Dee Flood Risk Management Plan

Habitats Regulations Assessment

December 2022

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1. Non-Technical Summary

Introduction

1.1 This is the Habitats Regulations Assessment (HRA) of the Dee River Basin District (RBD) Flood Risk Management Plan (FRMP). The HRA has been undertaken in accordance with The Conservation of Habitats and Species Regulations (The Habitat Regulations) 2017 (as amended) and considers the potential implications of the FRMP on designated European conservation sites. These sites contain species and habitats that are important at a European scale.

1.2 The FRMP, covering the years between 2021 and 2027, seeks to manage significant flood-related issues in the Dee RBD. The Dee River Basin District (RBD) spans the England and Wales border but lies mainly within Wales. The Flood Risk Management Plan (FRMP) covers the English portion of the Dee RBD only. The English Dee RBD covers an area of 416 km^2 which is split between two discrete areas. The smaller southern area (65 km^2) extends eastward from Selattyn to Welshampton and the larger north-eastern area (351 km^2) extends from near Whitchurch to West Kirby on the Wirral coast. The Dee FRMP seeks to reduce a range of flooding threats, including from rivers, the sea, surface water, groundwater and sewers / canals / reservoirs.

1.3 The need for protecting human receptors should be viewed in the context of the environmental challenges present in the English Dee RBD. Many geographic areas in the English RBD are experiencing growth and need to mitigate climate change. Therefore, many freshwater and coastal habitats in the English RBD, important in sustaining wintering wildfowl, fish populations and terrestrial species (e.g. otters), are subject to a wide range of human impacts, such as recreational pressure, reduced water flow / level, declining water quality and coastal squeeze. This HRA assesses the potential for the Dee FRMP to result in Likely Significant Effects (LSEs) and, where applicable, adverse effects on the integrity of European sites. (i.e. the ability of those sites to achieve their conservation objectives).

Methodology

1.4 The Habitats Regulations 2017 (as amended) set out the specific assessment steps required for the HRA process.

1.5 The first step in the sequence of tests, often referred to as HRA screening, establishes whether a more detailed analysis known as Appropriate Assessment is required. The purpose of HRA screening is to determine, in view of the best available scientific knowledge, whether a plan or project, either alone or in-combination with other plans or projects, could result in LSEs on European sites in view of their Conservation Objectives. If the Competent Authority determines that no LSEs are present (both alone and in-combination), then no further assessment is necessary.

Test of Likely Significant Effects

1.6 All measures included in the English Dee RBD were assessed for LSEs on the European sites across and within 10km of the English RBD. None of the measures were identified to result in LSEs on any European site for a range of reasons, including that they are too non-specific to assess meaningfully, already being implemented (thus having undergone HRA previously), being subjected to a separate consenting process (as applies to Local Flood Risk Management Plans, Shoreline Management Plans (SMPs) and Coastal Strategies), desk-based and involving no physical activity on the ground, remote from vulnerable sites or worded such they are about 'investigating', 'reviewing' and 'identifying opportunities'.

1.7 One group of measures was found to commit to physical work on the ground by 'delivering' or 'implementing' flood management interventions, such as coastal defence structures or natural flood management approaches. The broad location of some measures, is known, enabling a broad assessment of their proximity to European sites and potential linking impact pathways. However, further HRA (including Appropriate Assessment) was deferred to either lower-tier plans or the planning application stage when details on the nature of proposals are available. This approach was adopted to account for the strategic (and thereby necessarily non-specific) nature of the FRMP, while also identifying the measures with the highest impact potential on European sites.

1.8 This document also identified that a range of measures in the Dee FRMP have the potential to improve the hydrological condition of European sites across the English RBD, particularly the Mersey Estuary SPA through creation of new saltmarsh habitat. Overall, it was shown that the FRMP represents a positive framework that will help achieve the Conservation Objectives of the SPA, such as by fostering collaboration with landowners through the Environment Land Management Scheme.

Other Plans and Projects

1.9 The potential for the FRMP to result in LSEs and adverse effects on European sites in-combination with (i.e. when considered alongside) other plans and projects was also assessed. Many such plans are proposed across the English Dee RBD, which are associated with their own impact potential. For example, local authorities are proposing a minimum of 47,171 new dwellings within the timescales of their current Local Plans and Core Strategies. There is also a potential for cumulative impacts with Drought Orders and Permits, the Environment Agency National Draught Plan, SMPs, the Wales FRMP, Dee Tidal Estuary Strategy and the Dee LIFE Project.

1.10 Potential in-combination LSEs with Local Plan development were excluded due to most measures not being negatively linked to European sites, the fact that some measures are only included for completeness being driven by entirely separate plan processes, and the strategic nature of the FRMP, meaning that those measures with potential interactions with European sites depend upon considerable further development before the presence of any impact pathways can be clearly identified

Conclusion

1.11 LSEs of the FRMP on all European sites, both alone and in-combination, were excluded for all measures and an Appropriate Assessment was not required. This was based on various factors, including some measures being carried over from the cycle 1 FRMP (which would have been subject to the statutory consenting process, including HRA), already implemented, not associated with impact pathways linking to European sites or too non-specific (either in terms of specific location, their nature or both) to allow for a detailed, meaningful assessment.

1.12 Notably, 17 measures were screened out at the strategic FRMP level but recommended for down-the-line HRA since the measures are sufficiently broadly expressed that they could be delivered without adverse effects but this will need to be reassessed as actual schemes are developed. As the details of potential schemes are developed towards the planning application stage, the HRA process will ensure that adequate mitigation measures, where relevant, are incorporated and the integrity of European sites will be protected.

2. Introduction and Approach to Assessment

Background and Description of the Dee River Basin District

2.1 The Dee River Basin District (RBD) spans the England and Wales border but lies mainly within Wales. The Flood Risk Management Plan (FRMP) covers the English portion of the Dee RBD only. More about the flood risk management planning process in Wales by visiting the Natural Resources Wales website.

2.2 In England the Dee RBD covers an area of 416 km^2, which is split between two discrete areas. The smaller southern area (65 km^2) extends eastward from Selattyn to Welshampton and includes:

- Weston Rhyn
- Chirk Bank
- Moors Bank
- Castle Dingle
- Gadlas

2.3 The larger north-eastern area (351 km^2) extends from near Whitchurch to West Kirby on the Wirral coast and includes:

- Tilston
- Aldford
- Chester
- Neston
- Heswall

2.4 The English Welsh border broadly follows the line of the River Dee along much of its length. The Dee RBD encompasses a range of landscapes including Welsh mountains and steep sided wooded valleys, the plains of Cheshire and the mudflats in the estuary. It has a rich diversity of wildlife and habitats, supporting many species of global and national importance. The Dee is a migratory salmon (*Salmo salar*) river with internationally important pearl mussel (*Margaritifera margaritifera*) populations. The estuary also supports globally important bird populations. Around 89% of the river basin district is rural, with most land being used for agriculture. Over 160,000 people live in the English Dee RBD. The main urban and sub-urban areas are in the north of the English RBD, including:

- Chester
- Neston
- Heswall
- West Kirby
- Whitchurch

2.5 There are no FRAs within the English portion of the Dee RBD.

2.6 The Environment Agency leads development of the Flood Risk Management Plans (FRMP) for River Basin Districts in England and delivery of flood warning services. The draft second cycle FRMP is a plan to manage significant flood risks in designated flood risk areas (FRAs). The ambition is that the FRMP is a strategic, place-based plan which shows what is happening in flood risk management across the River Basin District. FRMPs focus on the more significant areas of flooding and describe the risk of flooding now and in the future. These plans will help:

- identify actions that will reduce the likelihood and consequences of flooding update plans to improve resilience whilst informing the delivery of existing flood programmes
- work in partnership to explore wider resilience measures, including nature-based solutions for flood and water
- set longer-term, adaptive approaches to help improve the nation's resilience

2.7 This document forms the Habitats Regulations Assessment (HRA) for the Dee FRMP. This document considers the potential effects of the draft FRMP on Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, either alone or in combination with other plans or projects, and in view of best scientific knowledge.

Legislative context

2.8 The National Site Network of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) is protected via the Conservation of Habitats and Species Regulations 2017 (as amended, most recently in 2019 to reflect Brexit). These regulations also set out the process for assessing potential adverse effects on such sites, known as HRA. Paragraph 181 of the National Planning Policy Framework[1] clarifies that, in England, the HRA process is also applied to another category of internationally important wildlife site called Ramsar sites.

2.9 The legislative basis for HRA is set in the Conservation of Habitats and Species Regulations 2017 (as amended). This states that 'A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives… The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site'.

2.10 The competent authority that carries out the HRA (in this case the Environment Agency) is required to apply the precautionary principle to European sites and can only adopt a plan once it has been ascertained that it will not adversely affect the integrity of the site concerned. However, even if significant adverse effects on the designated site are predicted, and in the absence of a suitable alternative solution, the plan can still be adopted in exceptional circumstances where there are deemed sufficient imperative reasons of over-riding public interest (IROPI). In such cases, however, compensatory measures must be implemented.

Overview of HRA process

2.11 The Habitats Regulations do not prescribe a particular methodology for carrying out an appraisal of plans or projects. However, it does set out the specific assessment steps involved. In February 2021 the government provided broad guidance on the HRA process[2]. The most detailed guidance on the HRA process in the UK has been produced by Scottish Natural Heritage (now NatureScot). They outline a series of thirteen steps. However, with cognisance of recent case law (refer to Table 1) clarifying when mitigation can be taken into account in the HRA process, the process has been revised to constitute eleven stages (see Figure 1).

2.12 A four-stage methodology for HRA would therefore include:

- HRA Stage 1 – screening (including a 'likely significant effect' judgement)
- HRA Stage 2 – appropriate assessment
- HRA Stage 3 – assessment of alternative solutions
- HRA Stage 4 – assessment where no alternative solutions exist and where adverse effects remain (i.e. consideration of Imperative Reasons of Overriding Public Interest (IROPI)) and identification of compensatory measures.

2.13 The first step in the sequence of tests is to establish whether an appropriate assessment is required. This is often referred to as HRA screening. The purpose of HRA screening is to determine, in view of best available scientific knowledge, whether a plan or project, either alone or in combination with other plans or projects, could have likely significant effects (LSE) on a European site, in view of that site's conservation objectives.

2.14 For this purpose, and as a result of case law 'likely' means 'possible', while a 'significant' effect is one which could undermine the Conservation Objectives of a European site. To this end the HRA process applies the 'Precautionary Principle'[3] to European sites. If the competent authority determines that there are no LSE (including 'in combination' effects from other plans or projects), then no further assessment is necessary and the plan or project can, subject to any other issues, be taken forward. If, however, the competent authority determines that there are LSE, or if there is reasonable scientific doubt, then the next step in the process must be initiated and a detailed appropriate assessment undertaken. While a judgment over likely significant effects must be precautionary, the court in R (Boggis) v Natural

England [2009] EWCA Civ 1061 also noted that there must be a ‘real’, rather than a hypothetical, risk to European sites.

2.15 This is relevant to the assessment of the FRMP measures; while many measures commit to the production, update and/or delivery of other plans (such as Water Level Management Plans, WLMPs), or the assessment of options for, or a general commitment to, flood risk management assets in certain locations, the ability to identify ‘real’ rather than hypothetical impacts is constrained by the fact that considerable further work is needed at lower tiers to develop the plans or schemes in question before specific impact pathways can be identified with any confidence. For example, whether a given WLMP poses a likely significant effect on a given European site will depend entirely on the proposals it contains, which are not set by FRMP measures that commit to updating WLMPs. Similarly, the potential for likely significant effects to arise from ‘implementing flood risk management improvements’ will vary significantly depending on what is proposed and how it is to be delivered, which may not be determined at the FRMP level; a set-back flood embankment or a flood relief channel may have no implications for a given European site compared to sheet piling in the river.

2.16 The purpose of the appropriate assessment is to carry out sufficient scientific investigation to ascertain whether the plan or project, alone or in combination with other plans or projects, will not adversely affect the integrity of European sites, in view of their conservation objectives and considering any design modifications or mitigation (but not compensatory measures, which can only be considered in exceptional circumstances when requirements for the above HRA Stages 3 and 4 have been met).

2.17 Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the European site(s) in question. Plans and projects with predicted adverse impacts on European sites may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network. To ascertain whether or not site integrity will be affected, an Appropriate Assessment should be undertaken of the plan or project in question:

2.18 Over time the term HRA has come into wide currency to describe the overall process set out in the Regulations from screening through to IROPI. This has arisen in order to distinguish the process from the individual stage described in the law as an ‘Appropriate Assessment’.

2.19 The HRA has been carried out being mindful of the implications of European case law in 2018, notably the Holohan ruling and the People over Wind ruling, both discussed below.

Figure 1. Stages of the HRA process (adapted from SNH (2015)). Note that for the purposes of this FRMP Natural Resources Wales were also consulted.

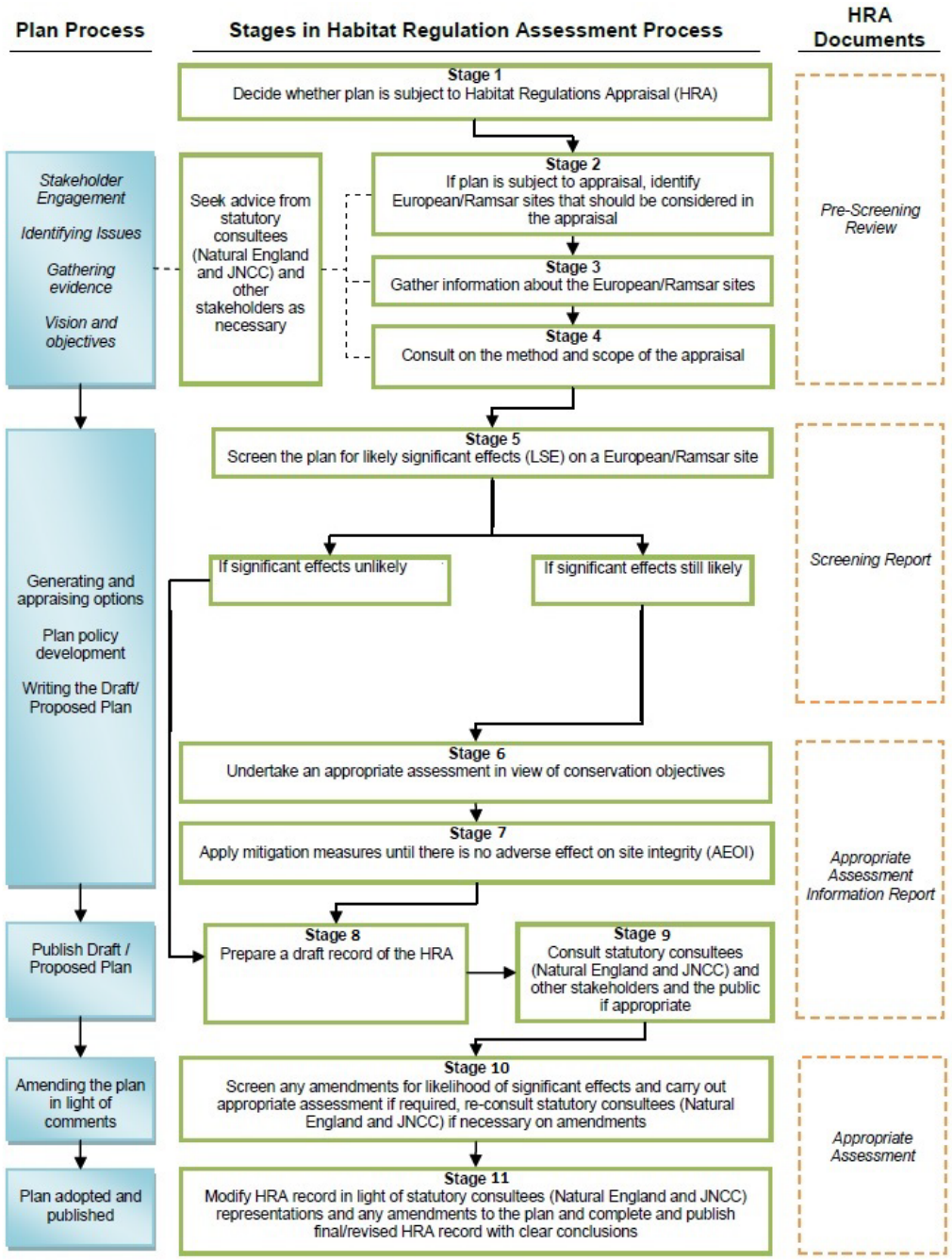


Figure 1 accessible description

Figure 1 shows the plan process, stages in Habitat Regulation Assessment process and HRA documents involved in the HRA process.

The first part of the plan process involves stakeholder engagement, identifying issues, gathering evidence and the vision and objectives. Advice may be needed from statutory consultees, such as Natural England and JNCC, and other stakeholders as necessary. The stages include:

1. Decide whether the plan is subject to Habitat Regulations Appraisal.
2. If the plan is subject to appraisal, identify European and Ramsar sites that should be considered in the appraisal.
3. Gather information about European sites and Ramsar sites.
4. Consult on the method and scope of the appraisal.

A pre-screening review document is needed for stages 1 to 4.

The second part of the plan process involves generating and appraising options, planning policy development and writing the draft/proposed plan. The stages include:

5. Screen the plan for likely significant effects (LSE) on a European or Ramsar site. If the significant effects are unlikely, then move on to stage 8. If significant effects are likely, then continue to stage 6.
6. Undertake an appropriate assessment in view of conservation objectives.
7. Apply mitigation measures until there is no adverse effect on site integrity (AEOI).

A screening report is needed for stage 5 and appropriate assessment information report is needed for stage 6 to 9.

The third part of the plan process involves publishing the draft or proposed plan. The stages include:

8. Prepare a draft record of the HRA.
9. Consult statutory consultees (Natural England and JNCC), other stakeholders and the public if appropriate.

The fourth part of the plan process involves amending the plan in light of comments. This includes stage 10:

10. Screen any amendments for likelihood of significant effects and carry out appropriate assessment if required, re-consult statutory consultees (Natural England and JNCC) if necessary, on amendments.

An appropriate assessment document is needed for stage 10 and 11 of the plan process.

In the fifth and final part of the process the plan is adopted and published. This includes stage 11:

11. Modify HRA record in light of statutory consultees (Natural England and JNCC) representations and any amendments to the plan and complete and publish final/revised HRA record with clear conclusions.

Relevant case law

2.20 As a consequence of the UK's exit from the EU, it was necessary for various amendments to be made to the Habitats Regulations. These changes were required to ensure that England and Wales (and Scotland through separate regulations) continue to maintain the same standard of protection afforded to European sites. The Habitats Regulations remain in force, including the general provisions for the

protection of European sites and the procedural requirements to undertake HRA. The changes made were only those necessary to ensure that they remain operable following the UK's exit from the EU.

2.21 Although the UK is no longer part of the EU, a series of prior rulings of the Court of Justice of the European Union (CJEU) are relevant and have been considered when preparing this document. These rulings and their implications for this HRA are summarised in Table 1.

Table 1. Case law relevant to the HRA of the FRMP

Case	Ruling	Relevance to the HRA of the FRMP
People Over Wind and Sweetman v Coillte Teoranta (C-323/17)	The ruling of the CJEU in this case requires that any conclusion of 'no likely significant effect' on a European site must be made prior to any consideration of measures to avoid or reduce harm to the European site. The determination of likely significant effects should not, in the opinion of the CJEU, constitute an attempt at detailed technical analyses. This should be conducted as part of the appropriate assessment.	NatureScot has published guidance on the implications of this ruling for HRA (SNH, 2019). It will be necessary to distinguish between those measures which are intended to avoid or reduce harmful effects on a European site and those elements of the flood management plan that may incidentally provide some degree of mitigation, but which are intrinsic or essential parts of the plan itself. SNH advises that intrinsic parts of a plan can be considered at the screening stage of HRA. If it can be concluded that the Flood management plan area will have no adverse effect on any European site, in the absence of mitigation, it will be possible to conclude 'no likely significant effects', and the need for further detailed appropriate assessment will be 'screened out'.

Case	Ruling	Relevance to the HRA of the FRMP
Waddenzee (C-127/02)	The ruling in this case clarified that appropriate assessment must be conducted using best scientific knowledge, and that there must be no reasonable scientific doubt in the conclusions drawn. The Waddenzee ruling also provided clarity on the definition of 'significant effect', which would be any effect from a plan or project which is likely to undermine the conservation objectives of any European site.	Adopting the precautionary principle, a 'likely' effect in this HRA is interpreted as one which is 'possible' and cannot be objectively ruled out. The test of significance of effects has been conducted with reference to the conservation objectives of relevant European sites.
Holohan and Others v An Bord Pleanála (C-461/17)	The conclusions of the Court in this case were that consideration must be given during appropriate assessment to: • effects on qualifying habitats and/or species of a SAC or SPA, even when occurring outside of the boundary of a European site, if these are relevant to the site meeting its conservation objectives, and • effects on non-qualifying habitats and/or species on which the qualifying habitats and/or species depend and which could result in adverse effects on the integrity of the European site.	This relates to the concept of 'functionally-linked habitat', i.e. areas outside of the boundary of a European site which supports its qualifying feature(s). In addition, consideration must be given to non-qualifying features upon which qualifying habitats and/or species rely.

Case	Ruling	Relevance to the HRA of the FRMP
T.C Briels and Others v Minister van Infrastructuur en Milieu (C-521/12)	The ruling of the CJEU in this case determined that compensatory measures cannot be used to support a conclusion of no adverse effect on site integrity.	Compensation can only be considered at the relevant stage of HRA and not during appropriate assessment. Compensation must be delivered when appropriate assessment concludes that there will be adverse effects on site integrity.

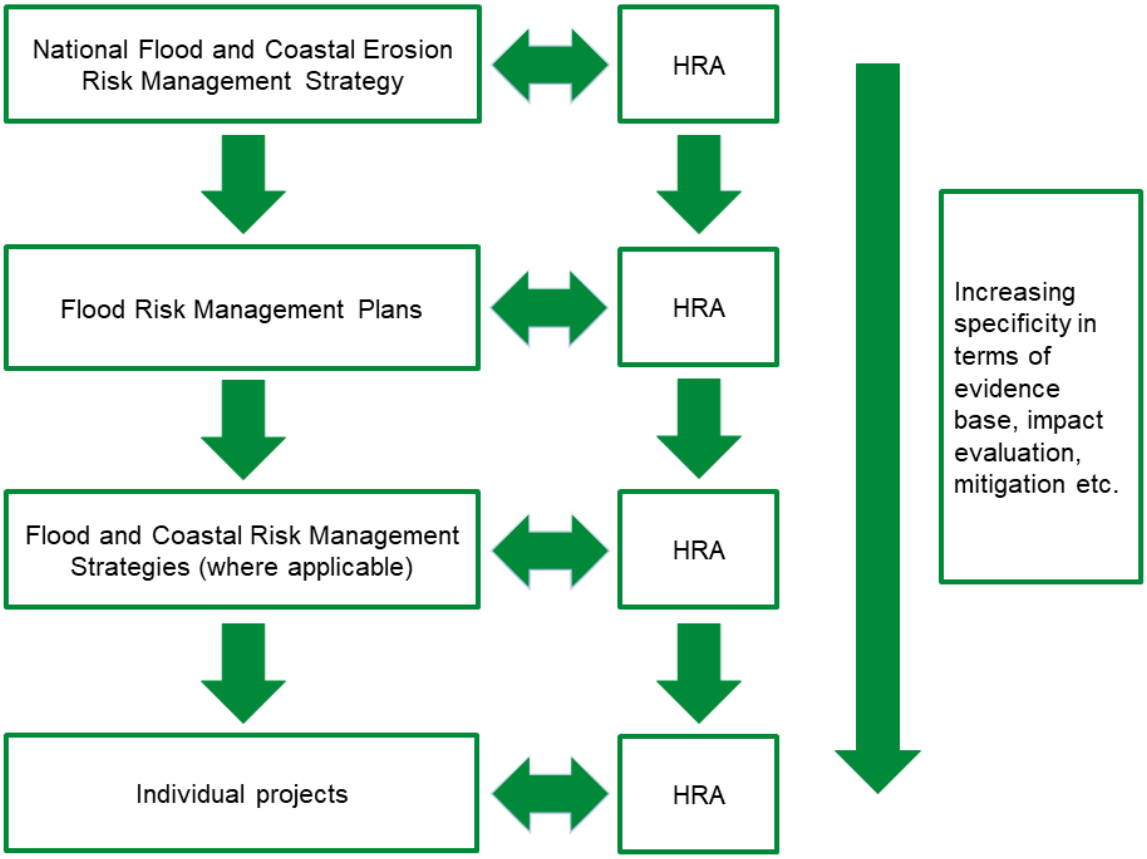
Purpose of this document

2.22 This document forms the HRA of the Dee FRMP. It has been prepared with regard to best scientific knowledge and an examination of potential impacts of the Flood Risk Management Plan on European Sites.

2.23 Project-related HRA often requires bespoke survey work and novel data generation in order to accurately determine the significance of effects. In other words, to look beyond the risk of an effect to a justified prediction of the actual likely effect and to the development of avoidance or mitigation measures.

2.24 However, there is a tacit acceptance that HRA can be tiered and that all impacts are not necessarily appropriate for consideration to the same degree of detail at all tiers as illustrated in Figure 2 below. Note that some measures in the FRMPs come from other plans and are reflected in the FRMP for consistency and completeness.

Figure 2. Tiering in HRA of Land Use Plans



2.25 In any strategic plan, there are numerous measures for which there is a limit to the degree of assessment that is possible at this plan level. This is because either:

- The measure in question does not contain any specific details describing what will be delivered or where so literally cannot be assessed in detail at the plan level.
- Development of a specific type is identified but the nature of the potential impacts are dependent on exactly how the development will be designed and constructed and therefore cannot be assessed in detail at the plan level but rather at the scheme level.

2.26 For example, NatureScot has published guidance[4] that indicates a measure or initiative in a higher tier plan can be screened out without further analysis if:

a. they are intended to protect the natural environment

b. they will not themselves lead to development or other change

c. they make provision for change but could have no conceivable effect on a European site

d. they make provision for change but could have no significant effect on a European site, or

e. effects on any particular European site cannot be identified because the measures are too general or lack any spatial definition

2.27 Similarly, the Habitats Regulations Assessment Handbook[5] sets out three criteria in section F.10.1.5, that it considers would make it reasonable to defer further assessment to a lower tier plan or project:

a. The higher level plan assessment cannot reasonably predict any effect on a European site in a meaningful way

b. The lower level plan or project, which will identify more precisely the nature, timing, duration, scale or location of the measure, and thus its potential effects, will have the necessary flexibility over the exact nature, timing, duration, scale and location of the measure to enable an adverse effect on site integrity to be avoided

c. The HRA of the lower tier plan or project is required as a matter of law or government policy

2.28 In these cases, the HRA focusses on setting down-the-line requirements for more detailed assessment at the scheme level that can be included in the plan to ensure that whatever proposals come forward will not result in adverse effects on integrity. On these occasions the advice of Advocate-General Kokott[6] should be considered. She commented that: 'It would …hardly be proper to require a greater level of detail in preceding plans [rather than planning applications] or the abolition of multi-stage planning and approval procedures so that the assessment of implications can be concentrated on one point in the procedure. Rather, adverse effects on areas of conservation must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure'.

2.29 Similarly, published EU guidance on HRA states: 'Where one or more specific projects are included in a plan in a general way but not in terms of project details, the assessment made at plan level does not exempt the specific projects from the assessment requirements of Article 6(3) at a later stage, when much more details about them are known.'[7]

2.30 It is also important to consider the approach taken regarding coastal defence schemes and strategies. The stance throughout all FRMP HRAs is that, provided measures are already covered by the SMP/Coastal Strategy process or another HRA process, then these measures are effectively included in the FRMPs for completeness. The FRMPs are not the source plans for these schemes and they are already committed elsewhere. The SMP and Coastal Strategies will be updated as part of their normal cycle and that will include revision to their HRAs which will take account of any changes in evidence. Each scheme will also have its own HRA before it is consented. In these cases, the DTA handbook states that plan elements can be screened out if they have, or will be subject to, HRA under another plan and this plan (the FRMP) would not materially change if they were omitted.

2.31 This is the approach taken in the HRA of the FRMP to avoid confusing the FRMP with other plan processes (such as Shoreline Management Plan (SMP) and Coastal

Strategy processes) that have their own separate HRA, or the individual schemes that are referenced in the FRMP and will be taken forward subject to significant further work including outline design, detailed design, securing of funding, community consultation and securing of necessary consents and permits. The fact that a scheme is referenced in the FRMP does not prejudge the down-the-line permitting processes.

The 'in Combination' Scope

2.32 It is a requirement of the Habitats Regulations that the impacts and effects of any land use plan being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the European site(s) in question.

2.33 When undertaking this part of the assessment it is essential to bear in mind the principal intention behind the legislation, i.e. to ensure that those projects or plans which in themselves have minor impacts are not simply dismissed on that basis but are evaluated for any cumulative contribution they may make to an overall significant effect. In practice, in combination assessment is therefore of greatest relevance when the plan would otherwise be screened out because its individual contribution is inconsequential. The overall approach is to exclude the risk of there being unassessed likely significant effects in accordance with the precautionary principle. This was first established in the seminal Waddenzee[8] case.

2.34 For the purposes of this HRA, in-combination assessment is focussed on the plans and projects identified in the Strategic Environmental Assessment (SEA) Environmental Report of the FRMP. The plans and projects were identified in the SEA as having a significant interaction with the FRMP for biodiversity, flora and fauna and required consideration. The key relevant plans and projects with a potential for in-combination effects are:

- Wirral Local Plan
- Cheshire West and Chester Local Plan
- Cheshire East Local Plan
- Cheshire East Local Plan Strategy
- Flintshire / Sir y Fflint Local Development Plan
- Shropshire Core Strategy
- National Flood and Coastal Erosion Risk Management Strategy for England
- River Basin Management Plans (RBMP) for the English Dee RBD
- North West England and North Wales Shoreline Management Plan (SMP) 2
- United Utilities Final Water Resources Management Plan 2019
- Hafren Dyfrdwy Water Resources Management Plan 2019
- Northern Powerhouse Strategy
- Welsh Dee RBD FRMP

- Wales FRMP (this was being developed at the time of writing and will cover the whole of Wales. The North East Place chapter will be relevant to the Dee FRMP)

2.35 The potential for ‘in combination’ effects between these plans and projects and the FRMP are discussed later in this document.

3. Pathways of Impact

Direct habitat loss

3.1 Any permanent, irreversible, habitat loss from a designated site that will result in the loss of qualifying habitats and / or species, or habitats that support the designated species, will be adverse, although to affect the integrity of the site (the coherence of its structure and function) the loss must be sufficiently adverse that it materially impairs the achievement of the Conservation Objectives for the site.

3.2 Various developments can result in the loss of habitat in European Sites, either temporary or permanent. Temporary habitat loss (e.g. such as due to the need for a construction period footprint to encroach on a site) is potentially reversible depending on what the site is designated for, and there is also potential for deploying mitigation measures to avoid adverse effects on site integrity. In contrast, the permanent loss of designated habitat will result in a reduction of coverage of a potentially very rare ecosystem, with potential knock-on impacts on dependent qualifying species.

3.3 Plans or projects that result in the loss of land from a SAC can be approved in certain situations (please see Defra (2012)[9], even if the loss is sufficient to adversely affect the integrity of an SAC, if three sequential tests are met:

- no feasible alternative solutions to the plan or project exist that are less damaging
- imperative reasons of overriding public interest (IROPI)
- compensatory measures secured to ensure that the overall coherence of the European Site network is maintained

Inappropriate Coastal Management Including Coastal squeeze

3.4 Inappropriate coastal management covers any coastal management activities that would interfere with natural coastal processes to such an extent that they would potentially interfere with the ability of European sites to achieve their conservation objectives. Examples of inappropriate coastal management include:

- Reduced sediment supply to adjacent frontages, resulting in loss of habitat area. For example, defending the Holderness Coast in East Yorkshire results in a reduction in the amount of longshore sediment that would otherwise be transported into the Humber Estuary SAC/SPA/Ramsar site and this in turn could affect the persistence of features that require a continued supply of sediment, such as Spurn Point.
- Presence of flood risk management defences causing habitat erosion seawards of those defences due to wave reflection. This is more of an issue

with some types of defence (such as sheet metal piling) than with other types of defence.

- Restriction of the area of intertidal habitat in front of the flood risk management defences.
- Coastal squeeze.

3.5 Coastal squeeze is defined by government as 'the loss of natural habitats or deterioration of their quality arising from anthropogenic structures or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures.'[10]

3.6 Measures which involve a 'Hold the Line' approach by establishing a hard structure or maintaining the existing standard of protection by improving the defences, have the potential to result in the loss of seaward habitats as a consequence of coastal squeeze. The process of coastal squeeze prevents the landward transgression of habitats in response to climate change and resulting sea level rise. Over time, unmitigated coastal squeeze would inevitably lead to the cumulative loss of designated habitats and supporting functionally-linked habitats. Coastal squeeze impacts due to measures have already been fully explored and mitigation or compensation quantified if necessary through the SMP and Coastal Strategy process and their HRAs, and through the Flood and Coastal Erosion Risk Management (FCERM) National Strategy 2021 and compensation delivered in the form of the Habitat Compensation Programme. Therefore, coastal squeeze is scoped out of this HRA.

3.7 All the FRMPs contain measures which refer to implementing or updating Shoreline Management Plans or Coastal Strategies or flood and coastal erosion risk management schemes that are contained within those documents. In commenting on the draft version of the HRA, Natural England advised the SMP Health Check documents will include detail on what changes to SMP HRAs will be required to account for (for example) changes in sea level rise predictions. However, these reports have not yet been completed or published, and as such this information is not yet available.

3.8 The approach taken throughout all FRMP HRAs is that, provided such schemes are already covered by the SMP/Coastal Strategy process or another HRA process, these measures are effectively included in the FRMPs for completeness. The FRMPs are not the source plans for these schemes and they are already committed elsewhere. The SMP and Coastal Strategies will be updated as part of their normal cycle and that will include revision to their HRAs which will take account of any changes in evidence. Each scheme will also have its own HRA before it is consented.

Disturbance

3.9 Flood risk management construction works can result in noise or visual disturbance of qualifying species in European sites, both during the construction and operational periods. For example, noise and visual disturbance arising from construction may result in temporary behavioural changes in otters (e.g. disturbance in holts, displacement from specific stretches of the river). Piling noise during construction of defences could displace over wintering or breeding birds for which an SPA is designated. Three of the most important factors determining the magnitude of disturbance from construction schemes appear to be species sensitivity, proximity of the disturbance source and timing / duration of the disturbance.

Birds

3.10 Development schemes (such as those for flood risk management assets) can result in the disturbance of qualifying SPA / Ramsar bird species in European sites or functionally linked habitats and this can apply whatever activity the bird is undertaking, whether nesting, foraging, loafing or roosting. Noise and visual disturbance arising from construction activities may result in behavioural changes (e.g. flight from the nest, cessation of foraging) in birds. Furthermore, post-construction disturbance from site usage, road traffic and operational lighting might also arise. Three of the most important factors determining the magnitude of disturbance appear to be species sensitivity, proximity of the disturbance source and timing / duration of the disturbance. Generally, the most disturbing visual and auditory stimuli are likely to involve irregular, infrequent, unpredictable loud noise events, movements or vibrations. Birds are least likely to be disturbed by activities that involve regular, predictable and quiet patterns of sound or movement. The further any activity is from the birds, the less likely it is to result in disturbance.

3.11 An increasing amount of research on visual and noise disturbance of waterfowl from construction (and other activities) is now available. Both visual and noise stimuli may elicit disturbance responses, potentially affecting the fitness and survival of waterfowl and waders. Noise is a complex disturbance parameter requiring the consideration of multiple parameters, including the fact that it is not described on a linear scale, its nonadditive effect and the source-receptor distance. A high level of noise disturbance constitutes a sudden noise event of over 60dB or prolonged noise of over 72dB. Bird responses to high noise levels include major flight or the cessation of feeding, both of which might affect the survival of birds if other stressors are present (e.g. cold weather, food scarcity).

3.12 Generally, research has shown that above noise levels of 84 dB waterfowl show a flight response, while at levels below 55dB there is no effect on their behaviour[11]. These two thresholds are therefore considered useful as defining two extremes. The same authors have advised that regular noise levels should be below 70 dB at the bird, as birds will habituate to noise levels below this level[12]. The Waterbird Disturbance Mitigation Toolkit published by the Institute of Estuarine & Coastal Studies in 2013, summarises the key evidence base relating to the noise disturbance

impact pathway[13]. Generally, noise is attenuated by 6 dB with every doubling of distance from the source. Impact piling, the noisiest construction process of approx. 110 dB at 0.67m from source, will therefore reduce to 67-68dB by 100m away from the source. The loudest construction noise should therefore have fallen to below disturbing levels by 100m, and certainly by 200m, away from the source even without mitigation. Note that this is a rule of thumb and does not obviate the need for application-level noise modelling. However, comparison with baseline noise levels will also be important in any assessment rather than purely using comparison with the 70 dB metric (see paragraph below).

3.13 An alternative approach to assessment is to consider the relative change in the noise levels experienced by birds, rather than an absolute noise threshold. There are no formal guidelines that define a change threshold that is deemed disturbing to waterfowl and waders, but they are thought to have hearing comparable to humans. For humans a change of 3 dB defines the threshold for a change in noise to be perceptible (in other words, a change of 1 or 2 dB cannot be detected by the human ear). However, there is a significant difference between being able to notice that a noise has gotten louder and finding the increase in noise to be sufficiently intolerable that it causes displacement or otherwise significantly disrupts activity. Therefore, 3 dB may be an excessively precautionary threshold to use for judging disturbance. Due to the logarithmic nature of the decibel scale a change of 5 dB increase at the receptor is approximately a 50% increase in perceived loudness while a 10 dB increase is a doubling in perceived loudness or sound intensity. It is reasonable to assume that an increase of 10 dB would run a high risk of causing adverse impacts to bird behaviour such as flushing, for the duration of exposure.

3.14 Visual disturbance is generally considered to have a higher impact than noise disturbance as, in most instances, visual stimuli will elicit a disturbance response at much greater distances than noise[14]. For example, a flight response is triggered in most species when they are approached to within 150m across a mudflat. Visual disturbance can be exacerbated by workers operating equipment outside machinery, undertaking sudden movements and using large machinery. Some species are particularly sensitive to visual disturbance[15], including curlew (taking flight at 275m), redshank (at 250m), shelduck (at 199m) and bar-tailed godwit (at 163m). In some areas, greater distances have been agreed between Environment Agency and Natural England, at least for purposes of HRA Screening. For example, in the Humber Estuary area have agreed a precautionary distance of 300m for the purposes of assessment of bird disturbance.

Fish / Marine Mammals

3.15 Fish use sound for vital life functions, requiring it for completion of their life cycle as well as maintaining productivity. A review of 115 primary studies (66 of which were investigating fish species) highlights that noise disturbance leads to a wide range of impacts in fish, including their development, anatomy, physiology, stress levels and behaviour[16]. A study comparing the foraging behaviour of perch and roach, found that both species showed significantly fewer feeding attempts when exposed to

motorboat noise[17]. For roach, which are better hearing than perch, no habituation to noise occurred over time. In a study of pink snappers (similar to many other commercial species such as tuna, cod and haddock), it was determined that a single seismic air gun with a source noise level of 222.6dB re 1uPa resulted in extensive damage to the ears, with no apparent recovery after 58 days[18]. The impacts of noise may not be immediately visible, as demonstrated by a noise playback experiment on perch, carp and gudgeon. Exposure of the fish to underwater ship noise, resulted in cortisol increases of between 81% to 120% compared to control values[19]. Notwithstanding this evidence, it is important to note that extrapolations from noise impact studies to different settings or species should be made with caution.

3.16 Construction noise also presents a significant threat (both regarding injury and mortality) to marine mammals, including harbour porpoise and grey seals. For example, the density of harbour porpoise has been shown to be significantly reduced for several kilometres surrounding seismic surveys and impact piling activities[20] [21]. Cetaceans produce and receive sound over a great range of frequencies for use in communication, orientation, predator avoidance and foraging. Interference with these important behaviours has the potential to result in significant negative impacts. Harbour porpoise are high frequency cetaceans that have low sensitivity thresholds to impulsive sound sources. Anthropogenic sound has the potential to result in direct effects on the hearing ability of mammals (among other impacts, such as behavioural responses and masking of other underwater sounds), including Permanent Threshold Shifts (PTS) and Temporary Threshold Shifts (TTS)[22]. Some construction works within the marine environment may require Unexploded Ordnance (UXO) detonation, which involves impulsive sound elements stretching over tens of kilometres. In practice, it is typically not known whether such works will be required. Guidance from the Joint Nature Conservation Committee (as utilised for example in the HRA of the South-West England Marine Plan) confirms that a likely significant effect via underwater noise could affect European sites up to 50km distant depending on the nature of the works.

Hydrology

3.17 The water level, its flow rates and the mixing conditions are important determinants of the condition of European sites and their qualifying features. Hydrological processes are critical in influencing habitat characteristics in wetlands and coastal waters, including current velocity, water depth, dissolved oxygen levels, salinity and water temperature. In turn these parameters indirectly determine the short- and long-term viability of plant and animal species, as well as overall ecosystem composition.

3.18 Many animal species are directly sensitive to hydrological changes, including the drying and excessive flooding of habitat. For example, many species (partially) restricted to the aquatic environment are sensitive to periodic or permanent drying, because this reduces the extent of supporting habitat available. This includes species such as the great-crested newt, southern damselfly, white-clawed crayfish and a diverse array of fish (e.g. Atlantic salmon, river lamprey, sea lamprey). In contrast, excessive flooding can result in sub-optimal water levels for foraging birds, such as

small waders. If water is too deep, some species may not be able to access their primary prey species, with potential implications for foraging efficiency.

3.19 Wetland, riverine, estuarine and coastal habitats rely on hydrological connections with other surface water systems. A supply of water within natural limits is fundamental to maintaining the ecological integrity of sites. However, while the natural fluctuation of water levels within narrow limits is desirable, excess or too little water supply might cause the water level to be outside of the required range of plant and animal species. This might lead to the loss of the structure and function of aquatic habitats.

3.20 FRMPs generally propose measures to reduce the magnitude and impacts of potential flooding events. This may involve a wide range of interventions, such as flood defences and natural flood management techniques. If any such measures are delivered in the proximity to hydrology-dependent European sites, they may have implications for the water level in designated site boundaries. For example, a natural flood management intervention delivered immediately upstream of a designated floodplain or waterbody, while intended to restore the hydrological regime to a natural baseline, could reduce the volume of freshwater input to and flooding regime in that downstream European site.

Pollution

3.21 The quality of the water that feeds European sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

- At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.
- Eutrophication, the enrichment of water with nutrients, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In freshwater ecosystems, plant growth is primarily determined by phosphorus concentrations, which are determined by a wide range of sources, including treated sewage effluent from Wastewater Treatment Works and urban surfaces such as roads.
- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

3.22 There is an obligation for flood risk protection, management and resilience schemes to consider water quality impacts. Under the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016, it is illegal to pollute watercourses. Individual planning proposals will undergo Preliminary Ecological Appraisal (PEA) or

Environmental Impact Assessment (EIA), if identified as Schedule 1 or Schedule 2 proposals by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. As such, water quality protection measures must by law be introduced on any scheme that could affect the water quality of the river or coastal environment, irrespective of whether part of that environment is designated as an SAC or SPA.

Functionally-Linked Land

3.23 While most European sites have been geographically defined in order to encompass the key features that are necessary for coherence of their structure and function, this is not the case for all such sites. Due to the highly mobile nature of waterfowl, it is inevitable that areas of habitat of crucial importance to the maintenance of their populations are outside the physical limits of the European site for which they are an interest feature. However, this area will still be essential for maintenance of the structure and function of the interest feature for which the site was designated and land use plans that may affect this land should still therefore be subject to further assessment. This has been underlined by a recent European Court of Justice ruling (C-461/17, known as the Holohan ruling[23]) which in paragraphs 37 to 40 confirms the need for an appropriate to consider the implications of a plan or project on habitats and species outside the European site boundary provided that those implications are liable to affect the conservation objectives of the site.

3.24 Certain management approaches, while positive for coastal processes, could result in the loss of landward habitats, such as coastal grazing marsh, grassland, reedbeds and arable land. Birds are mobile species and are also dependent on sites outside of formal designations and rely on the availability of a network of feeding and roosting resources over the winter period.

Spread of invasive non-native species

3.25 Invasive non-native species can have detrimental impacts on native species and habitats. Their spread can occur during construction and operation of a development, and via multiple pathways (for example via watercourses or on the treads of construction machinery).

3.26 Under the Wildlife and Countryside Act 1981, as amended, and the Invasive Alien Species (Enforcement and Permitting) Order 2019, it is an offence to cause any plant to spread or grow in the wild outside of its native range. Appropriate biosecurity measures will therefore also be implemented during works carried out during both the construction and operational phases of any scheme to prevent the spread of invasive non-native species, irrespective of whether there are European sites in the vicinity.

4. Test of Likely Significant Effects

4.1 When seeking to identify relevant European sites, consideration has been given primarily to identified impact pathways and the source-pathway-receptor approach, rather than adopting a purely 'zones'-based approach. The source-pathway-receptor approach is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means there is no possibility for an effect to occur. Furthermore, even where an impact is predicted to occur, it may not result in significant effects (i.e. those which undermine the conservation objectives of a European site). Briefly defined, pathways are routes by which a change in activity can lead to a significant effect upon a European site.

4.2 The likely zone of impact (also referred to as the likely 'zone of influence') of a plan or project is the geographic extent over which significant ecological effects are likely to occur. The zone of influence of a plan or project will vary depending on the specifics of a particular proposal and must be determined on a case-by-case basis with reference to a variety of criteria, including:

- the nature, size / scale and location of the plan
- the connectivity between the plan and European sites, for example through hydrological connections or because of the natural movement of qualifying species
- the sensitivity of ecological features under consideration
- the potential for in-combination effects

4.3 There is no geographical limit beyond which plans need not be considered by HRA. However, as a first step in identifying European sites which may be relevant, a search was made for sites within the River Basin District, or within 10km of the River Basin District. Consideration was then given to their hydrological sensitivity and the potential for them to be connected to flood risk management measures. The European sites identified within this search area is given in Table 2. Note that there are numerous European sites within the River Basin District or within 10km of it which are not hydrologically sensitive or likely to be affected by flood defences or are hydrologically sensitive but would not be linked to potential flood risk management activities. These are not listed below as they are scoped out of the HRA process.

4.4 The hydrologically sensitive European sites across the Dee River Basin District, can be divided into freshwater and coastal sites.

Freshwater European Sites

4.5 There are four freshwater sites that lie partially within the English portion of the Dee region: Midland Meres & Mosses Phase 2 Ramsar, Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC, Brown Moss SAC and the River Dee and Bala Lake SAC. Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC and River Dee & Bala

Lake SAC are both cross-border European sites lying partly within England and partly within Wales.

4.6 None of the measures have been identified to result in likely significant effects on any hydrologically sensitive freshwater sites. This is generally because the measures are:

- too non-specific to assess meaningfully
- already being implemented
- already subjected to a separate HRA process (e.g. a Coastal Strategy or a SMP will have its own HRA process)
- essentially desk-based
- remote from European sites or
- worded such that they are about 'investigating' or 'reviewing' or 'identifying opportunities for' interventions, rather than committing to any specific interventions or actions the ground. Any specific schemes that subsequently emerge from the investigation/ review will be subject to their own down-the-line HRA process.

4.7 One broader matter requiring consideration as part of the Likely Significant Effects process is the extent to which any measures, through committing to the status quo, may be contributing to the exacerbation or persistence of an existing water-related problem at European sites. However, for the Dee region no specific measures have been identified that contain proposals that would reinforce a negative situation, subject to down-the-line HRA for any schemes that may emerge from the numerous studies committed to in the FRMP.

4.8 Although not technically within the remit of HRA, it is nonetheless noted that there are several measures that present opportunities for improving the hydrological situation at European sites in affected areas, in conjunction with nature recovery plans and catchment sensitive farming, particularly as applied to the key foci for hydrologically sensitive European sites in Dee region. This is discussed in the following sections within the context of the current hydrological vulnerability of relevant freshwater European sites.

4.9 Although non-specific, the following broad measures applicable to the River Basin District could give rise to initiatives and opportunities to improve European site hydrology:

- 'The Environment Agency and Risk Management Authorities, wider communities and stakeholders will exploit opportunities to store water or manage run-off in identified areas in northern England to provide overall flood risk reduction and environmental benefits in the Dee River Basin District.'
- 'The Environment Agency and Risk Management Authorities will explore opportunities to collaborate with environmental partners and major landowners to increase upland and lowland peat and wetland restoration in northern England to reduce flood risk, restore natural habitats and allow for carbon sequestration to counter the impacts of climate change in the Dee River Basin District.' An example of this is the Marches Mosses BogLIFE Project[24] which

aims to restore Britain’s third largest lowland raised bog on the Shropshire/Welsh border.

4.10 Depending on how they are delivered, both these measures have the potential to benefit the bog and wetland European sites in the English Dee RBD. For example, the Site Improvement Plan for Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC indicates that the site is suffering from unfavourable hydrology and drainage, stating that ‘Because of the highly modified nature of the cut over peat surface, the large size of the site and the extensive and complex nature of the artificial drainage system allowing for pastoral agriculture and forestry on the main peat body, the restoration of a favourable hydrological regime requires considerable effort. To achieve stable water levels near to ground level beyond the core area will involve improving and reconfiguring the drainage system on and around the site beyond the current rewetted area of the National Nature Reserve (NNR) and this may have implications for the viability of agricultural grazing and forestry. This will be complex and require a significant investment of resources. Barriers that have prevented a water level management plan being put in place need to be reviewed and addressed. Further progress will require further planning, negotiation and the co-operation of landowners and watercourse managers, as well as the funding to implement the necessary measures that are identified’.

4.11 This is expanded upon in the Supplementary Advice on the Conservation Objectives for the SAC which states that ‘The sandy hill catchment to the north and north-east of the SAC has been identified as being critical in that water abstraction from this area would affect the amount of run-in to the bog (Symonds Group Ltd. 2004). Establishing an appropriate hydrological regime on the marginal peats may mean re-wetting some presently drained farmland on mineral ground around the peat edge. This means re-routing the lagg streams (e.g. the Bronington Manor Drain) to the margins of the bog and then ultimately raising their water levels. Currently many lagg streams have been canalised within the peat to enable marginal peats and mineral ground to be drained (Martin Wright Associates, 2014)’.

4.12 Similarly, for Brown Moss SAC, the Site Improvement Plan notes that ‘The site dried out almost completely in summer 2013. The influence of groundwater and direction of flow is thought to be key to the management of the notified feature. Surface drains and ditches also exist, some draining surrounding farmland, others linking the pools. Some of these have become silted up or diverted and need further investigation to determine the quantity and quality of water coming into the site’. The SACO expands on this stating ‘Brown Moss has modified drainage, with shallow ditches connecting all pools, Pool 3 appearing to be the last in the series. Also there are several pipe outfalls which bring surface and underground field drainage into the site which affects water quality, quantity and timing of delivery. The pools also receive shallow surface groundwater through the sands and gravels. Prior to artificial drainage the site probably received diffuse surface water via natural flow pathways on the surrounding land so it is not thought essential to block these drains to restore to more natural hydrology which could have adverse impacts if carried out suddenly, on the fen, marsh and swamp communities. Currently the main concern is the poor water quality

from these outfalls so the ditches should not be cleared out but allowed to infill gradually providing more opportunity for amelioration of the pollution by biological processes, whilst also addressing sources of diffuse pollution in the catchment and encouraging restoration of natural hydrology in the whole catchment'.

4.13 Depending on how they are realised the aforementioned measures could help to achieve these objectives.

Coastal European Sites

4.14 Hydrologically sensitive coastal European sites occupy much of the Dee Estuary. There are numerous measures in the Dee FRMP which refer to implementing or reviewing Coastal Strategies and SMPs. Such plans and strategies present considerable potential for impacts on sensitive coastal sites as set out in Section 3, particularly coastal squeeze, direct habitat loss from coastal defence footprints and (depending on use of land outside SPA boundaries by qualifying wildfowl and waders) loss of functionally-linked land.

4.15 However, the FRMP does not decide the content of either SMP's or Coastal Strategies (including the package of underlying schemes) as these are subject to their own independent development and assessment processes, including HRA. The FRMP's are essentially referencing these strategies and plans to create a complete picture of flood risk management in coastal areas. Therefore, despite the potential SMPs and Coastal Strategies possess for affecting European sites, the FRMP measures relating to those plans will not result in likely significant effects.

4.16 Measures that commit to 'reviewing' SMP's or Coastal Strategies do contain within them the potential to also commit to shaping those plans with a view not simply to managing flood risk to human assets but also positively influencing persistence and/or recovery of coastal habitats. This is not strictly an HRA consideration, since HRA is fundamentally about identifying whether given measures will interfere with the ability of European sites to achieve their conservation objectives, rather than shaping them to positively contribute towards achievement of those objectives. However, those measures could be amended to include reference to shaping the next generation of SMP's and Coastal Strategies to not only take account of the latest sea level rise projections but also opportunities to improve achievement of conservation objectives for the European sites on the relevant frontage.

4.17 The locations of the European sites detailed in Table 2 are illustrated in Appendix A.

Table 2. European sites within 10km of the Dee River Basin District and that are potentially linked to local flood risk management measures

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
Dee Estuary/ SAC SPA/ Ramsar	The site is designated as a SAC for its: Qualifying Annex I habitats: • Mudflats and sandflats not covered by seawater at low tide • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Estuaries • Annual vegetation of drift lines • Vegetated sea cliffs of the Atlantic and Baltic Coasts • Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') • Fixed coastal dunes with herbaceous vegetation ('grey dunes') * Priority feature • Humid dune slacks Annex I priority habitats are denoted by an asterisk (*). Qualifying Annex II species • Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis* • Petalwort *Petalophyllum ralfsii*	The Dee Estuary SAC/ SPA/ Ramsar lies partially within the English Dee River Basin District. The site consists of 3 component SSSI's, 1 of which (Gronant Dunes and Talacre Warren SSSI) is in Wales. The Dee Estuary lies on the boundary between England and Wales on the north-west coast of Britain. It is a large, funnel-shaped, sheltered estuary that supports extensive areas of intertidal sand-flats, mud-flats and saltmarsh. The saltmarshes grade into transitional brackish and swamp vegetation on the upper shore By definition, estuaries receive input from both freshwater and sea water sources, the interplay of which will determine the abiotic conditions and, ultimately the integrity of qualifying habitats. All qualifying fish species, particularly anadromous species such

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
	The site is designated as a SPA for its: Qualifying Annex I species: • Bar-tailed godwit *Limosa lapponica* • Common tern *Sterna hirundo* • Little tern *Sterna albifron* • Sandwich tern *Sterna sandvicensis* Regular use by the following migratory species (other than those listed in Annex I): • Redshank *Tringa tetanus*, passage • Shelduck *Tadorna tadorna*, wintering • Teal *Anas crecca*, wintering • Pintail *Anas acuta*, wintering • Oystercatcher *Haematopus ostralegus* -, wintering • Grey plover *Pluvialis squatarola*, wintering • Knot *Calidris canutus islandica*, wintering	as sea lamprey and river lamprey, depend on sufficient hydrological flows to reach their upstream spawning grounds. Being an estuary, the site is inherently linked to the River Basin District. All qualifying species in the SPA/ Ramsar depend on adequate freshwater supply, which determines mixing conditions, salinity gradients, sediment input and the distribution of foraging resources. The qualifying features are also directly and indirectly sensitive to water pollution and coastal squeeze. Natterjack toads spend a portion of their life within aquatic environments and are sensitive to changes in both ground and surface water flow and quality.

	• Dunlin *Calidris alpina*, wintering • Black-tailed godwit *Limosa limosa islandica*, wintering • Curlew *Numenius arquata*, wintering • Redshank *Tringa totanus*, wintering The site has been designated under Ramsar criteria 1, 2, 5 and 6 Ramsar Criterion 1: • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Vegetated sea cliffs of the Atlantic and Baltic coasts • *Salicornia* and other annuals colonising mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’) • Fixed dunes with herbaceous vegetation (‘grey dunes’) • Humid dune slacks Ramsar Criterion 2: • Natterjack toad *Epidelea calamita* Ramsar Criterion 5: Assemblages of international importance. Species with peak counts in winter: • Non-breeding season regularly supports 120,726 individual waterbirds Ramsar Criterion 6: Species/populations occurring at levels of international importance. Species with peak counts in spring/ autumn: • Redshank *Tringa tetanus*.	

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
	Species with peak counts in winter: • Teal *Anas crecca*, NW Europe • Shelduck *Tadorna tadorna,* NW Europe • Oystercatcher *Haematopus ostralegus*, Europe & W Africa • Curlew *Numenius arquata* Europe/NW Africa • Pintail *Anas acuta*, NW Europe • Grey plover *Pluvialis squatarola*, E Atlantic • Knot *Calidris canutus islandica,* W Europe/ Canada • Dunlin *Calidris alpina alpina* Europe (breeding) • Black-tailed godwit *Limosa limosa islandica,* Iceland • Bar-tailed godwit *Limosa lapponica*, W European • Redshank *Tringa totanus,* Eastern Atlantic Dee Estuary SSSI is 100% favourable condition; Thurstaston Common SSSI is 100% unfavourable – recovering.	

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
Liverpool Bay SPA	The site is designated as a SPA for its: Qualifying Annex I species: • Red-throated diver *Gavia stellata* (non-breeding) • Little gull (non-breeding) • Little tern (breeding) • Common tern (breeding) Regular use by the following migratory species (other than those listed in Annex I): • Common scoter Waterbird assemblage: Main components include non-breeding red-throated diver, common scoter, red-breasted merganser *Mergus serrator* and great cormorant.	Liverpool Bay / Bae Lerwpl SPA lies immediately adjacent (0.14 km) to the Dee River Basin District boundary.

Mersey Narrows & North Wirral Foreshore SPA/ Ramsar	The site is designated as a SPA for its: Qualifying Annex I species: • Bar-tailed godwit – non-breeding • Common tern – breeding and non-breeding In addition, it is one of the most important locations in the UK for non-breeding little gull (*Hydrocoloeus minutus*) and is used regularly by 1% or more of the biogeographical population of the following regularly occurring migratory species (other than those listed in Annex I) in any season: knot. Waterbird assemblage: cormorant, oystercatcher, grey plover, sanderling, knot, dunlin, bar-tailed godwit, redshank. The site is designated as a Ramsar site for the following Criteria: Criterion 4: The site regularly supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions e.g., important numbers of non-breeding little gulls *Hydrocoloeus minutus* and common terns. Criterion 5: Assemblages of international importance. The site regularly supports 20,000 or more waterbirds. Criterion 6: The site regularly supports 1% of the individuals in the populations of the following species or subspecies of waterbird in any season: *islandica* and *lapponica* sub-species of bar-tailed godwits, non-breeding knot. North Wirral Foreshore SSSI is in unfavourable – declining condition. Mersey Narrows SSSI is 77.73% unfavourable – recovering, 22.27% favourable.	Mersey Narrows & North Wirral Foreshore SPA/ Ramsar lies immediately adjacent (0.024 km) to the Dee River Basin District boundary. The site consists of 2 component SSSI's. Mersey Narrows & North Wirral Foreshore SPA/ Ramsar lies immediately adjacent to the North West River Basin District boundary. Mersey Narrows and North Wirral Foreshore is located on the northwest coast of England at the mouths of the Mersey and Dee estuaries. The site comprises intertidal habitats at Egremont foreshore, man-made lagoons at Seaforth and the extensive intertidal flats at North Wirral Foreshore. All qualifying species in the SPA depend on adequate freshwater supply, which determines mixing conditions, salinity gradients, sediment input and the distribution of foraging resources. The qualifying features are also directly and indirectly sensitive to water pollution and coastal squeeze.

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
River Dee and Bala Lake SAC	The site is designated as a SAC for its: Qualifying Annex I habitat: • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. (Rivers with floating vegetation often dominated by water-crowfoot) Qualifying Annex II species: • Atlantic salmon *Salmo salar* • Brook lamprey *Lampetra planeri* • Bullhead *Cottus gobio* • Floating water-plantain *Luronium natans* • Otter *Lutra lutra* • River lamprey *Lampetra fluviatilis* • Sea lamprey *Petromyzon marinus* The River Dee SSSI is 59.65% favourable and 40.35% unfavourable – no change	River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC lies partially within the Dee River Basin District, with the River Dee running along the Eland/Wales border. The site consists of 3 component SSSI's, 2 of which (Afon Dyfrdwy (River Dee) SSSI and Llyn Tegid SSSI) are in Wales. The River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC extends from the upland source of the Dee at Bala Lake in Snowdonia, Wales through lowland Shropshire and Cheshire in England, to its outflow into the Dee Estuary, and includes some of the tributaries such as the Ceiriog. Water is clearly fundamental to a riverine SAC. Therefore the quality, quantity and flow variability of water, plus the quality of adjacent habitats, needs to be maintained or adjusted to a level necessary to maintain the features in favourable condition for the foreseeable future.

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
Brown Moss SAC	The site is designated as a SAC for its: Qualifying Annex II species: • Floating water-plantain *Luronium natans* Brown Moss SSSI is 14.45% unfavourable – recovering and 85.55% unfavourable – no change.	Brown Moss SAC lies partially within the Dee River Basin District. The influence of groundwater and direction of flow is thought to be key to the management of the notified feature.
Midland Meres & Mosses Phase 2 Ramsar	The site is designated as a Ramsar for the following Criteria: Ramsar criterion 1: • The site comprises a diverse range of habitats from open water to raised bog. Ramsar criterion 2: • Supports a number of rare species of plants associated with wetlands, including the nationally scarce cowbane *Cicuta virosa* and, elongated sedge *Carex elongata.* Also present are the nationally scarce bryophytes *Dicranum affine* and *Sphagnum pulchrum.* • Also supports an assemblage of invertebrates including several rare species. There are 16 species of British Red Data Book insect listed for this site including the following endangered species: the moth *Glyphipteryx lathamella,* the caddisfly *Hagenella clathrata* and the sawfly *Trichiosoma vitellinae.* Linmer Moss SSSI is 100% unfavourable – recovering Oak Mere SSSI is 100% unfavourable – no change Abbots Moss SSSI is 37.2% unfavourable – recovering and 62.8%unfavourable – declining.	Midland Meres & Mosses Phase 2 Ramsar comprises 18 units, 3 of which lie within the Dee River Basin District. There is a hydrological link to the RBD as designated for lowland wetland habitats, including open water. Furthermore, faunal and floral wetland specialists are present, including bryophytes, moths, caddisflies and sawflies. These habitats (and associated wetland invertebrates) are inherently linked to the RBD.

Site name	Qualifying feature(s) (*and latest assessed condition taken from Natural England SSSI search website*[25])	Summary of connectivity with the River Basin District
Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC	The site is designated as a SAC for its: Qualifying Annex I habitat: • Active raised bogs* • Degraded raised bogs still capable of natural regeneration Annex I priority habitats are denoted by an asterisk (*). Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SSSI is 1.31% favourabel,66.51% unfavourable – recovering, 21.94% unfavourable – no change and 9.45% unfavourable – declining.	Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC lies within the Dee River Basin District. However, raised bogs are rainwater fed and won't be affected by FRMP measures. This site can therefore be screened out from further assessment.

4.18 Having identified the European sites within 10km that are likely to be hydrologically linked to flood risk management activities, consideration was next given to the potential impact sources from the FRMP at all stages and pathways to European sites (including those located at distances of more than 10km if there is connectivity) by which effects could arise on qualifying features.

4.19 Based on all possible impacts, pathways, and receptors, the Test of Likely Significant Effects for each measure in the FRMP is undertaken in the following tables.

Table 3. Screening table showing the Test of Likely Significant Effects results for Lead Local Flood Authority (LLFA) national measures contained within all Flood Risk Management Plans

Measure ID	Measure	Likely Significant Effects on European sites
0299999007	Act as a consultee for major planning applications in their area	No likely significant effect – This measure describes the role of LLFAs
0299999011	Designate third party flood risk assets and maintain a register of designated flood risk assets in their area	No likely significant effect – Designating assets and maintaining a register will not affect European sites
0299999003	Implement relevant government guidance on taking climate change into account where necessary for flood risk decision making in their area	No likely significant effect – Taking climate change into account will not affect European sites
0299999018	Investigate local flood events where appropriate and necessary in their area	No likely significant effect – Investigating local flood events will not affect European sites
0299999002	Maintain, keep under review, apply and monitor a local flood risk management strategy in their area	No likely significant effect – The production of a local flood risk management strategy will not itself affect European sites
0299999015	Plan flood risk management projects to achieve wider environmental benefits where appropriate in their area	No likely significant effect – Ensuring that flood risk projects achieve wider environmental benefits will not negatively affect European sites
0299999006	Provide information to inform spatial and infrastructure planning, development and regeneration in their area	No likely significant effect – The provision of information will not affect European sites
0299999013	Regulate the condition of, and third party activity on, ordinary watercourses and review new works on ordinary watercourses in their area	No likely significant effect – Regulating activities and works will not affect European sites

Measure ID	Measure	Likely Significant Effects on European sites
0299999004	Start implementing steps to work towards net zero carbon in their area	No likely significant effect – Implementing net zero carbon will not affect European sites
0299999016	Support communities to increase their resilience to flooding in their area	No likely significant effect – Supporting communities to increase resilience to flooding will not affect European sites
0299999017	Support emergency response partners and communities to plan, prepare and exercise for future flood scenarios in their area	No likely significant effect – Supporting planning for emergency response to flooding will not affect European sites
0299999012	Take a risk based approach to develop and maintain a register of flood risk assets/features in their area	No likely significant effect – Maintaining a register of assets will not affect European sites
0299999005	Work in partnership with other risk management authorities to reduce the risk of flooding from all sources in their area	No likely significant effect – This is a wide-ranging measure and the details include that by 2027, risk management authorities will have developed and/or delivered a programme of flood risk management capital schemes and/or maintenance to reduce risk of flooding and coastal change and its adverse consequences for human health and wellbeing. Individual capital schemes may have an effect on European sites depending on what and where they are and how they are to be delivered. However, developing a programme of capital schemes will not itself lead to likely significant effects on European sites. Any individual capital schemes will need to be subject to HRA before being consented, in order to comply with legislation.
0299999009	Work with other flood asset owners and riparian landowners to raise awareness of, and where necessary enforce, maintenance responsibilities in their area	No likely significant effect – specific maintenance measures could have an adverse effect on European sites (although they are unlikely to be approved measures if so) but a requirement to raise awareness of, and enforce where required, necessary flood asset maintenance will not adversely affect European sites.
0299999010	Work with other risk management authorities to identify a programme of nature based approaches in their area	No likely significant effect – working with other authorities to identify a programme of nature-based approaches will not adversely affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0299999008	Work with other risk management authorities to provide information where necessary to update flood maps in their area	No likely significant effect – providing information will not adversely affect European sites.
0299999014	Work with other risk management authorities to support the delivery of flood projects in their area	No likely significant effect – providing support to other authorities will not adversely affect European sites.
0299999019	Work with others to support communities through the recovery phase of a significant flood event in their area	No likely significant effect – supporting communities will not adversely affect European sites.

Table 4. Screening table showing the Test of Likely Significant Effects results for Environment Agency national measures contained within all Flood Risk Management Plans

Measure ID	Measure	Likely Significant Effects on European sites
0299999041	Continue to review flood events to improve and develop flood services in England	No likely significant effect – reviewing flood events will not adversely affect European sites.
0299999025	Designate flood risk assets where necessary in England	No likely significant effect – designating flood risk assets will not adversely affect European sites.
0299999046	Drive down carbon emissions and deliver the required flood risk management outcomes when planning and carrying out flood risk management works in England	No likely significant effect – driving down carbon emissions will not adversely affect European sites.
0299999030	In its strategic overview role, work with risk management authorities, including facilitating effective partnerships in local places in England	No likely significant effect – working with risk management authorities will not adversely affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0299999044	Invest in flood risk management projects to contribute to improving the natural, built and historic environments	No likely significant effect – investing in projects will not adversely affect European sites.
0299999035	Issue and maintain guidance on taking climate change into account for flood risk decision making in England	No likely significant effect – issuing guidance will not adversely affect European sites.
0299999026	Maintain and update a database of its flood risk assets in England	No likely significant effect – maintaining a database will not adversely affect European sites.
0299999020	Monitor weather, tidal, rainfall and river conditions to provide flood forecasts in England	No likely significant effect – monitoring will not adversely affect European sites.
0299999042	Plan all flood risk management projects in England to achieve biodiversity net gain and wider environmental benefits	No likely significant effect – planning for biodiversity net gain will not adversely affect European sites.
0299999043	Plan all flood risk management projects in England to help achieve river basin management plan objectives	No likely significant effect – this measure is about achieving the environmental objectives of river basin management plans. This will not adversely affect European sites.
0299999033	Provide quality and timely planning advice to help avoid inappropriate development in areas at risk of flooding in England	No likely significant effect – provision of planning advice will not adversely affect European sites.
0299999031	Regulate large, raised reservoirs in England	No likely significant effect – regulating reservoirs to reduce the risk of flooding from dam and reservoir failures will not adversely affect European sites.
0299999028	Regulate new works to main rivers and sea defences in England	No likely significant effect – regulating new works to reduce the likelihood of flooding will not adversely affect European sites.
0299999039	Respond to flood events and support other emergency responders in England	No likely significant effect – responding to flood events to reduce the consequences of flooding will not adversely affect European sites.
0299999040	Support communities to increase their resilience to flooding in England	No likely significant effect – supporting communities to help them increase their resilience will not adversely affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0299999023	Take a risk based approach to inspect, maintain and operate assets in England	No likely significant effect – adopting a risk based approach will not adversely affect European sites.
0299999027	Take targeted enforcement action where there are blockages or unpermitted structures in England	No likely significant effect – taking enforcement action regarding blockages or unpermitted structures will not adversely affect European sites.
0299999024	Understand the long term needs of its assets and plan for their whole life management in England	No likely significant effect – developing an understanding of long-term asset needs will not adversely affect European sites.
0299999045	Work with catchment partnerships, communities and other risk management authorities to maximise the use of nature based solutions in England	No likely significant effect – working to maximise the use of nature-based solutions rather than other methods of flood risk management will not adversely affect European sites.
0299999021	Work with emergency response partners to issue appropriate flood warnings in England	No likely significant effect – issuing flood warnings will not adversely affect European sites.
0299999022	Work with emergency response partners to plan, prepare and exercise for future flood scenarios in England	No likely significant effect – preparing for flood scenarios will not adversely affect European sites.
0299999032	Work with local planning authorities, developers and other place makers in England	No likely significant effect – working with other authorities to ensure all new development is resilient to flooding will not adversely affect European sites.
0299999029	Work with research partners and the wider scientific community in England	No likely significant effect – working with research partners into new approaches to reduce risk of flooding will not adversely affect European sites.
0299999036	Work with risk management authorities and other partners to implement the National Flood and Coastal Erosion Risk Management Strategy in England	No likely significant effect – individual proposals within the National Flood and Erosion Risk Management Strategy may pose likely significant effects to European sites but the Strategy has been subject to its own HRA. The measure concerns working with other authorities to implement the Strategy, which will not itself adversely affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0299999038	Work with risk management authorities to identify a programme of future flood risk management projects in England	No likely significant effect – a commitment to identify a programme of future projects will not adversely affect European sites. Individual schemes and projects may have an effect on European sites depending on what and where they are and how they are to be delivered. However, all schemes will need to be subject to HRA before being consented, in order to comply with legislation.
0299999034	Work with risk management authorities to maintain and update where necessary flood maps in England	No likely significant effect – maintaining and updating flood maps will not adversely affect European sites.
0299999037	Work with risk management authorities to support the delivery of flood risk management projects in England	No likely significant effect – supporting risk management authorities in delivering flood risk management projects will not itself adversely affect European sites. Individual schemes and projects may have an effect on European sites depending on what and where they are and how they are to be delivered. However, all schemes will need to be subject to HRA before being consented, in order to comply with legislation.

Table 5. Screening table showing the Test of Likely Significant Effects results for measures contained within the Dee Flood Risk Management Plan that apply throughout the RBD

Measure ID	Measure	Likely Significant Effects on European sites
0201211021	Aim to establish a North-West Coastal Centre of Excellence, sharing expertise, resources and innovative approaches for coastal schemes in northern England to reduce the risk of flooding to coastal communities in the Dee River Basin District (DRBD).	No likely significant effect – This is a preventative measure. Establishing a North-West Coastal Centre of Excellence will not adversely affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201211003	Align principles for modelling climate change and projected growth scenarios in northern England to identify priority locations for detailed studies that will improve the estimation of future flood risk in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. Modelling climate change to identify priority sites is not associated with impact pathways linking to European sites. This is a positive measure, that could ultimately benefit the wider environment by helping to mitigate climate change impacts.
0201211024	Assess the way flood risk is managed in the identified areas in northern England to preserve the current approach using the best and most efficient means for the longer term in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. Assessing the way in which flood risk is managed in order to identify and preserve the best and most efficient approach will not adversely affect European sites.
0201211023	Assess the way flood risk is managed within identified areas in northern England to keep actions proportionate to that area's current level of flood risk in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. Assessing flood risk management in order to maintain a proportionate approach This measure will not adversely affect European sites.
0201211019	Begin to implement long-term whole-life asset management plans in northern England to deliver improved work planning, stakeholder engagement, carbon reduction and future funding to enhance the strategic investment programme for reducing flood risk in the DRBD.	No likely significant effect, but down-the-line HRA required – There is insufficient information on the management plans at this stage to undertake a detailed assessment of this measure, which must therefore be undertaken for a lower tier plan or project once further details are devised. However, a simple commitment to implement asset management plans will not itself lead to likely significant effects. Bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0201211033	Carry out a strategic review of Environment Agency debris screens in northern England to identify opportunities to reduce the risk of flooding to properties in the Dee River Basin District.	No likely significant effect, but down-the-line HRA required - This is a preventative measure and unlikely to involve physical activity on the ground. A strategic review of debris screens is not associated with impact pathways linking to European sites. Depending on where the debris screens are located they could lead to visual and noise disturbance and water quality changes in the installation period, as well as impeding the passage of anadromous fish post-installation. However, that cannot be assessed until the study covered by this measure is completed. Bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201211038	Collate information, including condition and maintenance activities, on sea defence and coastal protection assets in northern England to ensure that asset owners can be readily identified and work together to manage coastal flooding and erosion risk in the DRBD.	No likely significant effect - This is a preventative measure and unlikely to involve physical activity on the ground. Collating information on sea defence and coastal protection assets is not associated with impact pathways linking to European sites.
0201211004	Consider the potential implications of climate change to flood risk, water resource requirements and the sustainable management of water in northern England to aid optioneering and help prioritise future investment needs in the DRBD.	No likely significant effect - This is a preventative measure and unlikely to involve physical activity on the ground. Considering the potential implications of climate change in order to aid optioneering and priority investment will not adversely affect European sites. This is a positive measure, which could ultimately benefit the wider environment by helping to mitigate climate change impacts.

Measure ID	Measure	Likely Significant Effects on European sites
0201211022	Deliver existing and updated coastal strategies in northern England to reduce the risk of flooding to coastal communities in the DRBD.	No likely significant effect – This is simply a commitment to deliver adopted coastal strategies. Existing Coastal Strategies have been subject to their own independent HRA processes and any updates to coastal strategies once they emerge will also be subject to HRA as part of that standard process independent of the FRMP.
0201311043	Determine the feasibility of Flood and Coastal Erosion Risk Management Schemes on a priority basis for identified places in northern England to enable the region's community flood and coastal risk profile to be reduced in the DRBD.	No likely significant effect - This is a protective measure and unlikely to involve physical activity on the ground. This is a feasibility study and is not associated with impact pathways linking to European sites Moreover, the process of determining the feasibility of FCERM Schemes will include the extent of any effect on European sites.
0201211039	Develop a collaborative plan for proactive and reactive maintenance in northern England to deliver a more agile response and efficient service to reduce the likelihood of flooding in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. Development of a collaborative plan is not associated with impact pathways linking to European sites European sites.
0201211041	The Environment Agency and Risk Management Authorities will develop an engagement plan with shared priority communities to improve how they work together in northern England to help them improve their response to and recovery from flooding in the DRBD.	No likely significant effect – This measure is unlikely to involve physical activity on the ground. Development of an engagement plan is not associated with impact pathways linking to European sites European sites.
0201211002	The Environment Agency and Risk Management Authorities will establish an outline investment programme, identifying priorities over 10 years, based on shared flood risk drivers, ambition and strategic objectives in northern England to deliver investment efficiency, reduce flood risk and improve community engagement in the DRBD.	No likely significant effect – This is aimed at recovery and reviewing working practices. It is unlikely to involve physical activity on the ground and the development of an engagement plan is not associated with impact pathways linking to European sites European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201211026	The Environment Agency and Risk Management Authorities, wider communities and stakeholders will exploit opportunities to store water or manage run-off in identified areas in northern England to provide overall flood risk reduction and environmental benefits in the DRBD.	No likely significant effect, but down-the-line HRA required – There is insufficient information on the opportunities available at this stage to undertake a detailed assessment of this measure, which must therefore be undertaken for a lower tier plan or project once further details are devised. Bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. However, storing runoff could be beneficial to European sites where they are suffering from poor hydrology or excessive drainage. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201211015	Explore opportunities to collaborate with environmental partners and major landowners to increase upland and lowland peat and wetland restoration in northern England to reduce flood risk, restore natural habitats and allow for carbon sequestration to counter the impacts of climate change in the Dee River Basin District.	No likely significant effect – This is a protective measure that has been carried over from Flood Risk Management Plan 1, therefore this measure has already undergone prior HRA appraisal. This measure will not adversely affect European sites provided it remains unchanged.
0201211034	Dwr Cymru Welsh Water and Risk Management Authorities will identify and assess opportunities to trial sites for surface water separation in northern England to assess the impacts and create a portfolio of examples that demonstrate the multiple benefits for flood risk reduction and environmental improvement in the DRBD.	No likely significant effect, but down-the-line HRA required – There is insufficient information on the opportunities available at this stage to undertake a detailed assessment of this measure, which must therefore be undertaken for a lower tier plan or project once further details are devised. Bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. However, there should be many opportunities to deliver sites to trail surface water separation that would impact on the two European sites in the Dee RBD. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0201211012	The Environment Agency and Risk Management Authorities will identify potential sites and map opportunities to deliver nature-based solutions on Risk Management Authority owned land in northern England to provide a shared resource that can be used to deliver schemes that reduce flood risk and benefit the natural environment in the DRBD.	No likely significant effect, but down-the-line HRA required – This is a protective measure and unlikely to involve physical activity on the ground. Identifying sites and opportunities for nature-based solutions will not, in itself, impact on the nearby European sites. Delivering nature-based flood risk management is likely to be beneficial for both human and environmental receptors. Notwithstanding this, such measures can impact on the water quality and level in European sites, particularly in the construction period. There is insufficient information on the sites and opportunities available at this stage to undertake a detailed assessment of this measure, which must therefore be undertaken for a lower tier plan or project once further details are devised. Bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0201211006	The relevant Lead Local Flood Authorities and Risk Management Authorities in the North-West Coastal Group will implement the shoreline management plan action plan and co-ordinate wider activities along the coastline in line with the Shoreline Management Plan in northern England to reduce the risk of flooding and manage coastal change in the DRBD.	No likely significant effect – A large part of the Dee Estuary SAC/SPA/Ramsar site occupies the coast within this RBD. However, the SMP was subject to its own HRA and this confirmed any mitigation needed to avoid adverse effects on the integrity of European sites or identified any need for compensation for those impacts where adverse effects on integrity cannot be avoided or mitigated but an Imperative Reasons of Overriding Public Interest/No Alternatives justification can be made, with compensation being/to be delivered in the form of the Habitat Compensation Programme. This measure in the FRMP is simply a commitment to continue with implementation of the adopted SMP via implementation of the Action Plan and therefore no likely significant effects will arise from including the measure in the FRMP.. This will include developing the specific coastal strategies and schemes needed to implement the SMP, which will be subject to their own HRAs once devised and before they are consented.
0201211008	The relevant Lead Local Flood Authorities and Risk Management Authorities in the North-West Coastal Group will improve engagement with Local Authorities with responsibility for estuaries in northern England to ensure flood risk is understood and mitigated in estuary environments, reducing flood risk to coastal communities, businesses and critical infrastructure in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. This measure is about improving communication which is not associated with impact pathways linking to European sites European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201211035	The Environment Agency and Risk Management Authorities will improve ways to share data to identify and understand combined flood risk sites, that reflects future levels of risk associated with climate change, in northern England to enable the development and assessment of integrated solutions that reduce the risk of flooding in the DRBD.	No likely significant effect – This is a preventative measure about data sharing and unlikely to involve physical activity on the ground. This measure will not impact on the nearby European sites. This is a positive measure, ultimately benefitting the wider environment by helping to mitigate climate change impacts.
0201211007	In-light of climate change predictions, investigate innovative approaches to coastal monitoring and access to data in northern England to facilitate pooling of resources and to develop new approaches to the long-term sustainable management of the north-west coastline in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground and is about access to data and monitoring. This measure will not impact on the nearby European sites. This is a positive measure, ultimately benefitting the wider environment by helping to mitigate climate change impacts.
0201211014	The relevant Lead Local Flood Authorities, and Risk Management Authorities in the North-West Coastal Group will influence planning and policy in relation to coastal erosion and flood risk at landfill and contaminated sites in northern England to affect long term investment to reduce coastal pollution from waste sites in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. Influencing planning and policy in relation to coastal erosion and flood risk at landfill and contaminated sites to reduce coastal pollution from waste sites in the DRBD is a positive measure which is not associated with impact pathways linking to European sites European sites.
0201211028	The Environment Agency will inform Local Planning Authorities of any significant consequences of proposed flood risk management asset decommissioning in northern England to ensure that Local Development Plans reflects the related future flood risk in the DRBD.	No likely significant effect – This measure is aimed at raising awareness within LPA's. This measure will not impact on the nearby European sites

Measure ID	Measure	Likely Significant Effects on European sites
0201611046	The Environment Agency and Risk Management Authorities will investigate and quantify flood risk issues associated with unmanaged and unadopted third party assets in northern England to explore potential remedial actions that will reduce the risk of flooding in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. Investigating and quantifying flood risk issues associated with unmanaged and unadopted third party assets in northern England to explore potential remedial actions is a positive measure which is not associated with impact pathways linking to European sites European sites.
0201211032	The Environment Agency and Risk Management Authorities with Catchment Based Approach partnerships will jointly engage with businesses and community groups in northern England to promote clear, consistent and endorsed guidance regarding; (1) the use of public open spaces to manage flooding, (2) responsibilities of riparian ownership and (3) the maintenance of third-party assets in a sustainable manner; to prevent the increase in flood risk in the DRBD.	No likely significant effect – This is a preventative measure and unlikely to involve physical activity on the ground. This measure involves engagement with businesses and community groups which is not associated with impact pathways linking to European sites European sites, although promoting understanding of the responsibilities of riparian ownership could benefit European sites.
0201211042	The relevant Lead Local Flood Authorities, and relevant Risk Management Authorities in the North-West Coastal Group will manage flood risk and coastal erosion schemes in northern England to maximise their benefit to sustainable coastal regeneration and for physical and mental health and wellbeing of communities in the DRBD.	No likely significant effect – This measure is unlikely to involve physical activity on the ground. Managing investment to maximise sustainability and physical and mental wellbeing will not adversely affect European sites
0201211030	The relevant Lead Local Flood Authorities, and relevant Risk Management Authorities in the North-West Coastal Group will promote the Shoreline Management Plan with Local Planning Authorities in northern England to ensure it is fully considered in the next revision of land use plans and associated planning decisions so they account for flood and coastal erosion risks in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. Ensuring the adopted SMPs (which are subject to a process separate from the FRMP and have had their own HRAs prior to adoption) are fully considered in emerging local policy will not adversely affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201311048	The Environment Agency and Risk Management Authorities will provide information and opportunities to the education sector, raising awareness of drainage, flood and coastal issues in northern England to influence the attitudes and behaviour of future generations towards flood risk and climate change in the DRBD.	No likely significant effect – This measure is one of preparedness and is unlikely to involve physical activity on the ground. This measure will not impact on the nearby European sites.
0201211005	The relevant Lead Local Flood Authorities and Risk Management Authorities in the North-West Coastal Group will review Shoreline Management Plan 2 Policies and capital investment programme taking account of current guidance and climate change predictions in northern England to update actions to reduce flood risk and manage coastal change in the DRBD.	No likely significant effect – The Dee Estuary SAC, SPA and Ramsar site covers the entire coastline of relevance. However, this is a preventative measure and is unlikely to involve physical activity on the ground. As a desk-based review exercise, this measure will not impact on the nearby European sites. SMPs are a separate process from FRMPs and reviewing an adopted SMP in light of current climate change projections is standard good practice. The revised SMP (depending on what if any changes are made) may have effects on European sites but these are subject to their own HRA process that will ensure any mitigation needed to avoid adverse effects on the integrity of European sites is delivered, or any need for increased compensation through the Habitat Compensation Programme is identified.

Measure ID	Measure	Likely Significant Effects on European sites
0201211025	The Environment Agency and Risk Management Authorities will take further action where the case is most compelling in identified areas in northern England to reduce the likelihood and adverse consequences of flooding in the DRBD.	No likely significant effect, but down-the-line HRA required – The area covered by this measure is the eastern (English) coast of the Dee Estuary SAC, SPA and Ramsar site. However, this is a new measure but is unlikely to involve physical activity on the ground in the short term, and there is no information available at this stage as to what actions are involved (as these have not yet been determined). This means the measure if sufficiently broadly expressed that adverse effects on the Dee Estuary European sites should be avoidable. However, consideration of potential impacts on the three European sites will need to be factored into the prioritisation process for actions and down-the-line HRA will be required before any actions are committed or consented. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201411044	The Environment Agency and Risk Management Authorities will undertake Flood and Coastal Erosion Risk Management Schemes, on a priority basis for identified places in northern England to reduce the risk of flooding to communities in the DRBD.	No likely significant effect, but down-the-line HRA required – The process of identifying FCERM schemes is separate from the FRMP process and is undertaken through the Lead Local Flood Authority via their Coastal Strategy process or their Local Flood Risk Management Plan process. Both these processes have their own HRA requirements and each plan must be subject to HRA before it is adopted. Each scheme that falls out of each plan must also be subject to HRA by law before being consented. This measure is simply a commitment to implementing adopted plans and prioritising the schemes in those plans in line with greatest need. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0201211020	The Environment Agency and Risk Management Authorities will undertake joint training to improve capabilities, streamline approaches, make efficiencies and increase understanding of funding mechanisms in northern England to improve our ability to attract investment for reducing flood risk in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. This measure will not impact on the nearby European sites.
0201211013	The relevant Lead Local Flood Authorities, and Risk Management Authorities in the North-West Coastal Group, will undertake prioritised estuary wide studies in northern England to establish intertidal linkages between flooding, erosion and habitat for identifying natural flood risk management and habitat gain opportunities in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. Undertaking estuary-wide studies in order to establish intertidal linkages between flooding, erosion and habitat for identifying natural flood risk management and habitat gain opportunities is not associated with impact pathways linking to European sites European sites.
0201211036	The Environment Agency and Risk Management Authorities will use new technology to improve their monitoring networks to have more accurate, timely and detailed flood information in northern England to improve their current and future incident responses, reducing the likelihood and impact of flooding in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. Utilising new technology and improving monitoring networks is not associated with impact pathways linking to European sites European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201211018	The Environment Agency and Dwr Cymru Welsh Water will work collaboratively to plan, prioritise and commence delivery of co-ordinated maintenance of new and existing assets in northern England to improve the agility and efficiency of flood response in the DRBD.	No likely significant effect, but down-the-line HRA required – A commitment to work collaboratively to take a coordinated approach to planning and delivery of maintenance of flood defence assets will not adversely affect European sites. Depending on what would be involved, steps required to protect assets could have effects on European sites but this is considered unlikely since the protection measures will normally be installed at the assets themselves (e.g., by raising or otherwise protecting key machinery at Water Recycling Centres) rather than at European sites. Since United Utilities is a competent authority, they will need to undertake an HRA for any proposals that could affect European sites before they are implemented. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201211016	The Environment Agency and Risk Management Authorities will work in unison to map opportunity catchments for habitat creation and develop a programme for joint delivery in northern England to ensure integrated flood risk is tackled and investment is focussed where there will be greatest socio-environmental benefit in the DRBD.	No likely significant effect, but down-the-line HRA required – There is insufficient information on the locations of habitat creation areas at this stage. In general, wetland habitat creation will be positive for European sites but bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0201211017	The Environment Agency and Risk Management Authorities will work together to align objectives for Flood Risk, River Basin and Drainage and Wastewater Management Plans up to 2030 in northern England to establish agreed strategic measures (activities) in a collaborative programme of flood risk management works in the DRBD.	No likely significant effect, but down-the-line HRA required – This is a preventative measure and is unlikely to involve physical activity on the ground as it is about aligning objectives with a view to subsequently agreeing strategic measures and is desk-based. However, there is insufficient information on the measures or management works at this stage and consequently bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201211011	The Environment Agency and Risk Management Authorities, wider communities and stakeholders will work together to help deliver conventional, innovative and natural improvements to flood risk, water and habitat quality in northern England to reduce community flood risk and improve future collaborative working in the DRBD.	No likely significant effect, but down-the-line HRA required – There is insufficient information on the proposals at this stage and consequently bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0288811019	The Environment Agency and Natural Resources Wales will work together to investigate and quantify flood risk in Balderton Brook Catchment to inform and support flood risk management downstream in the Lache Flood Risk Area in the DRBD.	No likely significant effect, but down-the-line HRA required – The River Dee and Bala Lake SAC runs through Balderton Brook catchment area and the mouth of the Dee Estuary SAC/ SPA/ Ramsar site lies just within the catchment area. The measure itself is simply a commitment to investigate and quantify flood risk. Actions that development from this measure could potentially affect European sites but there is insufficient information on the management activities at this stage and consequently, bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201211031	The Environment Agency and Risk Management Authorities will work together with Planning authorities, Local Enterprise Partnerships and communities in northern England to ensure that investment to reduce flood risk contributes to sustainable growth in communities in the DRBD.	No likely significant effect – This measure has been carried over from Flood Risk Management Plan 1, therefore this measure has already undergone prior HRA appraisal. Working collaboratively to ensure investment will not negatively impact on the nearby European sites. By definition any actions that led to adverse effects on European sites would not constitute sustainable growth.
0201211047	The Environment Agency and Risk Management Authorities will work together with communities and stakeholders in northern England to improve collective learning that reduces flood risk in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. Improving collective learning will not affect European sites.
0201511045	The Environment Agency and Risk Management Authorities will work together with communities so that they understand likely changes in future flood and coastal risk in northern England to take on adaptive approaches to its management over the long-term in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. Increasing understanding will not affect European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201211040	The Environment Agency will work with asset owners, local authorities and stakeholders to contribute to increasing the amenity value of flood risk assets in northern England to improve the physical and mental health and wellbeing of communities in the DRBD.	No likely significant effect, but down-the-line HRA required – A general commitment to improve the amenity value of flood risk assets will not adversely affect European sites. Increasing amenity use of some coastal flood risk assets could pose likely significant effects if for example it increased the disturbance risk of birds associated with the Dee Estuary SPA but no specific commitments are made as part of the measure. There is insufficient information on the proposals at this stage to undertake a detailed assessment of this measure, which must therefore be undertaken for a lower tier plan or project once further details are devised. Bespoke HRAs will be needed as part of the Outline Business Case of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.

Measure ID	Measure	Likely Significant Effects on European sites
0201211009	The Environment Agency and Risk Management Authorities will work with communities for whom long term maintenance of current levels of flood protection is uneconomical, including those in pumped catchments, in northern England to proactively support them and improve their resilience to flooding by considering adaptation options including nature-based solutions, and improving incident warnings and management in the DRBD.	No likely significant effect, but down-the-line HRA required – A general commitment to help communities with resilience to flooding where it is no longer economic to maintain the standard of protection of existing defences will not adversely affect European sites. There is insufficient information on the options at this stage to undertake a detailed assessment of this measure, which must therefore be undertaken for a lower tier plan or project once further details are devised. Delivering nature-based solutions is likely to be beneficial for both human and environmental receptors. Notwithstanding this, such measures can impact on the water quality and level in European sites, particularly in the construction period. Bespoke HRAs will be needed of more detailed proposals to adequately appraise LSEs and, where relevant, adverse effects on the integrity of European sites. In line with the guidance quoted in paragraph 2.26, down-the-line assessment will be required as further details emerge regarding what will be done to deliver this measure.
0201211027	The Environment Agency and Risk Management Authorities will work with local planning authorities, developers and other place-makers to promote the wider use and adoption of Sustainable Drainage practices in northern England to reduce flood risk and benefit the environment in the DRBD.	No likely significant effect – This is a protective measure and is unlikely to involve physical activity on the ground. This measure will not impact on the nearby European sites. Improved SUDS use would generally benefit the environment.
0201211037	The Environment Agency and Risk Management Authorities will work with owners and operators of critical infrastructure to understand the full consequences that their failure due to flooding could bring in northern England to better develop investment business cases and access funding sources in order to reduce flood risk in the DRBD.	No likely significant effect – This is a protective measure and is unlikely to involve physical activity on the ground. Working with owners and operators of critical infrastructure increase understanding is not associated with impact pathways linking to European sites European sites.

Measure ID	Measure	Likely Significant Effects on European sites
0201211029	The Environment Agency and Risk Management Authorities will work with the Regional Flood and Coastal Committee, Local Planning Authorities, developers and place-makers to promote adoption of best practices in northern England to maximise the benefit new development can bring to reducing flood risk and improving the environment in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. Promoting the adoption of best practice measures is not associated with impact pathways linking to European sites European sites.
0201211010	The Environment Agency and Risk Management Authorities will work together to agree practices and principles for partnered schemes in northern England to contribute to achieving carbon reduction targets in the DRBD.	No likely significant effect – This is a preventative measure and is unlikely to involve physical activity on the ground. This measure will not impact on the nearby European sites.

5. Other Plans and Projects

5.1 This section covers potential for effects in combination with other plans and projects. While the potential for the FRMP to occur 'in combination' with other FRMPs was considered for inclusion, each Local FRMP is specific to a relatively hydrologically self-contained River Basin District, meaning that potential for effects in combination with each other generally only exists where a European site straddles multiple RBDs. In this case Dee Estuary SAC and Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC straddle the boundary between the Dee FRMP and the North West and Severn FRMPs respectively. Similarly the Dess Estuary sac/ SPA/ Ramsar and River Dee and Bala Lake SAC straddle the England-Wales border. The Wales FRMP, which covers the Welsh Dee RBD, also incorporates these European sites. However, no mechanism has been identified for the actual measures in this FRMP (rather than any schemes that may emerge down-the-line) to operate in combination with those in the other FRMPs.

5.2 Natural England suggested inclusion of Diffuse Water Pollution Plans in the 'in combination' assessment of FRMP HRAs. Diffuse Water Pollution Plans are environmentally positive and intended to reduce diffuse pollution through fairly broad measures such as 'influencing management of farm infrastructure such as farm tracks, yards, buildings etc' through agri-environment schemes and similar. As such, no adverse likely significant effects or conflicts are expected to arise with the FRMP HRAs.

5.3 Potential in combination effects with Minerals and Waste Local Plans were also considered. However, Waste Local Plans are rarely technology-specific and potential impacts depend very much on the type of facility the market decides to bring forward on a given allocated site, or within a broad area of search where these exist. Minerals excavation can affect hydrologically sensitive European sites through dewatering for example. However, many minerals allocations are extensions to existing consented facilities to enable the site to be worked for longer (rather than to enable a net increase in consented extraction) and whose acceptability of effects on European sites are kept under review through the minerals planning authorities' Review of Consents process as required by the Conservation of Habitats and Species Regulations 2017 (as amended). In addition, many Minerals Plans include 'areas of search' for minerals rather than making specific allocations, leaving the market to bring forward proposals at the planning application level. As such, no specific likely significant effects in combination with the FRMP measures have been identified.

Local Plans

5.4 The delivery of c. 47,171 dwellings to 2030 across the English Dee area will result in the potential for a range of likely significant effects on the European sites surrounding the sub-region. While the majority of this development is unlikely to result in cumulative impacts with FRMP measures, a potential for in-combination effects on European sites cannot be excluded. The Northern Powerhouse is a government-

backed initiative to help improve the economic prospects of Northern cities. The project combines the Northern Powerhouse Investment Fund, the Northern Powerhouse Partnership, the European Regional Development Fund and Local Enterprise Partnerships (LEPS).

5.5 Impact pathways with potential interactions are varied and include recreational pressure, loss of functionally linked habitat for SPAs/ Ramsars, water level, water quality, coastal squeeze, and visual and noise disturbance. The potential for interactions largely depends on the specific location and nature of the proposed development, both in relation to European sites and FRMP measures. Taking impacts on the water level in European sites as an example, Local Plans have the potential to result in reduced water supplies to qualifying ecosystems due to increased water abstraction to meet the household and industrial demand. However, a potential for interaction with a FRMP measure would only exist if both were to affect the hydrological catchment feeding the same European site.

5.6 This section focusses only on hydrologically sensitive European sites and on the main European sites where adverse effects from residential and employment development have been identified in Local Plan HRAs. In the Dee RBD the principal hydrologically sensitive site at risk from Local Plan growth is Dee Estuary SAC, SPA and Ramsar site. Growth in the Liverpool City Region in particular has been identified in several Local Plans to pose adverse effects on the integrity of the site without mitigation. This is primarily due to recreational pressure impacts. To this end, a strategic Recreation Mitigation Strategy covering the English parts of the Dee Estuary and other recreation-sensitive coastal European sites in the Liverpool City Region is being developed by the Liverpool City Region authorities with input from some adjacent authorities and Natural England.

5.7 However, it is considered that the nature of the FRMP is such that no in combination effects will arise between adoption of the FRMP and delivery of housing and associated development across the sub-region. This is due either to the fact that the measures in the FRMP do not pose mechanisms to connect negatively to European sites, or because the measures of the FRMP are sufficiently high level (generally consisting of identifying a scheme and committing to its further development, design and implementation without committing to details) that they allow flexibility for measures necessary to be designed into schemes to protect European sites to be incorporated at further planning tiers as each scheme is devised.

River Basin Management Plans

5.8 River Basin Management Plans (RBMPs) describe the challenges that threaten the water environment and how these challenges can be managed and funded. The River Dee FRMP covers the same area as part of the Dee River Basin Management Plan 2021 - 2027, which covers England and Wales.

5.9 RBMPs set out a series of measures to bring about improvements in the waterbodies covered by the RBMP. By definition, the measures in the RBMP are positive and includes the following initiatives: partnership working with farmers and land

managers, sustainable management of water resources, restoring rivers and removing man-made barriers to fish migration and controlling invasive non-native species.

5.10 The RBMPs generally include projects that improve the water environment, for example by:

- enhancing and restoring rivers and floodplains
- creating sustainable drainage
- cleaning up metal pollution
- improving habitats and water quality by addressing diffuse pollution issues
- adapting weirs to provide fish passage
- involving the community
- using existing regulations to tackle agricultural and rural land pollution, such as lagoon construction

5.11 Since the measures within RBMPs are positive and are often necessary to restore freshwater aquatic European sites to favourable condition, there is no mechanism for them to have a negative effect on European sites in combination with the measures in the FRMP.

Shoreline Management Plans and Local Flood Risk Management Plans

5.12 SMPs provide a policy context for shoreline/coastal zone management and development. As acknowledged throughout this document, SMPs and the Coastal Strategies that result from them often result in adverse effects on the integrity of European sites through a combination of coastal squeeze, loss of functionally-linked land for SPA/Ramsar birds, direct habitat loss due to defence footprint and changes to long-shore sediment transport and other aspects of natural sediment dynamics. They also present opportunities for positive effects on European sites if opportunities for managed realignment are included that will enable a more natural coastline to be established.

5.13 The following SMP applies to the Dee RBD and has been considered for in-combination impacts:

- SMP 22 Great Ormes Head to Scotland

5.14 The assessments for any potential in-combination impacts between these plans and the measures contained within the Dee FRMP were considered with regards to spatial proximity and/or hydrological and/or hydrographical connectivity. No in-combination likely significant effects were identified in respect of the policies set out in the plans because the FRMP essentially draws upon measures in the SMP and subsequent Coastal Strategies for its measures in the coastal environment.

5.15 Similarly, Local Flood Risk Management Plan measures for relevant areas within the River Basin District have been included within the FRMP so there is no potential for in combination effects as the same measures are contained in both sets of plans.

Water Resource Management Plans

5.16 United Utilities and Dee Valley Water have both produced Water Resource Management Plans. Hafren Dyfrydwy a similar strategy covering the bordering parts of the RBD in Wales. These set out the water supply strategy for their areas and could therefore have negative effects on European sites in their own right. For example, the River Dee supplies water to Chester and North East Wales and North West England, with Bala Lake holding supplies. This encompasses the River Dee and Bala Lake SAC.

5.17 However, Water Resource Management Plans are required to have their own HRAs undertaken. The HRAs for each of the latest adopted WRMPs considered whether their future supply strategy to meet water needs would affect European sites and it was concluded that the supply needs of their areas could be met without an adverse effect on the integrity of European sites, primarily through a combination of improved water efficiency measures and bringing new water supply areas into consideration that do not result in increased abstraction from European sites. As such, there would be no in combination effect with the FRMPs.

Wales FRMP

5.18 Natural Resources Wales (NRW) are currently working to produce an updated FRMP that covers all of Wales, replacing the FRMPs that were published in 2015 for the Severn, Dee and West Wales. The Wales FRMP will cover flood risk from main rivers, reservoirs and the sea. However, that FRMP is in the early stages of development and, at the time of writing, is not available for in-combination assessment. The English Dee FRMP and accompanying HRA have been shared with NRW to inform their FRMP development, including the HRA assessment of any in-combination effects that may arise in European sites with cross-border hydrological catchments. In-combination effects are most likely to arise from national and local place measures, which will require specific consideration in the Wales FRMP HRA and relevant scheme-level HRAs.

Drought Plans, Permits and Orders

5.19 As discussed in the previous chapter, the English Dee RBD encompasses European sites that are sensitive to a wide range of anthropogenic pressures, including hydrology, water quality, recreational pressure, coastal squeeze and others. Multiple simultaneously acting impacting pathways can compound negative impacts on qualifying habitats and species.

5.20 For example, water companies, under their duty of delivering potable water to households and businesses, can apply for drought permits, enabling them to abstract water beyond existing abstraction consents for an agreed period of time. Granting of

drought periods has the potential for negative environmental impacts, particularly in European sites that are already subject to existing unfavourable flow conditions or water levels. While most measures included in the FRMP are likely to be positive for European sites by re-naturalising hydrological function, inadequately planned or sited natural flood management and hard defence structures have the potential to negatively interact with Environment Agency Drought Orders and water company Drought Permits.

5.21 Drought conditions will also impose further pressures on designated sites such as by reducing water quality (reduced flows would typically result in higher nutrient concentrations, exacerbating the impact of treated sewage effluent) and water flow. In addition, climate change has the potential to increase the frequency and severity of drought conditions. Drought Plan Orders and Permits would compound drought issues and operate in-combination with impact pathways associated with the FRMP. However, drought plans will generally only operate at times of low water levels and low rainfall, which is the opposite scenario to when the majority of FRMP measures will be active.

5.22 Notwithstanding this, Drought Plans of water companies are subject to their own assessment process including HRA. This ensures that potential adverse effects on the integrity of European sites are adequately mitigated or, where this cannot be achieved, suitable compensation is provided. Overall, given that the Drought Plans of water companies undergo robust HRA appraisal, no in-combination effects with the FRMP will occur.

Environment Agency National Drought Plan

5.23 The potential for in-combination effects of the Dee FRMP with the Environment Agency's National Drought Action Plan has been assessed and no in-combination impacts are anticipated. However, this should be considered further at the time of any potential implementation of drought management measures in liaison with the Environment Agency, particularly regarding local actions in the supply and water source catchment areas utilised by United Utilities. Moreover, drought plans will generally only operate at times of low water levels and low rainfall, which is the opposite scenario to when the majority of FRMP measures will be active.

Conclusion

5.24 In summary, is considered that the nature of the FRMP is such that no in combination effects will arise between adoption of the FRMP and delivery of housing and associated development across the sub-region. This is due either to the fact that the measures in the FRMP do not pose mechanisms to connect negatively to European sites, or because the measures of the FRMP are sufficiently high level (generally consisting of identifying a scheme and committing to its further development, design and implementation without committing to details) that they allow flexibility for measures necessary to be designed into schemes to protect European sites to be incorporated at further planning tiers as each scheme is devised.

6. Conclusion

6.1 All European sites have been screened out of further assessment. There are no likely significant effects on any European site as a result of the Dee Flood Risk Management Plan 2021-2027, either alone or in combination with other projects and plans. This is due either to the fact that the measures in the FRMP do not pose mechanisms to connect negatively to European sites, or because the measures of the FRMP are sufficiently high level (generally consisting of identifying a scheme and committing to its further development, design and implementation without committing to details) that they allow flexibility for measures necessary to be designed into schemes to protect European sites to be incorporated at further planning tiers as each scheme is devised. It should be noted that notwithstanding references in the FRMP, scheme level HRAs will be undertaken as part of the business case for all schemes, and many schemes will also need planning consent, which will also be accompanied by an HRA, thus ensuring legal requirements are met.

Appendix A Information on European Sites

A.1 Dee Estuary / Aber Dyfrdwy SAC

Qualifying Features

This SAC is designated for its:

Qualifying Annex I habitats:

- Mudflats and sandflats not covered by seawater at low tide
- *Salicornia* and other annuals colonizing mud and sand
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Estuaries
- Annual vegetation of drift lines
- Vegetated sea cliffs of the Atlantic and Baltic Coasts
- Embryonic shifting dunes
- Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)
- Fixed coastal dunes with herbaceous vegetation (‘grey dunes’) * Priority feature
- Humid dune slacks

Annex I priority habitats are denoted by an asterisk (*).

Qualifying Annex II species:

- Sea lamprey *Petromyzon marinus*
- River lamprey *Lampetra fluviatilis*
- Petalwort *Petalophyllum ralfsii*

Conservation Objectives

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the ‘Qualifying Features’ listed above), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- the extent and distribution of the habitats of qualifying species
- the structure and function of the habitats of qualifying species
- the supporting processes on which the habitats of qualifying species rely
- the populations of qualifying species
- the distribution of qualifying species within the site

Threats/ Pressures to Site Integrity

The Site improvement Plan[26] and Dee Estuary European Marine Site advice document[27] identifies the following pressures and threats to the SAC:

- public access/ disturbance
- changes in species distributions i.e., petalwort
- invasive species
- climate change
- coastal squeeze
- inappropriate scrub control
- water pollution
- fisheries: commercial marine and estuarine
- inappropriate coastal management
- overgrazing
- direct impact from third party
- marine litter
- planning permission: general
- marine consents and permits
- wildfire/ arson
- air pollution: impact of atmospheric nitrogen deposition
- transportation and service corridors
- physical modification i.e., impacts of reduced freshwater inputs flushing through the estuary
- physical loss e.g., removal through land claim and dredging; smothering e.g., depositing dredge spoil and beach feeding

A.2 Dee Estuary/ Aber Dyfrdwy SPA

Qualifying Features

The site is designated as a SPA for its:

Qualifying Annex I species:

- Bar-tailed godwit *Limosa lapponica*
- Common tern *Sterna hirundo*
- Little tern *Sterna albifron*
- Sandwich tern *Sterna sandvicensis*

Regular use by the following migratory species (other than those listed in Annex I):

- Redshank *Tringa tetanus*, passage
- Shelduck *Tadorna tadorna*, wintering
- Teal Anas crecca, wintering
- Pintail Anas acuta, wintering
- Oystercatcher *Haematopus ostralegus*, wintering
- Grey plover *Pluvialis squatarola*, wintering
- Knot *Calidris canutus islandica*, wintering
- Dunlin *Calidris alpina*, wintering
- Black-tailed godwit *Limosa limosa islandica*, wintering
- Curlew *Numenius arquata*, wintering
- Redshank *Tringa totanus*, wintering

Conservation Objectives

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed above, and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, bymaintaining or restoring:

- the extent and distribution of the habitats of the qualifying features
- the structure and function of the habitats of the qualifying features
- the supporting processes on which the habitats of the qualifying features rely
- the population of each of the qualifying features
- the distribution of the qualifying features within the site

Threats/ Pressures to Site Integrity

The Site Improvement Plan[28] and Dee Estuary European Marine Site advicedocument[29] identifies the following pressures and threats to the SPA:

- public access/ disturbance
- invasive species
- climate change
- coastal squeeze
- water pollution
- fisheries: Commercial marine and estuarine
- overgrazing
- predation of tern colonies
- planning permission: general
- marine consents and permits
- transportation and service corridors

- physical modification i.e., impacts of reduced freshwater inputs flushing through the Estuary

A.3 Dee Estuary/ Aber Dyfrdwy Ramsar

The site is designated as a Ramsar site for the following Criteria:

Ramsar Criterion 1:

- estuaries
- mudflats and sandflats not covered by seawater at low tide
- annual vegetation of drift lines
- vegetated sea cliffs of the Atlantic and Baltic coasts
- *salicornia* and other annuals colonising mud and sand
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- embryonic shifting dunes
- shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)
- fixed dunes with herbaceous vegetation (‘grey dunes’)
- humid dune slacks

Ramsar Criterion 2:

- Natterjack toad *Epidelea calamita*

Ramsar Criterion 5:

Assemblages of international importance.

Species with peak counts in winter:

- non-breeding season regularly supports 120,726 individual waterbirds

Ramsar Criterion 6:

Species/populations occurring at levels of international importance.

Species with peak counts in spring/ autumn:

- Redshank *Tringa tetanus.*

Species with peak counts in winter:

- Teal *Anas crecca*, NW Europe
- Shelduck *Tadorna tadorna*, NW Europe
- Oystercatcher *Haematopus ostralegus*, Europe & W Africa
- Curlew *Numenius arquata* Europe/NW Africa
- Pintail *Anas acuta*, NW Europe
- Grey plover *Pluvialis squatarola*, E Atlantic
- Knot *Calidris canutus islandica*, W Europe/ Canada
- Dunlin *Calidris alpina alpina* Europe (breeding)
- Black-tailed godwit *Limosa limosa islandica*, Iceland
- Bar-tailed godwit *Limosa lapponica*, W European
- Redshank *Tringa totanus*, Eastern Atlantic

Threats/ Pressures to Site Integrity

The Information Sheet on Ramsar Sites[30] identifies the following pressures and threats to the Ramsar site:

- introduction/ invasion of exotic animal species i.e., the Chinese mitten crab (*Eriocheir sinensis*)
- introduction/invasion of non-native plant species
- overfishing
- pollution – industrial waste
- general disturbance from human activities
- transport infrastructure development
- sand dune erosion and accretion along North Wales open coast
- physical loss e.g., removal through land claim and dredging; smothering e.g., depositing dredge spoil and beach feeding

A.4 Mersey Narrows & North Wirral Foreshore SPA

Qualifying Features

The site is designated as a SPA for its:

Qualifying Annex I species:

- Bar-tailed godwit – non-breeding
- Common tern – breeding and non-breeding

In addition, it is one of the most important locations in the UK for non-breeding little gull (*Hydrocoloeus minutus*) and is used regularly by 1% or more of the biogeographical population of the following regularly occurring migratory species (other than those listed in Annex I) in any season: knot.

Waterbird assemblage: cormorant, oystercatcher, grey plover, sanderling, knot, dunlin, bar-tailed godwit, redshank.

Conservation Objectives

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed above), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features
- the structure and function of the habitats of the qualifying features
- the supporting processes on which the habitats of the qualifying features rely
- the population of each of the qualifying features
- the distribution of the qualifying features within the site

Threats/ Pressures to Site Integrity

The Site improvement Plan[31] (which also covers The Dee Estuary SPA/ Ramsar/ SAC) and Supplementary Advice on Conservation Objectives (SACOs)[32] identifies the following pressures and threats to the SPA:

- public access/ disturbance
- changes in species distributions i.e., petalwort
- invasive species
- climate change
- coastal squeeze
- water pollution
- fisheries: commercial marine and estuarine
- overgrazing
- predation of tern colonies
- planning permission: general
- marine consents and permits
- transportation and service corridors
- physical modification i.e., impacts of reduced freshwater inputs flushing through the Estuary

A.5 Mersey Narrows & North Wirral Foreshore SPA

Qualifying Features

The site is designated as a Ramsar site for the following Criteria:

Criterion 4:

The site regularly supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions e.g., important numbers of non-breeding little gulls *Hydrocoloeus minutus* and common terns.

Criterion 5:

Assemblages of international importance. The site regularly supports 20,000 or more waterbirds.

Criterion 6:

The site regularly supports 1% of the individuals in the populations of the following species or subspecies of waterbird in any season: *islandica* and *lapponica* sub-species of bar-tailed godwits, non-breeding knot.

Threats/ Pressures to Site Integrity

The Information Sheet on Ramsar Sites[33] identifies the following pressures and threats to the Ramsar site:

- unspecific development urban use
- recreation/ tourism disturbance
- vegetation succession

A.6 River Dee and Bala Lake/ Afon Dyfrdwy a LlynTegid SAC

Qualifying Features

The site is designated as a SAC for its:

Qualifying Annex I habitat:

- water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. (Rivers with floating vegetation often dominated by water-crowfoot)

Qualifying Annex II species:

- Atlantic salmon *Salmo salar*
- Brook lamprey *Lampetra planeri*
- Bullhead *Cottus gobio*
- Floating water-plantain *Luronium natans*
- Otter *Lutra lutra*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

Conservation Objectives

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- the extent and distribution of qualifying natural habitats and habitats of qualifying species
- the structure and function (including typical species) of qualifying natural habitats
- the structure and function of the habitats of qualifying species
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- the populations of qualifying species
- the distribution of qualifying species within the site

Threats/ Pressures to Site Integrity

The Standard Data Form[34] does not identify any pressures and threats to the SAC.

A.7 Brown Moss SAC

Qualifying Features

The site is designated as a SAC for its:

Qualifying Annex II species:

- Floating water-plantain *Luronium natans*

Conservation Objectives

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed above), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- the extent and distribution of the habitats of qualifying species
- the structure and function of the habitats of qualifying species
- the supporting processes on which the habitats of qualifying species rely
- the populations of qualifying species
- the distribution of qualifying species within the site

Threats/ Pressures to Site Integrity

The Site Improvement Plan[35] identifies the following pressures and threats to the SAC:

- hydrological changes
- water pollution
- invasive species
- air Pollution: impact of atmospheric nitrogen deposition

A.8 Midland Meres & Mosses Phase 2 Ramsar

Qualifying Features

The site is designated as a Ramsar for the following Criteria:

Ramsar criterion 1:

- the site comprises a diverse range of habitats from open water to raised bog

Ramsar criterion 2:

- supports a number of rare species of plants associated with wetlands, including the nationally scarce cowbane *Cicuta virosa* and, elongated sedge *Carex elongata.* Also present are the nationally scarce bryophytes *Dicranum affine* and *Sphagnum pulchrum*
- also supports an assemblage of invertebrates including several rare species. There are 16 species of British Red Data Book insect listed for this site including the following endangered species: the moth *Glyphipteryx lathamella*, the caddisfly *Hagenella clathrata* and the sawfly *Trichiosoma vitellinae*

Threats/ Pressures to Site Integrity

The site Information Sheet on Ramsar Wetlands[36] identifies the following pressures and threats to the Ramsar:

- eutrophication
- introduction/ invasion of non-native plant species

- pollution – pesticides/agricultural runoff

A.9 Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses SAC

Qualifying Features

The site is designated as a SAC for its:

Qualifying Annex I habitat:

- active raised bogs*
- degraded raised bogs still capable of natural regeneration

Annex I priority habitats are denoted by an asterisk (*).

Conservation Objectives

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed above), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- the extent and distribution of qualifying natural habitats
- the structure and function (including typical species) of qualifying natural habitats, and
- the supporting processes on which qualifying natural habitats rely

Threats/ Pressures to Site Integrity

The Site Improvement Plan[37] identifies the following pressures and threats to the SAC:

- inappropriate water levels
- water pollution
- air pollution: impact of atmospheric nitrogen deposition
- inappropriate scrub control
- overgrazing
- planning permission: general
- peat extraction
- invasive species

References

[1] https://www.gov.uk/guidance/national-planning-policy-framework

[2] https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site

[3] The Precautionary Principle, which is referenced in Article 191 of the Treaty on the Functioning of the European Union, has been defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2005) as: *'When human activities may lead to morally unacceptable harm* [to the environment] *that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. The judgement of plausibility should be grounded in scientific analysis'.*

[4] SNH (2015). Habitats Regulations Assessment of Plans: Guidance for Plan-Making Bodies in Scotland. Version 3.0, January 2015. Available from: https://www.nature.scot/habitats-regulations-appraisal-plans-guidance-plan-making-bodies-scotland-jan-2015.

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[6] Opinion of Advocate General Kokott, 9th June 2005, Case C-6/04. Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland, paragraph 49. http://curia.europa.eu/juris/document/document.jsf?docid=58359&doclang=EN

[7] https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/EN_art_6_guide_jun_2019.pdf

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[9] Department for Environment, Food and Rural Affairs. August 2012. Habitats Directive: Guidance on the application of article 6(4). Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures. 9pp. Available at: www.defra.gov.uk [Accessed on the 03/11/2020].

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[11] Cutts N & Allan J. 1999. Avifaunal Disturbance Assessment. Flood Defence Works: Saltend. Report to Environment Agency).

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[13] The University's research is available at the following link: http://bailey.persona-pi.com/Public-Inquiries/M4%20-%20Revised/11.3.67.pdf.

[14] Research undertaken by the Institute of Estuarine & Costal Studies, University of Hull. 2013. Available at: http://bailey.persona-pi.com/Public-Inquiries/M4%20-%20Revised/11.3.67.pdf [Accessed on the 01/12/2020]

[15] Ibid. Response distances to visual stimuli are given in the Estuarine & Coastal Studies report.

[23] The Holohan ruling also requires all the interest features of the European sites discussed to be catalogued (i.e., listed) in the HRA. That is the purpose of Appendix B.

[24] Marches Mosses BogLIFE project - GOV.UK (www.gov.uk)

[25] https://designatedsites.naturalengland.org.uk/SiteSearch.aspx; data correct as of 29/07/22

[26] www.publications.naturalengland.org.uk/publication/6579320399069184

[27] Natural England & the Countryside Council for Wales (2010). The Dee Estuary European Marine Site comprising: Dee Estuary / Aber Dyfrdwy Special Area of Conservation, The Dee Estuary Special Protection Area, The Dee Estuary Ramsar Site. Natural England & the Countryside Council for Wales" advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

[28] www.publications.naturalengland.org.uk/publication/6579320399069184

[29] Natural England & the Countryside Council for Wales (2010). The Dee Estuary European Marine Site comprising: Dee Estuary / Aber Dyfrdwy Special Area of Conservation, The Dee Estuary Special Protection Area, The Dee Estuary Ramsar Site. Natural England & the Countryside Council for Wales" advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

[30] www.jncc.gov.uk/jncc-assets/RIS/UK11082.pdf

[31] www.publications.naturalengland.org.uk/publication/6579320399069184

[32]www.designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9020287&SiteName=mersey+narrows&SiteNameDisplay=Mersey+Narrows+and+North+Wirral+Foreshore+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=5

[33] www.rsis.ramsar.org/RISapp/files/RISrep/GB2202RIS.pdf

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