of climate futures								
measure									
1.2.1	0	0	0	0	0	0	0	000	0
1.2.2	00	00	00	00	00	00	00	000	00
1.2.3	✓X	✓X	✓X	0	0	0	0	000	0
1.2.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.2.5	✓X	✓X	✓X	✓0	✓0	✓0	0	000	0
objective									
1.3	Between now and 2030 all those involved in managing water will embrace and embed adaptive approaches to enhance the resilience of our environment to future flooding and drought								
measure									
1.3.1	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓X	✓✓X	✓✓XX	✓✓XX	000	✓✓✓✓
1.3.2	✓	✓	✓✓✓	✓✓	✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓
1.3.3	✓✓✓	✓✓✓	✓✓✓✓	0	0	0	✓✓✓	000	0
objective									

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
1.4	Between now and 2030 risk management authorities enhance the natural, built and historic environments so we leave it in a better state for the next generation								
measure									
1.4.1	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
1.4.2	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
1.4.3	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓✓	✓✓	✓✓✓✓	000	✓✓
objective									
1.5	Between now and 2030 risk management authorities will use funding and financing from new sources to invest in making the nation resilient to flooding and coastal change								
measure									
1.5.1	0	0	0	0	0	0	0	000	0
1.5.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ambition									
2	Today's growth and infrastructure – resilient to tomorrow's climate								
objective									
2.1	Between now and 2030 all new development will contribute to achieving place based resilience to flooding and coastal change								
measure									
2.1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.1.2	0	0	0	0	0	0	0	000	0
objective									
2.2	Between now and 2030 all new development will seek to support environmental net gain in local places								
measure									
2.2.1	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
2.2.2	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	000	✓✓✓✓
objective									

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
2.3	Between now and 2030 all risk management authorities will contribute positively to local economic regeneration and sustainable growth through their investments in flooding and coastal change projects								
measure									
2.3.1	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	000	✓✓
objective									
2.4	Between now and 2050 places affected by flooding and coastal change will be 'built back better' and in better places								
measure									
2.4.1	0	0	0	0	0	0	0	000	0
2.4.2	✓✓X	✓✓X	0	0	0	0	0	000	0
objective									
2.5	Between now and 2030 all flooding and coastal infrastructure owners will understand the responsibilities they have to support resilience standards for places								
measure									
2.5.1	0	0	0	0	0	0	0	000	0
2.5.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.5.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
objective									
2.6	Between now and 2050 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change								
measure									
2.6.1	X	X	X	0	0	0	0	000	0
2.6.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ambition									
3	A nation of climate champions, able to adapt to flooding and coastal change through innovation								
objective									

habitat	Marine, coastal and halophytic habitats	Coastal sand dunes and continental	Freshwater habitats	Temperate heath and scrub	Sclerophyllous scrub (matorral)	Natural and semi-natural grassland formations	Raised bogs and mires and fens	Rocky habitats and caves	Forests
3.1	Between now and 2030 young people at 16 should understand the impact of flooding and coastal change, but also recognise the potential solutions for their place, and opportunities for career development								
measure									
3.1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
objective									
3.2	A nation of climate champions, able to adapt to flooding and coastal change through innovation								
measure									
3.2.1	0	0	0	0	0	0	0	000	0
3.2.2	0	0	0	0	0	0	0	000	0
objective									
3.3	Between now and 2030 people will receive a consistent and coordinated level of support from all those involved in recovery from flooding and coastal change								
measure									
3.3.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.3.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.3.3	XX	XX	XX	0	0	XX	0	000	0
objective									
3.4	Between now and 2030 the nation will be recognised as world leader in managing flooding and coastal change, as well as developing and attracting talent to create resilient places								
measure									
3.4.1	0	0	0	0	0	0	0	000	0
3.4.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.4.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

As set out in table 4.3, the worst case scenario is that the draft strategy could give rise to some possible adverse effects upon Annex 1 habitat types in relation to 6 measures (measures 1.2.3, 1.2.5, 1.3.1, 2.4.2, 2.6.1 and 3.3.3).

Uncertainty exists as to whether a measure is at least neutral in terms of its effects upon Annex 1 habitats in 11 cases (measures 1.1.1, 1.1.2, 1.2.1, 1.3.3, 1.5.1, 2.1.2, 2.4.1, 2.5.1,

3.2.1, 3.2.2 and 3.4.1). Since we must adopt a precautionary approach, and be certain (with no reasonable scientific doubt remaining) before ruling out the possibility of adverse effects, we consider these measures must also be treated as potentially giving rise to adverse effects upon Annex 1 habitat types.

4.3 Assessment of potential in combination effects

The Habitats Directive and the Habitats Regulations require competent authorities to include within an Appropriate Assessment, the assessment of effects on a European site in combination with other plans or projects.

For the purpose of this assessment, and in keeping with the high-level nature of the draft strategy, only key relevant high-level plans that could potentially result in in-combination effects have been considered. At this national scale, it is not possible to provide an extensive list of all plans and projects which may lead to in-combination effects together with the draft strategy. These will, however, need to be considered further where HRA is required at subsequent stages in the implementation of the draft strategy. The key high level plans considered are summarised below.

A Green Future: Our 25 Year Plan to Improve the Environment

The Defra 25 Year Environment Plan sets out government's ambition for environmental policy over the next 25 years. It includes ambitions to reduce the risk of harm to people, the environment and the economy from natural hazards including flooding, drought and coastal erosion.

The draft strategy has been prepared to support these aims of the 25 year environment plan, however there are many other objectives within the plan which may interact with European sites, therefore in combination effects cannot be ruled out.

The UK's Industrial Strategy

The UK Industrial Strategy sets out the government's approach to boosting productivity across the country, raising living standards and improving the quality of life for citizens. This strategy includes objectives to boost innovation and employment including 'driving a major upgrade to the UK's infrastructure'.

There is potential for projects which result from this strategy to impact on European sites, which could lead to in combination effects when combined with actions resulting from the draft strategy. In many cases such potential in combination effects will require further consideration in HRAs undertaken at local strategy and project levels.

The UK Marine Policy Statement (MPS)

This implements the requirements of the Marine and Coastal Access Act 2009, and sets out a framework for a system of marine planning for the UK marine area.

Given that the MPS is focused on the marine and coastal areas, it is considered unlikely to result in any in combination effects on any of the English inland and non-marine European sites. However, the MPS itself has undergone HRA, the conclusions of which were that it was unable to exclude the possibility that the integrity of one or more European sites could be adversely affected by activities identified in the MPS, either alongside or in-combination with other plans or projects. The potential for in-combination effects between the draft strategy and the MPS in the marine environment cannot therefore be ruled out.

Shoreline Management Plans (SMPs)

SMPs are the regional strategic plans that will support and help to achieve the objectives of the draft strategy in the coastal context. They set out the priorities and strategic

direction for all flood and coastal erosion risk management on the coast. SMPs have a geographic framework set out according to an area of coastline known as a sub-cell within a littoral sediment cell (length of coastline that is relatively self-contained in terms of the movement of sediment).

Rather than result in 'in combination' effects with the draft strategy, the SMPs represent the lower-tier, spatially-based plans, which will support and implement many of the objectives of the national strategy. The SMPs are due to be refreshed under draft strategy measure 2.4.2. Therefore their potential adverse effects upon the integrity of European sites has already been assessed as part of the Appropriate Assessment.

The majority of these plans will also include their own HRAs which will be better able to define the likely impacts of the plans, alone and in combination with other relevant local plans, on particular European sites and their conservation objectives.

Catchment Flood Management Plans (CFMPs)

The Environment Agency has produced a CFMP for each of the 68 main catchments in England. They consider inland flood risk from rivers, surface water, groundwater and tidal flooding, and are designed to set the overall direction of flood risk management on a catchment basis. They identify broad flood risk management policies that are economically practical, have a potential life of 50 to 100 years, and will help the Environment Agency work with others to put them in place.

Rather than result in 'in combination' effects with the draft strategy, CFMPs are the regional strategic plans that will, amongst other lower-tier plans and strategies, support and help to achieve the objectives of the draft strategy.

The majority of these plans include their own HRAs which will be better able to define the likely significant effects of the plans, alone and in combination with other relevant local plans, on particular European sites and their conservation objectives.

River Basin Management Plans (RBMPs)

RBMPs deliver the objectives of the Water Framework Directive (WFD), namely to deliver good status for all water bodies. Designated European sites (water-dependant SACs and SPAs) are specifically referenced within the WFD and the RBMPs, referred to as 'Protected Areas', and have their own specific set of objectives and actions to deliver them.

Given that RBMPs include targets and objectives for achieving 'favourable conservation status' for water-dependant European sites, the potential in combination effects between the RBMPs and the draft strategy should predominantly result in beneficial effects. However, the RBMPs also include different objectives for a range of different water bodies, which could conflict with protection of European sites. Potential in combination effects with the draft strategy cannot therefore be ruled out.

Flood risk management plans (FRMPs)

Flood risk management plans are produced every 6 years. They:

- describe the sources and risks of flooding in a river basin district (RBD) and catchment
- include information on how risk management authorities (RMAs) plan to work with communities and businesses to manage and reduce flood risk

FRMPs and river basin management plans (RBMPs) help all those involved in managing water to make decisions that are best for people and the environment. The second round of FRMPs are due in 2021. The measures derive from the CFMPs and have been subject

to HRA. FRMPs will support and help to achieve the objectives of the draft strategy, therefore in combination effects cannot be ruled out.

The Draft Strategy as a whole

We are also required to assess the draft strategy as a whole, so have undertaken a high level in combination assessment of all the 'measures' assessed individually above.

Many of the measures complement each other and/or could influence the same types of FCERM activities. None of the measures combine to increase the risk of damage to the integrity of European sites.

4.4 Avoidance and mitigation of impacts

4.4.1 Generic mitigation

The draft strategy contains a number of measures which mitigate its potential adverse effects upon protected habitats and species. All RMAs in carrying out their FCERM functions must act in a manner which is consistent with the draft strategy as a whole, including its mitigating features. Consequently, when implementing measures that we consider could adversely affect European sites, all RMAs must also implement the mitigation measures contained in the draft strategy.

These measures include:

- the requirement that RMAs through all their activities should minimise damage to, and where possible improve, the natural environment
- the recognition that the draft strategy's strategic objectives and measures should support the achievement of wider environmental objectives, including by supporting the government's ambition to leave the environment in a better state than we found it and the objective of protecting threatened species and providing richer wildlife habitats
- the requirement that RMAs work with natural processes
- the recognition that RMAs must play a role in supporting sustainable development
- the requirement that RMAs should make choices and long term decisions that result in gains for the environment by:
 - contributing to the achievement of sustainable development, including through balancing the needs of the natural environment and seeking to secure environmental benefits
- meeting legal requirements, such as having regard to biodiversity conservation and complying with the Habitats and Birds Directives (including by undertaking HRA wherever required, including in implementing relevant measures)
- the requirement that RMAs contribute to improving the natural environment through their FCERM projects (measure 1.4.1)
- the requirement that RMAs work with others to realise benefits between FCERM and nature recovery networks (measure 1.4.2)
- the requirement that RMAs help ensure near-natural condition in 75% of waterbodies (measure 1.4.3)
- the requirement that RMAs achieve biodiversity net gain in all their programmes and projects (measure 2.2.1)

- the requirement that RMAs seek to work with others to achieve biodiversity net gain in strategic development proposals (measure 2.2.2)

4.4.2 Lower tier mitigation

Whilst it is not possible at a national scale to provide specific proposals for mitigation measures on a local basis, site-specific mitigation can be anticipated and can be tailored to the impacts that may arise from lower-tier plans, strategies and projects. This is supported at the higher-tier level of the draft strategy by the generic requirements set out above.

Further, wherever required, lower-tier plans, strategies and projects will be subject to their own HRAs. Such HRAs will ensure that these measures do not proceed unless they do not adversely affect the integrity of European sites or else, exceptionally, overriding reasons exist for proceeding. This further layer of protection for European sites is also supported by the explicit requirements in the draft strategy that RMAs comply with the Habitats and Birds Directives and should minimise damage to, and where possible improve, the natural environment.

4.4.3 Specific mitigation recommendations

The above features of the draft strategy and subsequent FCERM activities will help mitigate the effects of the draft strategy's measures. However, we also consider it desirable, in the final strategy, to include specific reference to mitigation for the 5 measures where negative effects are identified during appropriate assessment (see section 4.2 above, in particular Table 4.3).

The recommendations for the final strategy are set out below.

Measure: 1.2.3 By 2024 the Environment Agency will develop a national framework to help risk management authorities, people, businesses and public bodies identify the steps and decisions needed to take an adaptive approach to planning for flood and coastal resilience in a place.

Mitigation: It is recommended that the final strategy indicates that the framework to be developed under this measure is compatible with the natural capital approach promoted in the 25 Year Environment Plan, and in so doing ensure that the integrity of European sites is integrated.

Measure: 1.2.5 By 2026 lead local flood authorities will update their local flood risk strategies to incorporate adaptive approaches to planning for flood and coastal resilience in a place.

Mitigation: It is recommended that the final strategy indicates that, in updating local FCERM strategies to incorporate adaptive approaches, LLFAs integrate the needs of the environment recognising that European site integrity and future resilience relies upon a scientifically informed understanding of environmental processes beyond the site boundaries. .

Measure: 1.3.1 From 2021 the Environment Agency will use the lessons learned from the Defra £15 million natural flood management projects and other pilot projects to expand and mainstream working with natural processes by all risk management authorities.

Mitigation: It is recommended that, in mainstreaming the use of NFM, risk management authorities take account of the most up to date information on the implications of NFM for European sites. It is also recommended that they support the continued development of the evidence base, relevant tools, access to practitioner focussed information and collaboration.

Measure: 2.4.2 By 2021 coast protection authorities and the Environment Agency will refresh the Shoreline Management Plans and keep them under review.

Mitigation: It is recommended that the final strategy indicates that in refreshing their Shoreline Management Plans the coast protection authorities and the Environment Agency will incorporate the requirements of European sites and species that relate to the contribution that flooding, erosion, deposition, and the management of these processes has on their integrity and resilience.

Measure: 2.6.1 By 2021 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change.

Mitigation: It is recommended that the final strategy indicates that the Environment Agency and risk management authorities incorporate the requirements of European sites and species when working with infrastructure providers to ensure that infrastructure investment is resilient to future flooding and coastal change either in situ or relocated. .

Measure: 3.3.3 By 2025 the Environment Agency will work with Government to better join up the organisations involved in providing incident response and recovery to provide a consistent and coordinated service.

Mitigation: It is recommended that the final strategy indicates that, in providing a coordinated incident response service all RMAs will, wherever possible, effect works with minimal subsequent damage to European sites.

4.4 Conclusions of the appropriate assessment

At this national strategic level, it is not possible to predict, describe or assess the specific impacts associated with the different activities, plans and strategies that will result from the draft strategy on the integrity of a particular European site, with respect to the site's structure, function and conservation objectives. The appropriate assessment identifies FCERM activities that may give rise to particular impacts (generic impact types) on European site qualifying features (habitats and species), and therefore potentially result in an adverse effect upon European site integrity. In light of this the appropriate assessment has considered the potential effects of those measures that were screened in for assessment on all Annex 1 habitats and Annex 2 species/birds.

We cannot be certain that a number of the measures would not, alone or in combination, prejudice the lasting preservation of such habitats and species so result in adverse effects upon the integrity of European sites.

The draft strategy incorporates a number of requirements that help mitigate the effects of its measures on a generic basis. The HRA has also considered a series of methods, measures and approaches which should ensure mitigation is implemented within the lower-tier strategies, plans and projects to help avoid impacts on European site integrity. The HRA also recommends further, specific, mitigation is incorporated in the final strategy in respect of those measures where a potentially negative effect on European sites has been identified.

These mitigation measures are considered likely to substantially reduce the potential for the draft strategy to adversely affect the integrity of European sites. However, despite the implementation of mitigation, it is not possible to be certain that there will not remain the possibility of adverse effects upon the integrity of one or more European sites arising from the implementation of the draft strategy.

We therefore consider the HRA should proceed to stage 3 and the consideration of alternatives.

5. Habitats Regulations Assessment: Stage 3 assessment of alternatives

The Habitats Regulations require that the competent authority is satisfied that there are no alternative solutions before a plan or project may proceed despite potentially adversely affecting the integrity of a European site. European Commission guidance, reflecting rulings from the European Court of Justice, indicates that before reaching that conclusion all 'feasible' alternative solutions, which meet the plan or project's aims should be assessed to ensure they do not better respect the integrity of European sites. This should include assessment of a 'do nothing' alternative.

We therefore set out below our assessment of the 'do nothing' alternative. In the assessment of alternatives we have also considered the overall process and approach used in the development of the draft strategy to determine whether feasible alternatives exist that deliver the aims of the draft strategy in a way that better respects the integrity of European sites.

5.1 Aim of the draft strategy

Our objectives for updating the existing national FCERM strategy are framed by the legal requirement that any updated strategy should set out our strategy for managing flooding and coastal erosion. It is also framed by our vision that the nation should be ready for, and resilient to, flooding and coastal change up to 2100, taking account of a changing climate. The draft strategy also aims to fulfil government's commitment, in 25 Year Environment Plan, to update the existing national strategy in a way that strengthens joint delivery across organisations and government's policy for tackling flooding that includes actions to:

- use more natural flood management solutions where appropriate
- increase the uptake of sustainable drainage systems, especially in new developments
- improve the resilience of properties at risk of flooding and the time it takes them to recover should flooding occur

In light of these aims of the draft strategy the following sections explain the assessment of alternatives in more detail.

5.2. The 'do nothing' alternative

The 'do-nothing' alternative has been rejected as unfeasible for the reasons outlined below.

We have defined the 'do nothing' alternative in terms of the likely evolution of the baseline environment in the absence of a revised national FCERM strategy. This assumes that no action is taken to review and refresh the 2011 national FCERM strategy. As a result the current strategy would continue to be implemented. As set out in the HRA accompanying the adoption of the 2011 strategy, implementation of the existing strategy must be treated for Habitats Regulations purposes as capable of adversely affecting the integrity of European sites.

The SEA of the draft strategy has been used as the basis for the assessment of the 'do-nothing' alternative. The SEA concluded that as a result of the draft strategy there could be significant positive effects on the country's ability to adapt to climate change. The SEA also concluded there could be significant positive effects on population and human health through the management of flooding and coastal change. This would serve to benefit communities and businesses as well as the natural environment. The assessment identified that effects on biodiversity, water, material assets, soil and contaminated land, could be positive or negative. This would be dependent on the type of risk management solutions implemented, the sensitivities present at the local level and the effectiveness of mitigation measures. However, provided the final strategy incorporates the mitigation recommended, it is considered that mitigation will be effective and the updated national strategy's potential for negative environmental effects, through adversely affecting the integrity of European sites, will be minimised.

A second important consideration is that since 2011, government policy has changed significantly and as such the 2011 national FCERM strategy does not fully reflect the current policy context. For example, the current national FCERM strategy does not fully deliver the 25 Year Environment Plan aims of strengthening joint delivery across organisations, expanding the use of NFM, implementing more SUDS and making 'at risk' properties more resilient to flooding. If the 'do-nothing' alternative was implemented, the 2011 strategy would potentially conflict with current government policy. It could also fail to realise opportunities for improving and restoring the natural environment.

A further example of the changing context for the strategy is the urgency and challenge of climate change. As explained in the draft strategy the most recent climate change predictions confirm we will experience wetter winters and drier summers. There is also an increased likelihood of more intense rainfall leading to flooding as well as continued rise in sea levels. Urgent and immediate action is needed so we have climate resilience places that are able to manage and adapt to flooding and coastal change. This is not fully reflected in the current national FCERM strategy.

Finally, 25 Year Environment Plan makes a commitment to revising the national FCERM strategy during 2019. If the 'do-nothing' alternative was implemented, this commitment would not be fulfilled.

5.3 Alternatives in the development of the draft strategy

As set out in the SEA environmental report (section 4.4) we have developed the draft strategy through an extensive process of stakeholder engagement, generating a range of ideas for the draft strategy. However, these were discarded since they would not achieve the objectives for the draft strategy. Consequently, they are not considered feasible for the purposes of this HRA.

5.4 Other approaches

The 2011 national FCERM strategy considered, and rejected, the following alternative approaches:

- High level frameworks
- Detailed prescriptive rules

We believe that these two alternatives remain inapplicable. They would not achieve the aims of updating the existing national strategy and/or would not do so in a way that would allow us to conclude with certainty that the integrity of European sites could be better respected.

High level frameworks make it more difficult to achieve strategic consideration over large geographical areas. The urgency of climate change renders this approach deficient. Detailed prescriptive rules will never be sufficiently refined to be sufficiently responsive to place based intricacies. It make no sense to have a system that can only be monitored for success by how well it is being applied, and not by the outcomes that it is achieving.

5.5 Alternative measures

We have concluded at stages 1 and 2 that for 19 of the measures, we can be confident that they are not likely to significantly affect, or do not adversely affect the integrity of, European sites. We therefore have not considered alternatives to these measures.

For the 17 other measures we cannot exclude the possibility that they have some capacity for adverse implications for the conservation objectives of European sites.

Many of the points made in sections 5.2 and 5.3 above are relevant to any alternative that included removing these measures from the draft strategy. Removing this number of measures from the draft strategy would mean it would not achieve its objective so is not a feasible alternative.

Further, the measures in question are effectively aimed at moderating the consequences of FCERM. If these measures were removed the potential for damaging activity will be much higher, and more difficult to predict and reduce.

Finally, as set out in section 4.3, the draft strategy contains generic mitigation and we recommend further specific mitigation is also included in the final strategy. With this mitigation in place, it is considered that any alternative strategy would not better respect the integrity of European sites.

6. Habitats Regulations Assessment: stage 4 IROPI and compensatory measures

The Habitats Regulations require that if there are no feasible alternative solutions, the draft strategy can only be carried out for imperative reasons of overriding public interest (IROPI), sufficient to override the ecological importance of the designation/s. The imperative reasons may be of a social or economic nature. In the case of a site or sites that host a priority natural habitat type or priority species, the reasons must be for human health, public safety, beneficial consequences of primary importance to the environment, or for reasons specifically approved by the European Commission.

The results of the Appropriate Assessment are that we cannot conclude that there won't be adverse effects on the integrity of one or more European sites, although it is not possible to predict impacts on any particular site. The integrity of a site hosting a priority natural habitat type / species may therefore be adversely affected by the draft strategy, therefore the imperative reasons for the draft strategy must be for reasons of human health, public safety or beneficial consequences of primary importance to the environment or else ones specifically approved by the European Commission.

In the case of the draft strategy, the failure to proceed would mean that the overall framework or co-ordination of the management of flood and coastal erosion risk in England will remain the 2011 strategy. That strategy is out of date and does not fully reflect current policy or practice. Without the draft strategy, the Environment Agency will not be able to set out how to take the lead in understanding, mapping and advising on all forms of flood and coastal erosion risk. Nor will it be able to update the national strategy to guide how best flooding and coastal change can be managed, finding new ways of reducing flood and coastal erosion risk and generally co-ordinating and integrating flood and coastal erosion risk planning, informed by the 25 Year Environment Plan and more accurate forecasts of climate change effects.

The level of societal impacts and losses at the national scale, in the absence of flood and coastal erosion risk management, is enormous. 5.2 million homes and businesses are at risk of flooding in England. 1.8 million more are at risk of coastal flooding and erosion. At the regional scale it can undermine the viability of communities and have significant impacts on the economy. The impacts on deprived communities are likely to be greater as they are less likely to be insured, are likely to be in poorer health and are less able to finance a rapid recovery. This is likely to be exacerbated by climate change, predicted to result in sea level rise, increased storminess and increased peak river flows. Flood risk results not only from direct over-topping or failure of defences and flooding incidents, but restrictions on emergency services being able to assist the public and to reach casualties due to floodwaters.

The draft strategy is essential for the continued and improved national co-ordination of all aspects of FCERM, including planning and co-ordinating effective emergency response, and managing existing and planning future FCERM infrastructure. Therefore without the draft strategy, there would be a significant risk to the viability of communities, material assets and infrastructure from flooding and coastal erosion, and ultimately increased risk to human health and public safety.

There are therefore considered to be relevant imperative reasons over overriding public importance for the draft strategy.

These imperative reasons fulfil the requirements as stated in the Habitats Directive, being of fundamental importance for the long term protection of communities and infrastructure, therefore justifying the overriding public interest reasons, being of a social or economic nature. Furthermore, the imperative reasons are also for the protection of human health and of public safety across England, therefore satisfying the over-riding public interest requirements for sites that host priority natural habitat types / priority species.

The Habitats Regulations dictate that, where there are imperative reasons of overriding public interest for the strategy, in order for the strategy to proceed, the appropriate authority must secure any necessary compensatory measures. The compensatory measures must be provided to balance the draft strategy's adverse effects on European sites, in order to ensure that the overall coherence of European sites is maintained. The compensatory measures tend to be in the form of compensatory habitat, to replace that which is considered likely to be lost from FCERM activities, although compensatory measures may comprise a wider range of approaches, depending on the type/s of the impact, the nature of the European site/s and the qualifying features affected.

In England, the Environment Agency and other risk management authorities have a history of provision of compensatory habitat through various mechanisms. These include habitat compensation programmes and habitat creation programmes, managed realignment, scheme level habitat provision, and actions to achieve environmental outcome measure scores.

At this national strategic scale, it is not possible determine what the precise impacts of the draft strategy will be. Logically, therefore, it is also not possible to determine at this stage exactly what compensation requirements will be necessary. However, further definition and development of compensatory measures can be deferred to a later stage of FCERM planning and HRA. Where relevant, more detailed assessment of the likely gains and losses of habitats within European sites will be undertaken during the preparation of local FCERM strategies and the implementation of other measures specified by the draft strategy. In this way the precise amounts of new habitat that need to be created can be confirmed. Compensation habitat requirements arising from local FCERM strategies can be used to inform the relevant regional habitat creation strategies. The habitat creation programmes will then ensure the creation of the required compensation habitats, and as far as reasonably practicable, will ensure that the timing of habitat creation will be such that the new habitats are in place in advance of losses.

In these ways it can be secured that in adopting the draft strategy any necessary compensatory measures are implemented.

7. Hierarchy of strategies and need for further Habitats Regulation Assessment

It is recognised that the draft strategy sets the strategic direction for managing flood and coastal erosion risk in England. Many measures contained in the draft strategy cannot be put into effect until lower-tier strategies, plans, projects or activities arising out of the draft strategy are implemented. Consequently the potential impacts of the draft strategy, within a spatial framework, cannot be fully determined until more detailed assessment has taken place. Plans and projects arising from the draft strategy will be subject to further Habitats Regulations Assessment, to demonstrate that they have met the requirements of the Habitats Regulations.

This draft HRA can be used to provide an overview of the requirements and various stages of the HRA process. It can be used to highlight the habitat types of European sites that could be affected by the draft strategy. The report provides reference to the sources of information for European sites, their qualifying interests and conservation objectives. This overview of the types of impacts that may arise from FCERM activities, also summarises the approaches set out in the draft strategy to avoid and mitigate impacts.

However, this does not negate the need for assessment of impacts on specific areas or for particular designated European sites where they may be affected by FCERM activities. These area or site-specific issues are best addressed by Habitats Regulations Assessment alongside the development of lower-tier strategies, plans or projects (see Figure 4.1). Each subsequent HRA should make its own assessment of the relevant effects, informed by the greater level of detail available.

8. Monitoring

Monitoring does not form part of HRA. However, we have used the findings of the HRA to make suggestions for future monitoring based on the draft strategy's objectives. We have decided upon this approach because the draft strategy is high level; so monitoring will afford us the opportunity to refine the recommendations for the scope of subsequent tiers in the hierarchy of implementation.

There currently isn't any planned monitoring, however the Environment Agency will develop arrangements for the monitoring and reporting of the draft strategy's progress with risk management authorities. The following draft HRA specific monitoring considerations, whilst not exhaustive, could be taken into account in that process. The following notes are advisory suggestions only.

Ambition 1: Climate resilient places

Strategic Objective: 1.1 Between now and 2050 the nation will be resilient to future flood and coastal risks. Over the next year the Environment Agency will work with partners to explore and develop the concept of standards for flood and coastal resilience.

Resilience refers to more than flood and erosion risk management, it explicitly requires functioning natural systems providing the services required to reduce the risk. Implicit is the importance of the whole environment of which European sites are a part, albeit an important part providing the template to aspire to. Resilience also means that the habitats have the space and time to adapt to changing regimes. All guidance and standards should expand upon this principle. We can monitor the extent to which the standards reflect the requirements of European sites.

Strategic Objective: 1.2 Between now and 2050 risk management authorities will help places plan and adapt to flooding and coastal change across a range of climate futures

Putting the environment at the heart of strategic planning and the timely implementation of programmes. The direct and indirect conditions and space required for favourable condition will be put in place, endowing the environment with greater resilience to the effects of climate change. Scientific research and monitoring will inform management decisions, and uncertainty will be dealt with by a no regrets approach. No prejudice to the successful completion of HRAs which integrate the direct and indirect effects into their conclusions. We can monitor the extent to which plans and adaptations have integrated the requirements of European sites and learn from how successful the plans and adaptations have been.

Strategic Objective: 1.3 Between now and 2030 all those involved in managing water will embrace and embed adaptive approaches to enhance the resilience of our environment to future flooding and drought

Water conservation, including re-use and wastage reduction will improve, alongside WWNP and the creation or restoration of more natural geomorphological and hydrological conditions. Measured via the WFD Assessment and monitoring. Essentially this objective supports or enables the previous objective, so similar considerations apply.

Strategic Objective: 1.4 Between now and 2030 risk management authorities enhance the natural, built and historic environments so we leave it in a better state for the next generation.

Use of the appropriate metrics to record improvements, which are subtle enough to capture improvements to resilience and other forms of habitat improvement along the spectrum up to habitat creation. Similar in principle to the ways we currently systematically predict and record environmental outcomes but more scientifically informed by evidence. It should be possible to monitor how effectively this strategic objective is being captured in intermediate level plans and strategies.

Strategic Objective: 1.5 Between now and 2030 risk management authorities will use funding and financing from new sources to invest in making the nation resilient to flooding and coastal change

The monitoring will be useful to identify whether in practice the full range of funding sources are being utilised, including for WWNP/NFM, and whether any constraints associated with the funding is precluding maximising the effectiveness. For example, one form of funding better suited to all the aims of a schemes might prejudice funding that benefits a European site. Specifically isolating whether funding enhances risk to European sites or is bringing additional benefits. Operating on the principle that European sites will benefit indirectly from works outside of the designation boundary, this strategic objective could be monitored in tandem with the previous one.

Ambition 2: Today's growth and infrastructure – resilient to tomorrow's climate

Strategic Objective: 2.2 Between now and 2030 all new development will seek to support environmental net gain in local places

As well as monitoring the types of net gain, net gain where it is predicted that European sites would be the beneficiary would provide the most relevant measure.

Strategic Objective: 2.3 Between now and 2030 all risk management authorities will contribute positively to local economic regeneration and sustainable growth through their investments in flooding and coastal change projects

Monitoring of this strategic objective would be reflected in any use of ecosystem services, probably supported by a natural capital monetary valuation related to the benefits of the European sites affected.

Strategic Objective: 2.4 Between now and 2050 places affected by flooding and coastal change will be 'built back better' and in better places

Shoreline management planning timescales are based on epochs. We are midway through the first epoch of 0-10 years. If more challenging targets have been set for the

second epoch then this is the opportunity to monitor how achievable they are, especially in relation to ever improving evidence of sea level rise. The effectiveness of the draft strategy in supporting this, especially in relation to European sites, will probably be a reportable metric.

Strategic Objective: 2.6 Between now and 2050 the Environment Agency and risk management authorities will work with infrastructure providers to ensure all infrastructure investment is resilient to future flooding and coastal change

Probably a similar sort of metric to the above strategic objective could be applied, just more widely. This aspect would benefit from guidance, based on evidence, on how to accommodate the direct and indirect requirements of European sites.

Ambition 3: A nation of climate champions, able to adapt to flooding and coastal change through innovation.

Strategic Objective: 3.2 Between now and 2030 people will understand the potential impact of flooding and coastal change on them and take action

Management interventions relating to European sites could be perceived as being very specialist. However there are already well established examples of communities taking responsibility, such as closing flood gates or installing NFM measures that bring benefit to European sites. Coastal erosion is more difficult to achieve this, but monitoring is essential in order to target and focus the message, and organise the relevant community action.

Strategic Objective: 3.3 Between now and 2030 people will receive a consistent and coordinated level of support from all those involved in recovery from flooding and coastal change

Monitoring of this objective should involve ensuring that all European sites that have a flood or coastal erosion risk management function have clear instructions about how to effect emergency repairs in the least damaging way possible. Any habitat that is created as a precaution because pre-emptive management to prevent failure would not be possible should also be monitored in the usual way as compensatory habitat.

Strategic Objective: 3.4 Between now and 2030 the nation will be recognised as world leader in managing flooding and coastal change, as well as developing and attracting talent to create resilient places

Monitoring of this strategic objective would be to determine how innovative technology, or innovative application of existing technology, is being applied to benefit European sites.

9. Cross-border effects

The potential for cross-border effects with Wales and Scotland exists because some rivers and estuaries comprise the borders. This adds complexity. The implementation of the draft strategy will mark a continuation of co-operation in relation to cross-border management rather than a significant change. This includes more natural ways of managing estuarine processes that also take account of the added significance of resulting geomorphological change.

WWNP and NFM in the catchments could also lead to the cross-border effects but this is more likely to be positive.

Further afield, the Habitats Directive specifically addresses the needs of birds via the SPA designation, so if by preserving the overall coherence of the SPA network, England's continued contribution to the north Atlantic flyway is assured.

The other potentially significant and highly mobile species are fish, especially anadromous and catadromous (i.e. migratory) species like eel and salmon. The tidal inundation of mudflat and saltmarsh is essential nursery habitat for young sea fish.

10. Summary and conclusions

10.1. Consultation

A draft Habitats Regulations Assessment of the draft strategy has been developed by the Environment Agency. It is intended for consultation with Natural England (NE), Natural Resources Wales (NRW) and Scottish Natural Heritage (SNH). The draft HRA will also be available for public consultation. The consultation will inform the final HRA of the final strategy.

10.2. Levels of HRA

This Habitats Regulations Assessment (HRA) has been carried out in a manner which is consistent with the non-spatial, strategic nature of the draft strategy. Given the high-level national basis of this draft strategy, the detail of where and how lower-tier plans, strategies, projects and FCERM activities will be implemented is not yet known.

Separate HRAs will be needed alongside the consideration and development of the subsequent lower-tier plans and projects.

10.3. Screening

The draft strategy is not directly connected with or necessary to the management of any European site. The assessment of 'likely significant effect' of the draft strategy has not been able to conclude without reasonable doubt that a number of measures in the draft strategy will not result in significant effects on one or more European sites.

10.4. Appropriate Assessment

At this national strategic level, it is not possible to predict or describe with any certainty all potential impacts associated with the different activities, plans and strategies that will result from the draft strategy. A range of potential generic impact types may arise, that may pose risk to the qualifying features and conservation objectives of European sites. This uncertainty meant that many of the measures in the draft strategy could not be proved to have no adverse effects upon the integrity of European sites.

The draft strategy contains generic mitigation measures and further HRA will be required before many of the measures are implemented. The draft HRA also makes recommendations for specific mitigation in the final strategy that should assist in further avoiding and minimising the risk of impacts on European site integrity.

However, despite this mitigation, it is not possible to be certain that there will not remain the possibility of adverse effects upon the integrity of one or more sites of European importance, either alone, or in combination with other plans or projects, arising from the implementation of the draft strategy.

10.5. Positive outcomes

In the future of uncertainty about how the features of European sites will respond to climate change, the draft strategy has a positive role to perform in promoting natural processes outside of the site boundaries. The interventions must be targeted spatially in order to provide the European sites with the necessary buffering capacity to improve their resilience to climate change effects. More research leading to improved tools would make a difference to our understanding of this aspect of resilience.

10.6. Alternative Solutions

Not developing the draft strategy is considered likely to result in greater impacts on European sites, and strategic opportunities to deliver improvements to favourable conservation status of European sites may not be realised. Developing alternative proposals to the draft strategy, such as a detailed prescriptive rules approach (incorporating criteria for European sites) or alternative measures, is not considered feasible or likely to have a reduced impact on European sites.

10.7. IROPI

The draft strategy is required to ensure the continuing coordination of FCERM across England and to ensure that FCERM activities align with current policy and practice, including in light of predicted climate change. Consequently, adopting the draft strategy is considered necessary for imperative reasons of overriding public interest related to human health and public safety.

The Environment Agency and other RMAs have programmes for the implementation of compensatory measures which can be used to secure that any necessary compensatory measures are implemented to protect the integrity of Natura 2000. The draft strategy is high level so it is not possible to predict what compensatory measures might be appropriate in individual cases. Such measures will be expected to be identified at suitable locations at the project level, or alternatively if the same conclusion is made following HRAs of the more spatially specific local FCERM strategies.

10.8. Monitoring

Monitoring is not part of the HRA process however the draft strategy implementation will entail monitoring. In light of the assessment undertaken for HRA it is recommended that monitoring in relation to the strategic objectives might include consideration of:

- The value of no regrets types of adaptive approaches
- Capability of guidance to meet the requirements of European sites
- Incorporation of European site requirements into the core objectives of plans
- Ability to meet both the direct and indirect requirements of European sites
- European site requirements, especially in relation to climate change, as part of sustainability indices or criteria

Acknowledgements

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List of abbreviations

CFMP	catchment management plan
cSAC	candidate Special Area of Conservation
Defra	Department for Environment, Food and Rural Affairs
FCERM	Flood and Coastal Erosion Risk Management
FRMP	Flood Risk Management Plan
HRA	Habitats Regulations Assessment
IROPI	Imperative reasons of over-riding public interest
JNCC	Joint Nature Conservation Committee http://jncc.defra.gov.uk/
MPS	Marine Policy Statement
NPPF	National Planning Policy Framework
NFM	natural flood management
NRW	Natural Resources Wales Cyfoeth Naturiol Cymru https://naturalresources.wales/?lang=en
pSPA	potential Special Protection Area
RBMP	River Basin Management Plan
RMA	risk management authority
SAC	Special Areas of Conservation http://jncc.defra.gov.uk/page-23
SCI	Site of Community Importance
SEA	strategic environmental assessment
SPA	Special Protection Area http://jncc.defra.gov.uk/page-162
SUDS	sustainable drainage system
SNH	Scottish Natural Heritage https://www.nature.scot/
SMP	shoreline management plan
WFD	Water Framework Directive
WWNP	working with natural processes

Glossary

Ambition: what the draft strategy hopes to achieve

Appraisal Guidance: Appraisal guidance for flood and coastal erosion risk management published by Defra in March 2010, updated in 2018. It provides best practice implementation guidance on appraisal and supports the Defra Policy Statement on Appraisal (June 2009)

Assumptions: the effect on site integrity is one of "reasonable" scientific doubt rather than absolute certainty. It is not possible to demonstrate absolute certainty given that all assessments will rest on assumptions of what might happen in the future (DTA publications)

Buffer zone: an area of land or water whose characteristics minimise or eliminate adverse effects from impacting on the integrity of the European site

Coastal Squeeze: Narrowing of the intertidal zone due to the prevention of its natural landward migration in response to sea-level rise

Compensatory habitat: habitat that is created to offset losses

Favourable condition: The designated feature(s) within a European site are being adequately conserved and the results from monitoring demonstrate that the feature(s) are meeting all the mandatory site specific monitoring targets in relation to the minimum standards for favourable condition for the designated features and there may be scope for the further (voluntary) enhancement of the features / unit. A unit can only be considered favourable when all the component designated features are favourable

Grouping: the term used in this HRA to try to group measures according to their mode of possible impact on European sites

Hydroecology: the ecological interactions in the aquatic environment between the water, habitats and aquatic species

Hydrology: how water moves, especially in relation to the land

Integrity: integrity of a site is defined as the coherence of its ecological structure and function across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which the site is designated. It also refers to the quality or condition of being whole or complete; or in a dynamic ecological context, as having resilience and an ability to evolve in ways that are favourable to conservation. A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required. (DTA publications)

Managed adaptive approach: an iterative process, especially helpful where there is uncertainty, in which the solution is designed to be monitored and can subsequently be adapted, informed by the monitoring data. Essentially a more flexible approach to providing solutions

Measure: in the draft strategy, the measures indicate what types of actions will be required to meet the strategic objectives and achieve the ambitions

Mitigation: mitigation is a vital planned component of scheme design, construction and operation in order to reduce consequent damage. The mitigation hierarchy, in order of desirability, is avoid, minimise, rectify, reduce and offset

Monitoring: systematic, planned observation to check progress and success of something. In the case of the HRA we recommend monitoring to check on the degree of compliance with the strategic objectives as the measures are implemented

Natural capital: natural capital is the sum of our ecosystems, species, freshwater, land, soils, minerals, our air and our seas. These are all elements of nature that either directly or indirectly bring value to people and the country at large. They do this in many ways but chiefly by providing us with food, clean air and water, wildlife, energy, wood, recreation and protection from hazards (25 Year Environment Plan 2018)

Natural flood management and working with natural processes: natural flood management (NFM) and working with natural processes (WWNP) refer to actions to improve the natural processes in order to reduce the risk of flooding and coastal erosion. NFM is an important part of the mosaic, including complementing heavy engineering designs. It spans the spectrum from re-instatement of traditional land management through to innovative solutions. NFM projects provide fantastic opportunities for community involvement and leadership, as demonstrated by the Defra £15m NFM programme

Nature Recovery Network: a Nature Recovery Network is a joined-up system of places important for wild plants and animals, on land and at sea. It allows plants, animals, seeds, nutrients and water to move from place to place and enables the natural world to adapt to change. It provides plants and animals with places to lie, feed and breed. It can only do this effectively if it is treated as a joined up whole. (The Wildlife Trusts www.wildlifetrusts.org)

Outcome: outcomes are what happens on the ground as a result of management actions or decisions (including decisions to cease actions)

Outcome measures: outcome measures, which are basically counts of relevant things, are currently used in FCERM programmes to report on progress towards current targets

Output: outputs usually refer to reports, or the output from a computer model, or brainstorming at a meeting

Pathway: in the context of the HRA the pathway summarises the route by which an action can have an eventual effect on a European site. It can be a tangible pathway, such as water that is held in the catchment by NFM eventually reaching a watercourse. It can also be a virtual pathway, such as improved outcomes for designated sites because guidance has been written that includes European site integrity as one of the core objectives

Priority feature: habitats and species in danger of disappearance in a European context. Their needs override those of non-priority habitats and species. The IROPI test derogation is correspondingly more restricted

Programme: a list of projects to be undertaken, usually accompanied by some kind of priority ranking system. When mitigation or compensatory habitat is required, in relation to European sites, it is essential that this is in place and functioning before any losses as a result of management occur

Project: a piece of planned work to achieve a purpose, so it could be a project to produce guidance, to undertake research, or to produce designs for new FCERM infrastructure (referred to as a scheme) for example

Resilience of European sites: the capability of European sites to withstand adverse conditions. Resilience reduces where the population of a species or a habitat is already under stress from other causes

Scheme: a project that will result in improvements to FCERM infrastructure

Screening: the process of deciding which components of the draft strategy might have significant effects and should therefore be the subject of assessment

SEA: SEA is applied to high-level decision-making to identify the major environmental effects of new policies, plans or programmes before they are approved. SEA helps to ensure that new proposals are:

- assessed for significant environmental impacts
- communicated to decision makers
- mitigated against
- monitored through a monitoring programme
- made known to the public

Strategic Objective: in the draft strategy the strategic objectives define the desired status to be achieved, via implementation of the measures. Monitoring informs progress towards the strategic objectives

SUDS: Sustainable drainage systems bring the processes of the water cycle into the urban environment, comprising small scale constructed and planted vegetated areas. Surface water can be stored, infiltrate the soil and experience bio-filtration. A better alternative than surface water overwhelming sewers during heavy rainfall

Surface water: surface water is the water above ground, resulting from rainfall. It is especially noticeable in urban catchments with impermeable surfaces, preventing the surface water from soaking into the ground

Water Framework Directive: this directive was transposed into national law through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The purpose is to ensure the protection of inland waters, estuaries (transitional waters), coastal waters and groundwater.

Working with natural processes and **natural flood management:** working with natural processes (WWNP) natural flood management (NFM) and refer to actions to improve the natural processes in order to reduce the risk of flooding and coastal erosion. NFM is an important part of the mosaic, including complementing heavy engineering designs. It spans the spectrum from re-instatement of traditional land management through to innovative solutions. NFM projects provide fantastic opportunities for community involvement and leadership, as demonstrated by the Defra £15m NFM programme

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