

## Water for life and livelihoods



## River basin management plan for the Humber River Basin District Habitats Regulations Assessment Updated December 2015

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## Executive summary

A Habitats Regulations Assessment (HRA) of the River Basin Management Plan for Humber River Basin District has been carried out by the Environment Agency, in consultation with Natural England.

The purpose of a River Basin Management Plan (RBMP) is set out in UK Ministerial Guidance: 'An RBMP should be a strategic plan which gives everyone concerned with the river basin district a measure of certainty about the future of water management in that district. It will include objectives for each water body and a summary of the programme of measures necessary to reach those objectives'.

At this high-level plan stage, the detail of precisely where and how the programme of measures will be implemented has not yet been developed. This assessment informs any subsequent lower tier plan or project level HRA of the key risks to European sites and the range of potential control and mitigation techniques that could be applied. The assessment has identified potential hazards associated with implementation of the measures in the RBMP. These hazards are associated with the types of measures that are related to each significant water management issue (SWMI) in the RBMP and indicate the potential levels of risk to the range of features of the network of European sites. The level of detail of the plan does not allow detailed consideration of effects on individual European sites. However, at this strategic level, the assessment undertaken still allows confidence that the measures could go ahead without harm to European sites, subject to more detailed scrutiny of mitigation options at the lower tier plan or project level. This conclusion is primarily drawn because the RBMP does not constrain where or how the measures are implemented, and the process for deferring HRA to lower tier plan or project level, where necessary, will provide for a range of mitigation options to be pursued at the lower tier plan or project level.

The assessment demonstrates that controls are in place to identify any risks to European sites when the actions required to implement the measures are developed. The RBMP itself also makes it clear that before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations.

It is determined that, at this strategic plan level, the range of potential mitigation options available allow a conclusion that the RBMP is not likely to have any significant effects on any European sites, alone or in combination with other plans or projects. Given this conclusion, there is no requirement, at this strategic plan level, to progress to the next stage of the Habitats Regulations Assessment (an 'appropriate assessment' to examine the question of adverse effect on the integrity of European sites).

Acceptance that this Plan is consistent with the Habitats Regulations is on the basis of the level of detail of the plan. This conclusion does not guarantee that any plan or project derived from the Plan will also be found to be consistent. As local actions are developed at a project level and the details of their scope and scale are known, this may identify additional effects on European sites that have not been assessed here, or were not appropriate to consider at this spatial scale of plan.

This conclusion does not therefore remove the need for later Habitats Regulations Assessment of any other plans, projects, or permissions associated with, or arising out of, the measures identified in the Plan. As the RBMP does not give weight to lower tier plans or

projects, it is important to note that inclusion of projects within the RBMP should not have any influence on the lower tier or project level HRA conclusions. Any HRA at the lower tier for which adverse effects on site integrity cannot be ruled out, and cannot be mitigated, must consider the merits of the individual project to determine whether there are imperative reasons of overriding public interest for its implementation. Inclusion in this plan does not give any weight to any such conclusions.

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### **Appendix 1:**

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**Table A2 - Potential Hazards arising from Measures proposed within the Humber RBMP**

**Table A3 – European site features against Hazards for the Humber RBD**

**Appendix 2: Project level control and mitigation for SWMI required measures**

**Appendix 3: Descriptions of Hazards used within the HRA**

**Appendix 4: European sites within the Humber RBD**

# 1 Introduction

## 1.1 Introducing this report

This report sets out the results of a Habitat Regulations Assessment (HRA) into the effects on designated 'European sites' of the 2015 updated River Basin Management Plan (RBMP) for the Humber River Basin District updated in December 2015. This report has been produced by the Environment Agency as the 'competent authority' for the HRA as part of preparing the updated RBMPs for approval by the Secretary of State for Environment and Rural Affairs. In preparing the HRA report the Environment Agency has consulted with Natural England (for English River Basin Districts) and Natural Resource Wales (for English-Welsh cross border River Basin Districts).

RBMPs provide a long-term framework for the management of all issues that affect the water environment in a River Basin District (RBD). They rely on a range of more detailed plans that government or key sectors are responsible for developing to enable the objectives of the RBMP to be achieved. The HRA has been carried out at the level of detail published in the RBMP, which is high-level and does not include specific details of actions on the ground. The HRA informs subsequent lower tier plans and/or project level HRAs of the likely risks and possible need for mitigation and controls that will need further consideration once measures are developed as specific local actions. Potential mitigation and control techniques that could be applied are described, but will need further investigation at the lower tier project/plan level.

This report describes each of the main stages and results of the updated RBMP HRA, as follows:

- Describing the European sites within the RBD
- The approach to the HRA
- Screening, assessing likely significant effects and consideration of further HRA stages
- In combination effects of other plans
- Conclusion and future HRAs.

## 1.2 Background to the RBMPs

The purpose of a River Basin Management Plan (RBMP) is set out in UK Ministerial Guidance: 'An RBMP should be a strategic plan which gives everyone concerned with the river basin district a measure of certainty about the future of water management in that district. It will include objectives for each water body and a summary of the programme of measures necessary to reach those objectives. The RBMP should also be a gateway, providing easy access to relevant supporting information.' It goes on to say that RBMPs should:

- record outcomes from the river basin planning process
- set the policy framework for how regulatory decisions affecting the water environment in that river basin district will be made
- report to the public and the European Commission on the implementation of the Water Framework Directive (WFD)

The Water Framework Directive (WFD) requires member states to meet the following objectives:

- Prevent deterioration in the status of surface waters and groundwater
- Achieve 'Protected Area' objectives and standards
- Aim to achieve good status for all water bodies
- Aim to achieve good ecological potential and good surface water chemical status for artificial and heavily modified water bodies.

In preparing the updated RBMPs the Environment Agency consulted in June 2013 on the range of 'Significant Water Management Issues' (SWMIs) that the RBMP would need to address to meet WFD objectives. There was a further consultation in October 2014 on the range of interventions (measures) that would be worthwhile to prevent deterioration, achieve protected area objectives and meet water body status objectives. Worthwhile measures are those that have been assessed as cost-beneficial without funding or timescale constraints. Following these consultations, the range of SWMI required measures has been reviewed and set out in the updated RBMP as proposed programmes of measures, under the following headings:

- Measures to prevent deterioration
- Measures to deliver 2021 outcomes
- Measures to achieve outcomes for 2027 or beyond
- Additional measures for protected areas.

The focus of the updated RBMP is on programmes of measures that will deliver outcomes for 2021. These have been drawn from proposed investment plans of government and key sectors and set out measures where there is confidence that they are affordable, planned for 2021 and expected to deliver a WFD outcome.

### **1.3 The Humber RBMP**

The Humber river basin district covers an area of 26,109 km<sup>2</sup>. It ranges from the upland areas of the Peak District, South Pennines and the North York Moors, across the Derbyshire and Yorkshire Dales and the fertile river valleys of the Trent and Ouse, to the free-draining chalk of the Yorkshire and Lincolnshire Wolds. The river basin district has several major urban centres including Birmingham, Leeds and Sheffield as well as the ports of Hull, Immingham, Goole and Grimsby. In total, more than 10.8 million people live and work in towns and cities within the district. The Humber RBD is made up of 15 management catchments (see map below). The next level down comprises the operational catchments. These cover a number of smaller water bodies based around the same local geography or affected by common pressures on the water environment. These are sub-divisions of a management catchment and typically relate to the areas draining well-known tributaries of a bigger river, or to discrete small rivers of their own. There are also operational catchments specific to certain larger water bodies, for example ground waters, which, due to their size, can cross management catchment boundaries and even river basin districts

The updated Humber RBMP provides a summary of the extent of Significant Water Management Issues (SWMIs), as follows:

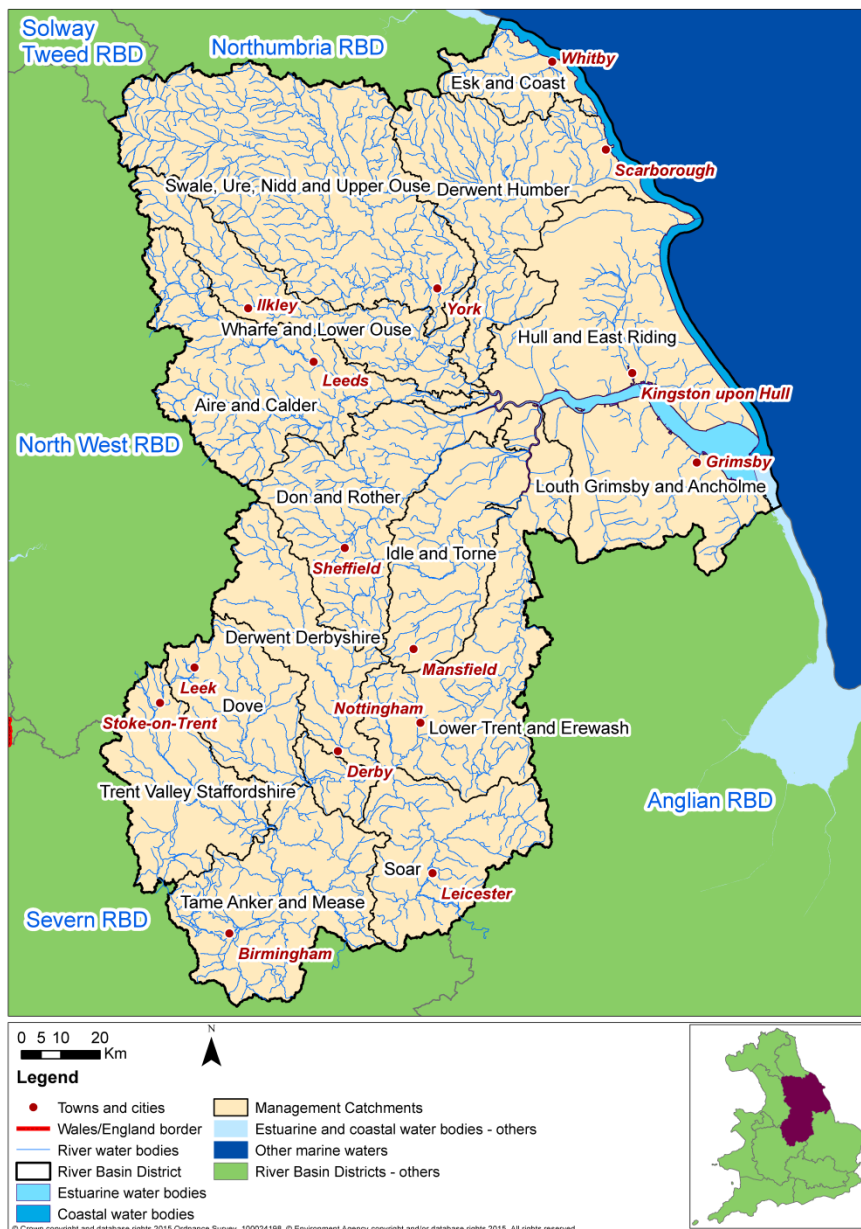
- **Pollution from waste water** – affect 38% of water bodies in the river basin district



- **Physical modifications** – affect 42% of water bodies in the river basin district
- **Pollution from rural areas** – affect 32% of water bodies in the river basin district
- **Changes to the natural flow and level of water** – affect 6% of water bodies in the river basin district
- **Pollution from towns, cities and transport** – affect 16% of water bodies in the river basin district
- **Pollution from abandoned mines** – affect 4% of water bodies in the river basin district
- **Negative effects of non-native invasive species** – affect <1% of water bodies in the river basin district.

Further details of the measures proposed to address the Significant Water Management Issues for the Humber RBD are described in section 4.1.

**Figure 1 Map of the Humber river basin district and management catchments**



## 1.4 Background to Habitats Regulations Assessment

In England, the Conservation of Habitats and Species Regulations 2010, as amended, commonly termed the Habitats Regulations, implements the European Union Habitats Directive (Directive (92/43/EEC) on the Conservation of natural habitats and of wild flora and fauna, and certain elements of the Birds Directive (2009/147/EC). This legislation provides the legal framework for the protection of habitats and species of European importance in England.

European sites protected under the Habitats Regulations comprise Special Protection Areas (SPA), Special Areas of Conservation (SAC), candidate SACs (cSAC), Sites of Community Importance (SCI) and, as a matter of government policy, to potential Special Protection Areas (pSPA), areas formally provided as compensation for European site loss and Ramsar sites (sites designated under the 1971 Ramsar Convention for their internationally important wetlands). These sites are referred to collectively in this report as 'European sites'.

Regulation 9(5) of the Habitats Regulations requires that a 'competent authority' must consider the requirements of Habitats Directive in exercising any of its functions. Article 6(3) of the Habitats Directive and Regulations 61 and 62 of the Habitats Regulations, define the requirements for assessment of plans and projects potentially affecting European sites. This requires that a competent authority, before deciding to undertake, or give any consent or authorisation for a plan or project which is likely to have a significant effect on a European site, and is not directly connected with or necessary to the management of that site, must carry out an appropriate assessment. The term commonly referred to for the whole, step by step assessment process is 'Habitats Regulations Assessment' or HRA.

The Humber RBMP is considered to fit within the definitions of a 'plan' as defined by the Habitats Directive, and requires a Habitats Regulations Assessment (HRA). The RBMP is a high-level planning document for the Humber RBD, therefore the HRA needs to be tailored to be appropriate for the spatial area of coverage and the strategic nature of the plan.

The HRA has followed a framework of four distinct stages, only moving to the next stage if required by the results of that stage of the assessment. The four stages are:

**Stage 1: Screening and Likely Significant Effects** is the process which initially identifies the likely impacts upon a European Site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts may be significant. This stage also includes the development of mitigation to avoid or reduce any possible effects.

**Stage 2: Appropriate Assessment** is the detailed consideration of the impact on the integrity of the European Site of the plan or project, either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function. This is to determine whether there is objective evidence that adverse effects on the integrity of the site can be excluded. This stage also includes the development of mitigation to avoid or reduce any possible impacts.

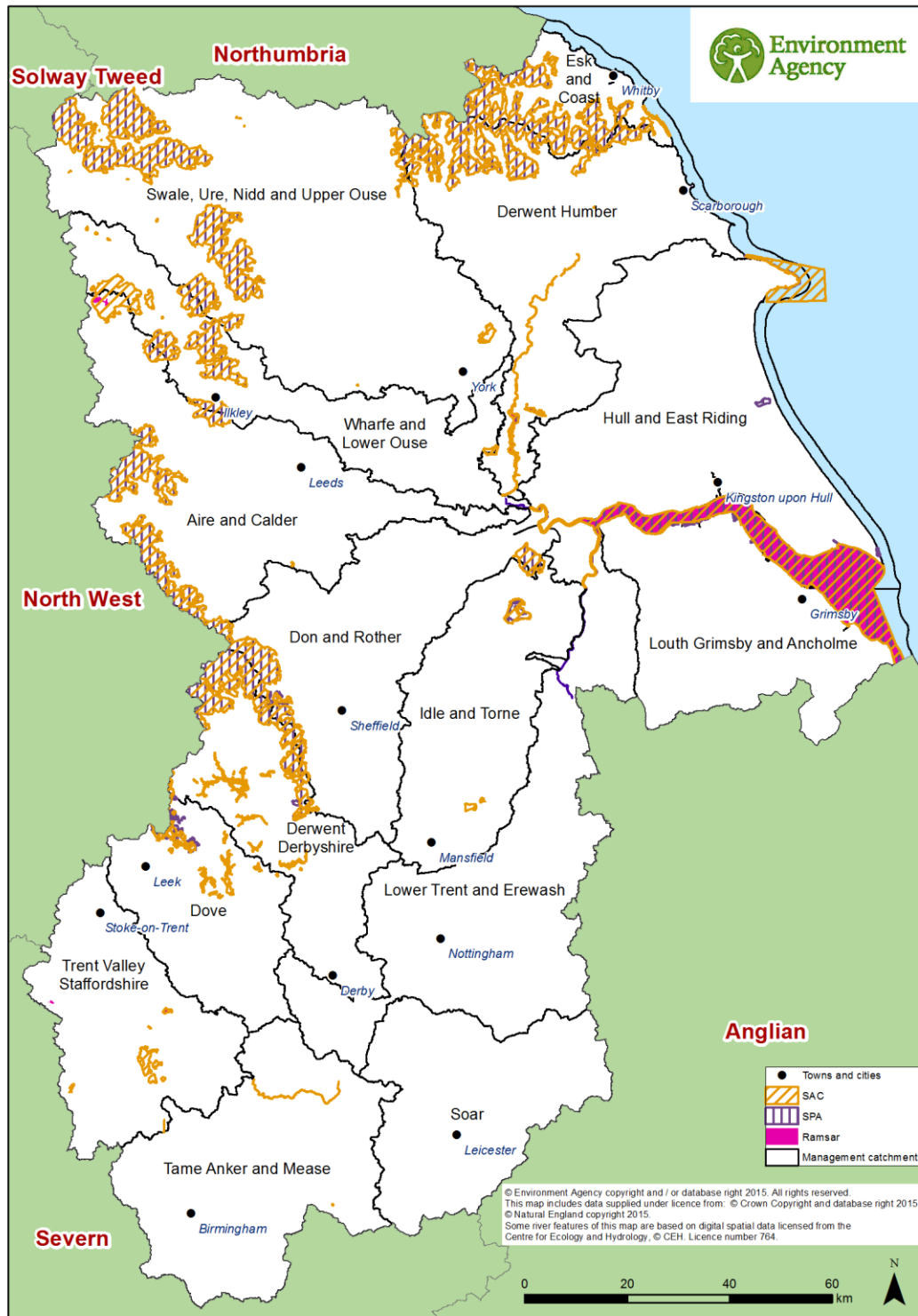
**Stage 3: Assessment of alternative solutions** is the process which examines alternative ways of achieving the objectives of the plan or project that would avoid adverse impacts on the integrity of the European Site, should avoidance or mitigation be unable to avoid adverse effects.

**Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain** is made with regard to whether or not the plan or project is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of any required compensatory measures.

## 2 European sites in the Humber RBD

Within the Humber RBD there are 31 SACs, 9 SPAs, and 5 Ramsar sites. Some of the sites have more than one designation such as Morecambe Bay, parts of which are designated as SPA, SAC and Ramsar.

Figure 2 - Map of the European sites in the Humber River Basin District



Of the 5 Ramsar sites, only the Humber Estuary is located on the coast and the remainder are inland freshwater sites including the Lower Derwent Valley, which is predominantly designated for large numbers of overwintering waders that gather in the seasonally-flooded agricultural land.

The SPAs in the Humber RBD are a mixture of upland moors, lowland wetland sites, and coastal sites. The 31 SACs in the Humber RBD range in size and nature. Some relatively small sites are designated for one species such as Ensor's Pool SAC which is designated for white-clawed crayfish or Kirk Deighton SAC, which is designated for its population of Great Crested Newts. Other sites are designated for their habitats such as the North York Moors for extensive tracts of heath land and the Humber Estuary for its extensive coastal habitats.

A number of sites in the river basin district have multiple designations such as the North York Moors and South Pennine Moors which are both designated as a SAC and a SPA due in part for their wetland upland habitat (e.g. blanket bog) and their importance for breeding birds.

The Humber Estuary is also designated as SAC, SPA and Ramsar site, due to its estuarine habitats, its importance for breeding and over-wintering birds and in supporting River Lamprey and Sea Lamprey.

Rivers in the district that are designated as SACs include the River Derwent and the River Mease. The Derwent supports species including Bullhead, Sea Lamprey and River Lamprey, whilst the Mease supports important populations of Bullhead and Spined Loach.

Appendix 4 contains a summary of the European sites present within the Humber RBD. This includes their geographic area and whether they are identified as 'Natura 2000 protected areas' under the WFD. It is worth noting that in some cases only part of the European site is within the Humber RBD and therefore not all interest features may lie inside the RBD boundary.

## **2.1 European sites that could be affected by the RBMP**

The RBMP is a long term plan for the water environment that could potentially affect both water dependent and non-water dependent European sites and their qualifying features.

Water dependent sites are classified as protected areas under the WFD; each protected area European site has specific objectives to ensure their favourable conservation status. Supporting measures within the RBMP should therefore predominantly be beneficial for the conservation status of water dependent European sites. However, this does not mean that water-dependent sites may not be adversely affected, since other measures within the RBMP could still have unintended consequences for these sites.

Effects on non water dependent European sites and their qualifying features are also possible. Measures proposed within the plan take a wide variety of forms, including interventions on land as well as water bodies. Potential effects on non water dependent European sites therefore cannot be ruled out and are considered as part of the assessment.

## **2.2 European sites and their status for RBMPs**

The RBMP provides summary information on the current status and baseline for water dependent European sites as part of its monitoring data. These are Protected Areas under

the Water Framework Directive, and provide an indicator of those that are most likely to be influenced by changes to the water environment.

European sites in England, with the occasional exception, are also designated as SSSIs. Natural England monitors the conditions of SSSIs and their component units using six reportable condition categories: favourable; unfavourable recovering; unfavourable no change; unfavourable declining; part destroyed and destroyed.

The current status of water-dependent European site protected areas for the Humber RBD is summarised in the table below. This gives the current area of water-dependent SSSI units of European protected areas in different condition categories as currently recorded on Natural England’s designated site data system. SSSI units underpin European protected areas and Natural England collects data at a SSSI unit level, but those assessments have regard for the current condition of European features as well as SSSI features. When SSSI units are in favourable condition, they are usually deemed to be meeting their European level conservation objectives. Caution is required however, as the SSSI condition assessment is a snapshot in time, and achievement of European level conservation objectives is reliant upon long term maintenance.

This shows that for the Humber RBD, a large proportion (84% by area) of water-dependent SSSI units of European protected area sites are currently do not meet their SSSI conservation objectives.

**Table 1 WFD status of water dependent SSSIs for the Humber RBD<sup>1</sup>**

Condition	Humber RBD (ha)
Favourable	18,167
Destroyed / Part destroyed	-
Unfavourable declining	524
Unfavourable no change	2,803
Unfavourable recovering	95,637
Total Area Unfavourable	98,964
% Unfavourable	84

The generic pressures on sites in the Humber RBD include freshwater point source and diffuse pollution, siltation, forestry and woodland management, agricultural practices and diffuse pollution, under or over grazing, drainage and inappropriate water levels, invasive non-native species, and public access and disturbance. For example, extensive tracts of mainly moorland habitat in the South Pennines have been degraded by pollution, over-grazing and wildfires. There are also long term national threats to habitats and especially species, including climate change, alterations in hydrological and coastal processes and invasive non-native species.

<sup>1</sup> Source: Extract from Natural England databases August 2015.

## **2.3 European sites and their management**

As part of a new strategic approach to managing all England's European sites, new measures needed to achieve favourable conservation status for all European site interest features in England have been developed by Natural England. These are collectively referred to as Site Improvement Plans (SIPs), and have been developed by the Improvement Programme for England's Natura 2000 sites (IPENS).

In relation to RBMPs, which include objectives and actions specifically for WFD Natura 2000 Protected Areas, these Protected Areas' objectives and actions are informed by the SIPs developed by Natural England, and inform the RBMP. Water dependent / protected area sites in the Humber RBD are referenced in the table in Appendix 4.

### 3 Approach to HRA

The steps undertaken to complete the HRA are as follows:

- Describe the plan and the measures proposed.
- Screen and assess the likely significance of any effects on European sites.
- Consider need for further stages of assessment (i.e. appropriate assessment, alternative solutions and IROPI)
- Determine a conclusion.

#### 3.1 Description of the RBMP Measures

RBMPs set out long-term objectives for sustainable use of the water environment, covering rivers, lakes, coasts and groundwater. They are strategic documents which set the framework for local action to be taken to meet long-term objectives for the water environment. The RBMP is underpinned by a programme of investigations that determine: Whether there is a problem (i.e. Significant Water Management Issue, SWMI) with the current status of water bodies; if so, the reasons the water body is failing; and the types of measures required for the water body to attain good status.

The RBMPs do not include the detail of local actions, but are a high level summary of measures, developed through consultation about how society and specific sectors should contribute to their long-term objectives. There are sources of information about the implementation of RBMP actions that have informed the RBMP but are not part of the published plan, including the Environment Agency's Catchment Data Explorer<sup>2</sup> and government and other sector investment programmes.

##### Consultation of the updated RBMP

For the consultation on the updated RBMP, proposed measures were assessed as worthwhile and put forward to address significant water management issues (SWMIs) to achieve the long-term objectives for the water environment. These also included measures that would prevent deterioration and support protected area objectives. Worthwhile measures are those that have been assessed as cost-beneficial without funding or timescale constraints. They were summarised as follows:

**Table 2 SWMI required measures in the RBMP**

<b>Categories of Significant Water Management Issue</b>	<b>SWMI Required Measures (may be referred to as tier 2 measures)</b>
<b>Physical modification</b>	Removal or easement of barriers to fish migration
	Removal or modification of engineering structure
	Improvement to condition of channel/bed and/or banks/shoreline
	Improvement to condition of riparian zone and /or wetland habitats

<sup>2</sup> A web-based interactive map to navigate to catchments and water bodies, view catchment summaries and download data, to support updates to the river basin management plans.



	Vegetation management Changes to operation and maintenance
<b>Manage pollution from waste water</b>	Mitigate/remediate point source impacts on receptor Reduce point source pollution at source Reduce point source pollution pathways (i.e. control entry to the water environment) Reduce diffuse pollution at source
<b>Manage pollution from towns, cities and transport</b>	Reduce diffuse pollution pathways (i.e. control entry to the water environment) Mitigate/remediate diffuse pollution impacts on the receptor, Reduce diffuse pollution at source Reduce diffuse pollution pathways at source
<b>Improve the natural flow and level of water</b>	Control pattern/timing of abstraction Water demand management Improvement to condition of channel/bed and/or banks/shoreline Use alternative source/relocate abstraction or discharge
<b>Manage invasive non-native species</b>	Prevent introduction Mitigation, control and eradication (to reduce extent) Building awareness and understanding (to slow the spread) Early detection, monitoring and rapid response (to reduce the risk of establishment)
<b>Manage pollution from rural areas</b>	Reduce diffuse pollution at source Mitigate/remediate diffuse pollution impacts on the receptor Reduce diffuse pollution pathways (i.e. control entry to the water environment)
<b>Manage pollution from mines</b>	Mitigate/Remediate point source impacts on receptor

### Publication of the updated RBMP

For the 2015 updated RBMP, the SWMI required measures are set out as programmes of measures led by government and key sectors and related to more specific WFD objectives within the river basin planning cycles<sup>3</sup>, as follows:

- Measures to prevent deterioration
- Measures to deliver 2021 outcomes
- Measures to achieve outcomes for 2027 or beyond
- Additional measures for protected areas.

The programmes to deliver 2021 outcomes have taken forward those SWMI required measures that were assessed as worthwhile but only where there is confidence in government and key sectors over funding and planned delivery by 2021. Some of these measures have predicted water body improvements that will achieve specific WFD

<sup>3</sup> RBMPs are required to be reviewed every 6 years. These 6 year periods are called cycles. Cycle 1 was 2009-15, cycle 2 is 2015-21 and cycle 3 will be 2021-27.

objectives. Other measures will make a contribution to improvements but without predicted WFD outcomes. All other SWMI required measures that were assessed as worthwhile but not planned to deliver outcomes by 2021 have been carried forward as requirements for future programmes for 2027 and beyond.

### **3.2 Screening and Likely Significant Effects**

The screening and assessment of likely significant effects has involved the following steps:

1. Consider measures not requiring assessment (to be screened out)
2. Assess the effects of SWMI required measures in the consulted on updated RBMP
3. Consider the programmes of measures in the 2015 updated RBMP.

Measures that have been screened out at this stage are on the basis of the current level of information available. However, this does not mean that they are automatically screened out at the project level. Therefore, when they are implemented, further consideration should be given to any potential effects on European sites.

#### **3.2.1 Screening for SWMI required measures that will have potential effects**

There are over 20 categories of SWMI required measures in the Humber RBMP. Of these, the following 3 measures have been screened out as having little or no effect on European sites:

- Reduce waste water point source pollution at source
- Prevent introduction of invasive non-native species
- Building awareness and understanding to slow the spread of invasive non-native species.

Measures to reduce waste water point source pollution at source are considered likely to be implemented within the confines of existing waste water treatment works, and therefore not give rise to significant hazards. The measures relating to invasive, non-native species are based around preventative measures and education and awareness, will not give rise to significant interventions on the ground, and therefore are not considered likely to give rise to significant hazards to which European sites could be susceptible.

#### **3.2.2 Screening of measures managing European sites**

If there are measures in the plan that are directly connected with or necessary for the management of European sites, then these are normally screened out of consideration in the HRA, provided that there is no likely significant effect on the designated features of other European sites.

While the RBMP as a whole is not considered to be directly connected with or necessary for the management of European sites, the RBMP includes measures for a number of designated Protected Areas, which includes water dependent European sites (SACs and SPAs). The measures for those water dependent sites will incorporate the information from the Site Improvement Plans (SIPs) published by Natural England. The plans outline the priority measures required to improve the condition of the sites' qualifying features, and are thus directly necessary for their management. For HRA purposes these Protected Area measures are therefore not required to be considered further.

### **3.2.3 Assessment of SWMI required measures**

The HRA has been carried out on the range of SWMI required measures to achieve long-term WFD objectives, as set out in the updated RBMP for consultation. These are measures that prevent deterioration, achieve protected area objectives and meet water body status objectives, and that for the consultation stage of preparation are assessed as cost-beneficial without any constraints on affordability or timescales of delivery.

The SWMI required measures are high level summaries of the range of actions required to address the SWMIs, without any specific details as to the precise location, design and method of implementation. At this strategic level, there are significant constraints as to the extent to which the effects on European sites can be assessed. The RBMP HRA provides a high level assessment of potential hazards and risks to European sites, which subsequent plans or projects will be able to use to inform assessment in more detail, along with the types of mitigation that may be required to enable a measure to be implemented in accordance with the Habitats Regulations. The results of the assessment are provided in section 4.1 and 4.2; further consideration of the highest risk measures for the RBD is provided in section 4.3.

The potential effects from the SWMI required measures on European sites was assessed by identifying their potential hazards and relating these to the range of features for which the sites in the RBD are designated, using the national tables from the Environment Agency's Habitats Directive Handbook. Appendix 1 (Table A1) sets out the potential hazards to qualifying features of European sites in the Humber RBD. The table shows the frequency of different SWMI required measures (across catchments) and the frequency of occurrence of qualifying features (within SACs, SPAs and Ramsar sites) within the RBD. Where the measures have greater potential for hazards on the European site features in the RBD, this is illustrated by the numbering and colour coding within the table. This matrix of potential hazards has been developed from the Environment Agency Habitats Directive Handbook's national tables, shown in Table A2 and A3 (Appendix 1). An extract from the table is provided in Table 3 below to illustrate the approach.

Although the proposed measures are set out according to management and operational catchments, the details of where the measures will be implemented and their methods of implementation are not included within the plan. The measures have been assessed on the basis of the potential hazards they may give rise to, combined with the potential sensitivities of site features present in the RBD. The assessment identifies potential risks to European sites and their features, but cannot determine at this stage whether those risks would lead to impacts on specific European sites and features, or the nature and scale of those impacts. Therefore, the assessment is not accurate indication of cumulative impact, but it flags where there may be greater risk due to frequency. The assessment also identifies the range of controls and mitigation that more detailed plans and projects will need to consider the potential risks (see section 4). This gives confidence that there are options available at the lower tier to adequately mitigate for any potential impacts, notwithstanding the fact that lower tier HRA will still be required

**Table 3 Potential Impacts of Measures on qualifying features of European sites in the Humber RBD** (extract of Table A1 in Appendix 1)

HUMBER		RBMP MEASURES for RBD		Physical modifications (to improve habitats)						
No of impacts (hazards) from measures on qualifying features		water dependent features Y/N	no. of occurrences of the feature within RBD	Measure type						
				Removal or easement of barriers to fish migration	Removal or modification of engineering structure	Improvement to condition of channel/bed and/or banks/shoreline	Improvement to condition of riparian zone and/or wetland habitats	Change to operations and maintenance	Vegetation management	
No. Of EUROPEAN SITES in RBD (45)				42	29	40	34	34	26	
Qualifying features				81%	56%	77%	65%	65%	50%	
SAC (31)	Ramsar (5)	1.1 Fens and wet habitats not acidification sensitive*	Y	13	9	9	8	8	5	2
		1.2 Bogs and wet habitats, acidification sensitive*	Y	16	6	6	6	6	5	2
		1.3 Riverine habitats	Y	10	10	10	9	9	6	2
		1.4 Standing Waters acidification sensitive*	Y	5	7	7	7	7	4	1
		1.5 Standing waters not acidification sensitive*	Y	7	9	9	8	8	5	1
		1.6 Dry woodlands*	N	12	3	3	2	2	2	1
		1.7 Dry Grassland*	N	11	3	3	2	2	2	1
		1.8 Dry heathland habitats*	N	12	2	2	2	2	2	1
		1.9 Upland*	N	4	4	4	4	4	4	2
		1.10 Coastal habitats*	N	6	6	6	5	5	4	2
		1.11 Coastal habitats sensitive to abstraction*	Y	8	6	6	6	6	3	1
		1.12 Estuarine and intertidal habitats	Y	6	8	8	8	8	5	2
		1.13 Submerged marine habitats	Y	7	5	5	5	5	2	1

Type of measure

SWMI required measures

Number / %-age of operational catchments where the SWMI required measures are proposed

Colour coding used to indicate risk, assuming higher risk is associated with a higher number of hazards.  
1 = 1 hazard / qualifying feature sensitivity  
10 = 10 hazard / qualifying feature sensitivities

Total number of European sites (SAC, SPA, Ramsar) present in the RBD

Site qualifying features: habitat / species groups present within the RBD and whether water dependent

Number of times the SAC / SPA / Ramsar qualifying feature occurs within sites in the RBD

The number of hazards associated with the SWMI required measure to which the qualifying feature group is sensitive. The SWMI required measure highlighted is considered to give rise to 8 hazards that Estuarine and intertidal habitats are sensitive to.

### 3.2.4 Assessment of proposed programmes of measures

Following the consultation on the updated RBMP SWMI required measures, the RBMP has drawn on government and key sector plans to identify more specific programmes of measures that will deliver specific WFD objectives in specific timescales for the 2015 updated RBMP, as follows:

- Measures to prevent deterioration – these are national regulations or mechanisms that operate to safeguard the water environment
- Measures to deliver 2021 outcomes – these are specific programmes of investment planned by government and key sectors to deliver improvements in the 2<sup>nd</sup> cycle of the RBMP
- Measures for 2027 and beyond – these are future required levels of investment nationally by government or sectors to achieve the objectives of water bodies
- Measures for protected areas – these are the national set of action plans in place for different designated protected areas, including drinking water protected areas, shellfish waters, bathing waters, nutrient sensitive areas and Natura 2000 (European) Sites.

In preparing the updated RBMP programmes of measures, any likely significant effects of SWMI required measures on European sites, as identified from the HRA, were highlighted so that programmes of measures could take account of required controls and mitigation.

The HRA further considered each of these programmes of measures to assess if any further detail was given about their nature and scope, beyond what has been assessed for the SWMI required measures. The main focus is on the measures delivering 2021 outcomes, where there are a series of national programmes related to different funding sources, and a range of local measures developed by catchment partnerships across the RBD. The HRA considered each of these in order to identify any more specific risks of the proposed measures, and any more specific controls and mitigation that would be required as more detailed plans and projects are developed.

The main national programmes are:

- Water company investment programme
- Countryside Stewardship
- Highways England's environment fund
- Flood risk management investment programme
- Catchment level grant in aid funded improvements
- Abandoned metal and coal mine programmes
- Water resources sustainability measures.

The range of local measures proposed by the catchment partnerships were considered together as a bundle of measures across the RBD.

### 3.2.5 Controls and mitigation

Assessing likely significant effects on European sites for the RBMP requires consideration of the scope for controls and mitigation to avoid significant effects. These will be required if lower tier HRAs determine that adverse effects cannot be ruled out in the absence of

mitigation. The detail of the control and mitigation will be set out as part of more detailed plans and projects during the implementation of the RBMP, led by different sectors and investment programmes.

**Controls:** The principal controls on measures proposed within the RBMP are the subsequent tiers of regulation and consenting, and the further requirement for HRA on more detailed plans/projects. The Habitats Regulations require that the competent authority<sup>4</sup> for any plan or project to ensure the requirements of the Habitats Regulations are met before undertaking or permitting any project. Any project developer is required to provide the competent authority with information necessary for the HRA of that project. The competent authority must consult Natural England, as statutory adviser, on the HRA and its conclusions before it can undertake the measure or authorise consent for another to do so. It should be noted that in the context of the Habitats Directive and Habitats Regulations, the term 'project' is widely defined. Projects are not limited to construction works, and may include variations in the use, or the intensity of use of land or water. In cases where activities cease, potential effects on European sites will be taken into account and the statutory conservation body consulted.

**Mitigation:** A subsequent tier of plan or project, if deemed likely to result in significant effect on one or more European sites, will need to include mitigation to avoid or reduce potential effects. The precise specification of mitigation measures is best determined at project level, where greater detail is known about the design, location and extent of the project, and its potential influences on European sites and their qualifying features. Section 4.3.3 provides an example of mitigation specified by a project-level HRA and incorporated within a scheme to deliver measures from the Cycle 1 RBMP.

Appendix 2 sets out generic examples of mitigation / approaches that can be applied to the RBMP measures. These include statutory planning, regulatory and consenting processes, and project level mitigation options to avoid and/or reduce potential adverse effects.

### **3.3 Considering the need for further stages of assessment**

The assessment of likely significant effects on European sites from measures in the plan will result in a conclusion as to whether the effects may be significant or not. If they are, then this would trigger the need for more detailed consideration of effects in a further stage of HRA called Appropriate Assessment. Where any adverse effects are unable to be avoided or mitigated fully, then consideration of alternative solutions is required. In the event there are no available alternatives, then a case for imperative reasons of overriding public interest (IROPI) would have to be made to the Defra Secretary of State. The HRA report sets out the requirements for these levels of further consideration (see section 4.5).

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<sup>4</sup> A competent authority, as defined by the Habitats Regulations, is a Minister, government office, statutory undertaker or public body, with authority to give consent, or with authority to carry out projects (or plans) themselves.

## 4 Screening and Likely Significant Effects

This section reports on the results of screening and consideration of likely significant effects. These are summarised under the following headings:

- The range of SWMI required measures (as set out in the consultation)
- The highest risk SWMI required measures for the Humber RBD
- The specific programmes of measures in the updated RBMP
- Likely Significant Effects conclusion.

### 4.1 Summary of SWMI required measures

We have considered the likely significant effects on European sites of the full range of SWMI required measures that were considered worthwhile and put forward for **consultation in the updated RBMP**. Table 4 below summarises the results of this, with section 4.2 reporting on each type of measure related to SWMIs. The summary draws directly from the potential hazards matrix – Table A1 in Appendix 1, and focuses on the measures with highest numbers of potential hazards, and the European sites with features likely to be most vulnerable to these hazards.

**Table 4 Summary of potential risks to European sites in the Humber RBD**

SWMI required measures and their numbers of hazards to European Sites and frequency across catchments	Measures with higher no of hazards to European sites (10-8)		Measures with medium no of hazards to European sites (7-4)		Measures with lower no of hazards to European sites (3-1)	
	SWMI measure (no of)	Occurring in % of RBD catchments	SWMI Measure (no of)	Occurring in % of RBD catchments	SWMI measure (no of)	Occurring in % of RBD catchments
<b>Physical modification</b>	4	56-81%	1	65%	1	50%
<b>Pollution from waste water</b>					3	37-77%
<b>Pollution from towns, cities and transport</b>			1	23%	2	12-79%
<b>Changes to natural flow &amp; levels of water</b>	1	10%			2	4-23%
<b>Invasive non-native species</b>					2	2-8%
<b>Pollution from rural areas</b>			1	46%	2	2-63%
<b>Pollution from mines</b>					1	17%

The 5 highest risk measures are (% occurrence in RBD catchments):

**Physical modification:**

- Removal or easement of barriers to fish (81%)
- Removal or modification of engineering structure (56%)
- Improvement to condition of channel/bed and/or banks/shoreline (77%)
- Improvement to condition of riparian zone and/or wetland habitats (65%)

**Changes to natural flow and levels of water:**

- Improvement to condition of channel/bed and/or banks/shoreline (10%)

The most frequently occurring qualifying features in the RBD that would potentially be most affected by these measures are ( no of sites in RBD with qualifying features)::

- (1.1) SAC/Ramsars with fens and wet habitats not acidification sensitive (up to 13 sites)
- (1.3) SAC/Ramsars with riverine habitats (up to 10 sites)
- (2.6) SAC/Ramsars with non-migratory fish and invertebrates of rivers (up to 10 sites)
- (3.8) SPA/Ramsars with birds of coastal habitats (up to 9 sites)
- (3.9) SPA/Ramsars with birds of estuarine habitats (up to 10 sites)

See section 4.3 for summary of highest risk SWMI related measures.

Each of the categories of significant water management issues (SWMIs) is considered in turn in the following sections.

## 4.2 The assessment of SWMI required measures

Each section below sets out the HRA assessment on each type of measure related to SWMIs and a list of more specific measures by drawing on the potential hazards matrix (Table A1 in Appendix 1). The risks of each measure on the features of European sites are considered, as well as the range of controls and mitigation that may be required for more detailed plans and projects that will implement these measures.

### 4.2.1 Measures required to address physical modifications

**Physical modifications** affect 42% of water bodies in the Humber RBD. The measures required to address this are present in up to 81% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Physical modification	Removal or easement of barriers to fish migration,	42 (81%)
	Removal or modification of engineering structure,	29 (56%)
	Improvement to condition of channel/bed and/or banks/shoreline,	40 (77%)
	Improvement to condition of riparian zone and /or wetland habitats	34 (65%)
	Vegetation management	26 (50%)
	Changes to operation and maintenance	34 (65%)



## Consideration of effects

Measures that address the physical modifications of water bodies and aim to improve habitats have the greatest potential risks to designated site features. These measures include significant physical works as well as lower risk actions such as operational / maintenance changes and vegetation management, and are proposed in half to two thirds of the operational catchments in the RBD. Many of the protected species in particular are considered susceptible to these types of measures, with vascular plants and marine mammals considered generally less vulnerable. Bird populations including birds of lowland grassland, lowland freshwaters and their margins, and birds of coastal and estuarine habitats are particularly susceptible to measures proposing physical modifications. However, the sensitivities of site features are more likely to relate to hazards arising from construction activities, and therefore be of a short term nature. Habitats are also considered susceptible to physical modifications, in particular the riverine, fens, bogs and wet habitats and standing waters, and also coastal, estuarine and inter-tidal habitats.

## Controls and mitigation

The main mechanisms for controlling hazards arising from these measures are project level HRA where European sites are identified as affected, and would include planning permission where significant schemes are involved. Some work can be undertaken under permitted development rights and where a European site may be affected the statutory consultation body is consulted. Should the measures be found to have likely significant effect then the application for consent is made to the local planning authority. Any physical modifications on or near a main river or river / sea flood defences would require flood defence consent from the Environment Agency, or its equivalent consent for ordinary watercourses from the relevant Internal Drainage Board (IDB) or Lead Local Flood Authority (LLFA). In the marine context, for any measures involving works below the mean high water spring (MHWS) tidal limit, a marine licence would be required from the Marine Management Organisation (MMO). These consenting organisations would be the competent authority<sup>5</sup> under the Habitats Regulations, and would consult with Natural England on the HRA, including any proposals for mitigation.

Project-level mitigation for these measures would focus on appropriate controls for the hazards identified, along with consideration of any site specific sensitivities of the affected qualifying features. From the hazards identified from this HRA (Table A2 in Appendix 1), the hazards are broadly similar across the different SWMI required measures, reflecting potential for changes in water levels, flows / velocities and physical regime, (noise or visual) disturbance, loss of habitat, physical damage and potential changes to water quality (salinity / siltation / turbidity).

For potential loss of habitat, physical damage and disturbance, key project-level mitigation would focus on the avoidance of working on, or in proximity to sensitive habitats; the use of fencing and screening to minimise visual and noise disturbance, and also segregation / prevention of construction activity on or near sensitive habitats. Works can also be timed to avoid ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Such mitigation can best be developed by consideration of the existing habitats and species and their sensitivities, carried out as part of the project-level

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<sup>5</sup> Where multiple consents are required a single authority is identified as the 'lead competent authority'.

HRA, supported by appropriate survey as necessary, and informed through site specific knowledge, established through early consultation with Natural England. Changes in water levels, flows / velocities and physical regime, and potential water quality changes, may be temporary, arising from construction, or more long term due to the changed behaviour of flows / sedimentary regime due to the removal of a structure or changed profile of the riparian zone / channel / banks or shoreline.

Impacts of temporary changes during construction can be mitigated through sensitive timings and construction methods of working, for example removal of a fish barrier during low flow conditions to minimise risk of silt plumes, or breach of a bank for a managed realignment during neap tides to minimise scour / erosion of inter-tidal habitat at the breach location. Consideration of longer term / operational impacts would be considered through building of mitigation in to the design. Taking for example the measure 'removal or easement of barriers to fish migration', the design of the project would consider potential upstream and downstream effects of changes to the hydrodynamic regime, any potential consequences for European site habitats, and build in mitigation. Such mitigation may include design of the scheme to reduce potential changes in flow velocities, and erosion / accretion downstream effects.

**4.2.2 Measures required to manage pollution from waste water, from towns, cities and transport and from mines**

**Pollution from waste water** affects 38% of water bodies in the Humber RBD. The measures required to address this are present in up to 77% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from waste water	Reduce point source pollution at source	2 (4%)
	Mitigate/remediate point source impacts on receptor	40 (77%)
	Reduce point source pollution pathways	23 (44%)
	Reduce point source pollution at source	19 (37%)

Consideration of effects

Measures required to manage pollution from waste water, are proposed in approximately a quarter to half of the Humber RBD operational catchments, and are considered generally to present a relatively low risk to European site features, although measures targeting the impacts of diffuse pollution from these sources on receptors may present a slightly higher risk.

**Pollution from towns, cities and transport** affects 16% of water bodies in the Humber RBD. The measures required to address this are present in up to 79% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from towns, cities and transport	Reduce diffuse pollution pathways	41 (79%)
	Mitigate/remediate diffuse pollution impacts on the receptor	12 (23%)
	Reduce diffuse pollution pathways at source	6 (12%)

### Consideration of effects

The measures required to manage pollution from towns, cities and transport, for approximately a quarter to two-thirds of the operational catchments in the RBD, are considered to generally present a relatively low risk to European site features, although measures targeting the impacts of diffuse pollution from these sources on receptors may present a slightly higher risk. For these measures, the SAC species, with the exception of vascular plants and marine mammals, are considered slightly more vulnerable, as are the birds of lowland and coastal / estuarine habitats.

**Pollution from abandoned mines** affects 4% of water bodies in the Humber RBD. The measures required to address this are present in 17% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from mines	Mitigate/remediate point source impacts on receptor (Mining and quarrying)	9 (17%)

### Consideration of effects

Measures required to manage pollution from mines within the RBD, are targeted on a limited number of catchments. The measures are focused on addressing the impacts of point source pollution from these sources on receptors, and, in terms of potential risks to site qualifying features, reflect a similar pattern to that of the towns/cities/transport measures targeting impacts on receptors.

### Controls and mitigation

Management of pollution from towns, cities and transport, from waste water and from mines all involve consenting / regulatory mechanisms. Measures in relation to waste water and mine water pollution may require environmental permits under the Environmental Permitting Regulations. Predicted hazards from these measures are varied and therefore mechanisms / project-level mitigation approaches will have different areas of focus or emphasis given the urban / transport / mine water context of the measures.

Projects should include details of all mitigation measures and how they will be delivered if the project proceeds. Proponents of projects and/or competent authorities should seek the advice of Natural England at an early stage in the development of a project; that way any mitigation can be agreed early on, built into the project's appraisal and design, and incorporated within sensitive construction methods of working.

#### 4.2.3 Measures required for pollution from rural areas

**Pollution from rural areas** affects 32% of water bodies in the Humber RBD. The measures required to address this are present in up to 63% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from rural areas	Reduce diffuse pollution at source	33 (63%)
	Mitigate/remediate diffuse pollution impacts on the receptor	24 (46%)

#### Consideration of effects

Measures to manage pollution from rural areas are proposed in approximately half of the Humber RBD operational catchments. The management of pollution from rural areas, with measures focused on diffuse rather than point source pollution, is considered to present greater risk to site features. The risk does not vary significantly across the (SWMI required) measure types, although measures to address diffuse pollution impacts on receptors may present a higher risk to site features. Notably, the majority of SAC species, birds of lowland dry grassland, freshwaters and margins, and birds of coastal / estuarine habitats, riverine, fens and wet habitats, and estuarine / intertidal habitats.

#### Controls and mitigation

Hazards associated with the management of pollution from rural areas are identified as disturbance, habitat loss, physical damage, turbidity and surface water flooding changes. Consenting / regulatory mechanisms may vary, depending on their nature and location. For example, remediation measures may consider physical interventions such as sediment removal or river restoration, which is subject to flood defence consent, or requires a marine licence in a marine context, with physical works in or next to rivers subject to the requirements of the EIA (Land Drainage Improvement Works) Regulations. Other measures comprise agricultural and land use management, which may not necessarily require a specific consent for their implementation. However, where operations or activities are within / in proximity to, or will impact on SSSIs (which underpin the majority of European sites in England) the Countryside and Rights of Way (CRoW) Act 2000 requires the prior assent from Natural England before those operations can commence. Any public body seeking assent is required to undertake their own HRA.

Project-level mitigation would consider timing of management activities to avoid sensitive periods, implementation methods to reduce disturbance, habitat loss and physical damage.

Advance consultation with Natural England would ensure any new / changed management practices were checked against the list of operations likely to damage affected SSSI/s and inform changes to SSSI management agreements, where appropriate. Similarly, consultation in relation to relevant Site Improvement Plans (SIPs) for European sites affected would establish priority issues and pressure on sites, particularly any related to water quality / diffuse pollution. This would inform whether proposed actions or methods of working may exacerbate these issues and allow tailoring of site-specific mitigation, but also potentially optimise management activity to help deliver actions proposed in the SIPs to remedy these issues.

#### **4.2.4 Measures required to manage changes to natural flow and levels of water**

**Changes to the natural flow and level of water** affects 6% of water bodies in the Humber RBD. The measures required to address this are present in up to 23% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

<b>Type of measure</b>	<b>Description of measures</b>	<b>Number of operational catchments where measure proposed</b>
<b>Improve the natural flow and level of water</b>	Control pattern/timing of abstraction	12 (23%)
	Improvement to condition of channel/bed and/or banks/shoreline	5 (10%)
	Water demand management	2 (4%)

#### Consideration of effects

Measures required to address changes to natural flow and levels of water are proposed in approximately one quarter of the operational catchments. Of the measures, water demand management and abstraction controls are considered to present a relatively low risk to designated SAC and SPA qualifying features. The measures proposed to improve condition of channel/bed and/or banks/shoreline present a slightly higher risk to European site features. The majority of SAC features are considered more vulnerable, with the exception of dry woodland / heathland / grassland and upland habitats, and marine mammals and vascular grassland plants. Similarly, SPA features are likely to be more vulnerable, particularly birds of lowland and coastal / estuarine habitats.

#### Controls and mitigation

For measures proposing changes to natural flow and levels of water, those targeting the improvement in condition of channel/bed and/or banks/shoreline, and to a lesser extent, measures considering alternative sources / locations of abstractions or discharges, were identified as having the greatest potential to lead to hazards, with potential risks to qualifying site features. Principal consenting mechanisms for these measures, require project level HRA where European sites were identified as affected, and include: planning permission where significant schemes are involved; some work can be undertaken under permitted development rights and should the measures be found to have likely significant effect on a

European site then the application for consent is made to the local planning authority; flood defence consent / ordinary watercourse consent where these measures involve building or removal of structures or alteration to river channel/bed/bank profiles; and marine licence for any measures below MHWS. Alternative sources / locations of abstractions are subject to an application for a water abstraction licence, and for discharges, require environmental permits from the Environment Agency under the Environmental Permitting Regulations. Measures involving changes to natural flow and levels of water require an impoundment licence from the Environment Agency.

Hazards identified for channel/bed/banks/shoreline improvement are very similar to physical modifications, and project-level mitigation for these measures is also similar. Hazards from alternative sources / locations of abstractions / discharges are considered to be habitat loss, physical damage and disturbance, as well as changes to water levels and flows / velocity regime, therefore construction mitigation would focus on avoidance of working on / near sensitive habitats, fencing / screening / segregation of activity as well as sensitive timing of works. Operational changes in water levels, flows / velocities and physical regime, due to new or changed abstractions or discharges, would be mitigated through consideration of mitigation as part of the appraisal / design. For example, modelling may be required to understand the potential changes to the flow regime, and any potential secondary effects on channel morphology, and how this in turn may influence dependent habitats and species.

#### **4.2.5 Measures required to manage invasive non-native species**

**Negative effects of non-native invasive species** affects less than <1% of water bodies in the Humber RBD. The measures required to address this are present in up to 8% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

<b>Type of measure</b>	<b>Description of measures</b>	<b>Number of operational catchments where measure proposed</b>
<b>Manage invasive non-native species</b>	Mitigation, control and eradication (to reduce extent)	4 (8%)
	Building awareness and understanding (to slow the spread)	3 (6%)
	Early detection, monitoring and rapid response (to reduce the risk of establishment)	1 (2%)

#### Consideration of effects

Measures required to manage invasive non-native species, are proposed in only a limited number of operational catchments and are generally considered to present a low risk to site qualifying features, with two of the four (SWMI required) measures screened out as unlikely to have an effect on European sites.

### **4.3 The highest risk SWMI required measures for the Humber RBD**

Of the SWMI required measures proposed within the updated RBMP, those identified with the highest potential risk for SAC / SPA / Ramsar site features were as follows:

- Removal or easement of barriers to fish migration
- Removal or modification of engineering structure
- Improvement to condition of riparian zone and/or wetland habitats
- Improvement to condition of channel/bed and/or banks/shoreline.

All 4 measures relate to the 'physical modification' SWMI, although 'improvement to condition of channel/bed and/or banks/shoreline' also relates to the 'changes to natural flow and levels of water' SWMI. Each of these measures is proposed in over half of the operational catchments of the Humber RBD<sup>6</sup>.

#### 4.3.1 Identification of the most sensitive European site features within the RBD

The potential hazards of these measures to European site features present in the Humber RBD are highlighted in table 5, below.

**Table 5 Potential hazards and sensitivities of site features of the highest risk measures proposed in the Humber RBMP**

	Hazards:	Change in water levels or table	Changes in flow or velocity regime	Changes in physical regime	Competition from non-native species	Disturbance (noise or visual)	Habitat loss	Killing/injury or removal of fish or other animals	Physical damage	Salinity	Siltation	Turbidity
<b>RBMP Measures</b>												
<b>No opt'l catchments</b>												
Removal or easement of barriers to fish migration	42	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Removal or modification of engineering structure	29	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Improvement to condition of channel/bed and/or banks/shoreline	40 / 5	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Improvement to condition of riparian zone +/- wetland habitats	34	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
<b>Habitats</b>												
<b>No. of occurrences in RBD</b>												
Fens and wet habitats not acidification sensitive	13	✓	✓		✓	✓	✓		✓	✓	✓	✓
Riverine habitats	10	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Standing waters not acidification sensitive	7	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Estuarine and intertidal habitats	6	✓	✓			✓	✓		✓	✓	✓	✓
<b>Species</b>												
Anadromous fish	7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-migratory fish and invertebrates of rivers	10	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Mammals of riverine habitats	8	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Amphibia	8	✓	✓			✓	✓		✓	✓	✓	✓
<b>Bird Species</b>												
Birds of lowland freshwaters & their margins	8	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Birds of coastal habitats	9	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Birds of estuarine habitats	10	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

The following **habitat groups** of the European sites within the RBD were considered to be particularly sensitive to the hazards that may occur as a result of these measures:

- fens and wet habitats not acidification sensitive
- riverine habitats
- standing waters not acidification sensitive
- estuarine and intertidal habitats

<sup>6</sup> As part of 'physical modifications' improvement to condition of channel/bed and/or banks/shoreline is proposed in 18 of the 32 operational catchments; and as part of 'changes to natural flow and levels of water' in 12 of the 32 operational catchments.

The following **species groups** of the European sites within the RBD were considered to be particularly sensitive to the hazards that may occur as a result of these measures:

- anadromous fish
- non-migratory fish and invertebrates of rivers
- mammals of riverine habitats
- amphibia

The following SPA / Ramsar **bird species groups** within the RBD were considered to be particularly sensitive to the hazards that may occur as a result of these measures:

- birds of lowland dry grassland
- birds of lowland freshwaters & margins
- birds of coastal and estuarine habitats

Of the most sensitive features identified, one of the most commonly occurring in the RBD are the birds of lowland freshwaters and their margins, and birds of estuarine and coastal habitats, occurring in 10 / 9 designated (SPA / Ramsar) sites within the RBD. The hazards for which they were identified as sensitive were: change in water levels or table; changes in flow or velocity regime; changes in physical regime; competition from non-native species; disturbance (noise or visual); habitat loss; killing/injury or removal; physical damage; salinity; siltation and turbidity.

#### **4.3.2 Potential project-level mitigation for highest risks**

At this level of RBD detail, it is not possible to define the precise locations of the substantial majority of the measures, their spatial scale or the nature of their implementation. Specification of mitigation should be tailored to the specifics of the projects, and to the sites and features potentially affected, through the project level HRA process and consultation with Natural England, ideally early in the project's appraisal and design. That way, mitigation can be incorporated into the way that the project is designed and built, tailored to the specifics of the site/s and their qualifying features, and therefore is most effective in avoiding or reducing potential adverse effects.

##### **Mitigation of risks to bird species**

Project-level mitigation for the commonly occurring sensitive bird species of the SPAs / Ramsar sites in the Humber RBD (birds of lowland freshwaters & margins, coastal and estuarine habitats) would consider the potential impacts arising from construction and operation of the project / measure, alongside any site specific sensitivities of the affected individual qualifying features.

Depending on the nature of the project / measure, identification of the use of site habitats in proximity by bird populations and the functioning role of supporting habitat/s potentially affected, may either be established by existing data / studies or may need to be established through site survey.

Construction-related mitigation should consider managing the timing of activities to avoid sensitive periods, such as breeding, over-wintering or migratory passage periods for birds. The exact timings for these construction 'windows' may vary for different sites in the RBD,



depending on the assemblages of bird species present as qualifying features. However, with the majority of SPA / Ramsar sites in the RBD, and all estuarine / coastal SPA and Ramsar sites designated due to regularly supporting at least 20,000 waterfowl, constraints on construction activity during the over-wintering period (typically October through to March) may be appropriate. Construction timings may also need to consider other sensitive times of year; for example, SPA / Ramsar sites in the RBD have migratory bird species present as qualifying features (e.g. Redshank, Ringed Plover) whose numbers peak during the spring and autumn migration periods; and are designated for breeding species (e.g. Little Tern, Sandwich Tern), generally breeding between May and July.

Avoidance or reduction of visual or noise disturbance to bird species may also consider the use of techniques such as screening, segregation or establishing buffer zones, recognising that some bird species may be more vulnerable (e.g. Little Tern, Sandwich tern) to disturbance and vary in their flight response compared to others.

Although protected bird species were grouped according to general habitat types for the purpose of this HRA, project level HRA should consider the specific qualifying bird assemblages present and the functioning habitats on which they depend. For example, areas of shingle and sand within estuarine / coastal SPAs / Ramsar sites in the Humber RBD support breeding populations of terns and high tide roosts for wildfowl and wading birds; whereas inter-tidal mudflats contain abundant invertebrate fauna that supports many of the bird populations using the sites; and adjacent habitats such as freshwater wetlands, fringing saltmarsh and saline lagoons, provide capacity for sites to support large numbers of qualifying bird species.

#### Mitigation of risks to habitats

Different habitats can be adversely affected in different ways, either directly through habitat loss or physical damage, or indirectly through changes in physical processes such as changed flow velocities / regimes, resulting in salinity changes, changes to erosion and deposition affecting the formation or functioning of different habitat types.

For loss of habitat and physical damage, key construction focused mitigation would focus on the avoidance of working on, or in proximity to sensitive habitats, and development of site sensitive construction techniques (e.g. avoiding heavy plant usage in particular areas) identified through the project-level HRA process, and supporting survey as required. This can be informed through site specific knowledge on habitats and features, established through early consultation with Natural England.

For operational changes in physical processes, e.g. flows / velocities and physical regime, and potential water quality changes, for example due to the removal of a structure or changed profile of the riparian zone / channel / banks or shoreline, consideration of mitigation should be considered through building of mitigation in to the design. Taking this example, the appraisal and design of the project should consider potential upstream and downstream effects to important functioning habitats (supporting the SPA / Ramsar bird species) such as saltmarsh and mudflat resulting from changes to the hydrodynamic regime, identified through the project-level HRA. Mitigation may include refinement of the project's design, for example removal of a structure in phases to allow sufficient time for saltmarsh to re-establish, or designing the structure's removal in such a way as to minimise long term changes to flow velocities and any erosion of functional supporting habitat such as saltmarsh and mudflat.

### **4.3.3 Example of mitigation**

On the River Derwent SAC near Kirkham, the Environment Agency worked with partners to build a silt trap on an adjacent stream which was identified as a considerable source of sediment, negatively the status of the water body. An assessment of likely significant effect on a European site was undertaken. This identified that several interest features of the River Derwent could be sensitive to the proposed project - lamprey species, bullhead, riverine habitats and otter. The assessment concluded no adverse effect. Mitigation included onsite management of the construction by an experienced fish expert and timing works to avoid sensitive spawning period.

In a similar project, hard standing cattle watering stations were constructed on the banks of the River Derwent SAC near Huttons Ambo village to reduce erosion and the input of fine sediment – known to one of the issues affecting the status of the water body. An assessment of likely significant effect on a European site was undertaken. This identified that several interest features of the River Derwent could be sensitive to the proposed project - lamprey species, bullhead, riverine habitats and otter. The assessment concluded no adverse effect. Mitigation included onsite management of the construction by an experienced fish expert and timing works to avoid sensitive spawning period.

## **4.4 The specific programmes of measures in the updated RBMP**

The updated RBMP sets out specific programmes of measures to meet the following WFD objectives:

- Measures to prevent deterioration
- Measures to deliver 2021 outcomes
- Measures to achieve outcomes for 2027 or beyond
- Additional measures for protected areas.

### **4.4.1 Measures to prevent deterioration**

The updated RBMP sets out the range of regulations and operations that are in place nationally under various government and sector bodies, and will continue to operate to prevent deterioration across water bodies generally. The level of detail in the plan does not relate to SWMI required measures, and so the HRA is unable to consider any further specific risks related to these programmes.

### **4.4.2 Measures to deliver 2021 outcomes**

The updated RBMP gives summaries and examples of the following sector specific programmes of measures and local measures that are expected to deliver outcomes by 2021. They are proposed investments to improve the water environment and achieve WFD objectives from government and key sectors having reviewed the SWMI required measures for long-term objectives, and considered the priorities related to funding, outcomes and delivery timescales. The measures for each programme are described in relation to whether they are likely to directly contribute to predicted improvements in water body element status by 2021; or will secure additional outcomes for the environment, but are not linked to specific improvements in element status by 2021. The programmes of measures for both

outcomes are assessed in the following sub-sections, referred to as 'contributing to water body element improvements' and 'securing additional outcomes for the environment'.

- National Measures include:
  - Water company investment programme
  - Countryside Stewardship
  - Highways England's environment fund
  - Flood risk management investment programme
  - Catchment level grant in aid funded improvements
  - Abandoned metal and coal mine programmes
  - Water resources sustainability measures
- Local Measures are proposed measures from 16 catchment partnerships

Some of these programmes will or have undergone their own HRA, or more likely, be part of a wider plan that is subject to HRA. To maintain a consistent approach to all of the programmes these individual assessments have not been taken into account at this strategic level. Nevertheless, these will have a significant influence at the lower tier plan or project level and should be taken into account.

The HRA has considered the range of SWMI required measures that make up these programmes, how these may give rise to any more specific risks to European sites, and any required mitigation, based on the assessment in the previous section (4.2) of the report.

The numbers of measures referred to in the HRA are from supporting information to the updated RBMP and may not be directly referred to in the published plan. It allows the programmes of measures to be summarised into groups of measures of each SWMI required measure type. The levels of potential risks of each group of measures can therefore be considered, based on the risks assessed for SWMI required measures in the previous steps of the HRA (sections 4.2 and 4.3).

#### **4.4.2.1      *Water company investment programme***

The RBMP measures from the water company investment programme, identified as contributing to water body element improvements, comprise 112 measures for water bodies across the Humber river basin district, made up of:

- 104 measures to control or manage point source impacts;
- 4 measures to control or manage abstraction;
- 2 mitigation measures for heavily modified water bodies (screening intakes to avoid fish entrainment);
- 1 measure to improve modified habitat, and;
- 1 measure to improve regulated flow.

There are 17 measures to secure additional outcomes for the environment. Of these, 13 measures are to manage the risk of fish being entrained (sucked) into river abstractions; 1 measure to control or manage point source inputs; and 1 measure to manage diffuse source inputs at source. In addition, there are 2 national measures to control and manage abstraction, targeting 17 locations in the Humber river basin district.

The potential risks from this programme to European sites and features will vary according to measure type. The measures proposed to control or manage point source impacts make up the majority of the programme but are likely to present negligible risk to European sites and features.

The measures to manage the risk of fish entrainment could present a slightly higher risk to water-dependent European site features. However, the works will be localised and any hazards such as disturbance, habitat loss, physical damage and siltation / turbidity are likely to be short-term in nature and easily managed through appropriate project controls. These controls could include clearly identifying the sensitive features such as spawning fish and building any controls into the timing and methods of construction through the involvement of specialists and obtaining the relevant consents and permits.

Examples of the controls required in connection with the proposed measures include project-level Habitats Regulations Assessment where the interest features of a European site are at risk. Measures to address point source pollution might require environmental permits from the Environment Agency under the Environmental Permitting Regulations. Measures involving any physical works / modifications on or near a main river<sup>7</sup>, flood defence consent from the Environment Agency and / or planning permission from the local planning authority.

Mitigation to manage potential effects of these measures on European site features could include managing flow / water level requirements as part of any appraisal to support the consent application. Depending on the complexity of the proposed changes to the flow regime on river flow patterns, modelling may be required to assess changes to the flow and physical regime, potential secondary effects on channel morphology, and how this in turn may influence dependent European habitats and species. Such modelling and appraisal would be undertaken as part of project-level HRA, where required to support the consent applications.

Construction-related mitigation could include avoiding working on or in proximity to sensitive habitats, screening works and adopting sensitive working methods to minimise visual and noise disturbance to sensitive species. Other mitigation will include timing works to avoid sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Project-level HRA will refine mitigation according to the habitat types, affected species and their sensitivities in order to build mitigation in to the design and operation of the project.

#### **4.4.2.2 Countryside Stewardship**

The Countryside Stewardship programme is an entirely voluntary national scheme to enhance the natural environment, increase biodiversity and improve water quality. At this stage the programme does not identify outcomes contributing to water body element improvements because the uptake of measures is voluntary and the exact location of measures and their outcomes are not yet known. However, measures are expected to contribute significantly to securing additional outcomes for the environment, with 30% to 40% of rural England expected to be part of a Countryside Stewardship agreement by 2020.

<sup>7</sup> For works on or near ordinary watercourses, the equivalent ordinary watercourse consent from the Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) would be required, which would also trigger the need for HRA where European site/a were potentially affected.

Countryside Stewardship is expected to principally address diffuse pollution from rural areas, through soil management and reducing the effect of nutrients, sediment and faecal bacteria pollution on water bodies. Measures to address diffuse pollution are considered to be relatively low risk, with any effects on European sites and features are considered likely to primarily be beneficial, particularly for water-dependent sites.

Measures are also anticipated to comprise physical modifications, such as tree planting, re-naturalising rivers and coast defences, including making space for water and coastal realignment. As the uptake of measures is voluntary and the precise details of measures and their outcomes are not yet known, it is not possible to predict the likely impacts on European sites. Because the measures are to target improvements in water bodies, the effects on European sites are expected to be primarily beneficial. However, such measures and interventions have the potential to generate unintended consequences for European sites where in proximity of the measures. Measures for such physical modifications are expected to generate hazards similar to those identified for flood risk management (see section 4.4.2.4).

Such measures would be subject to HRA by Natural England prior to finalising the agreement (as it is a form of consent), and then subsequently project level HRA where required, such as planning permission or flood defence consent.

As part of the Countryside Stewardship programme, further research is planned that will help to evaluate the likely benefits of the programme for water. Such research could help in targeting mitigation to avoid adverse effects of the programmes of measures for European sites, and how the measures could be tailored to maximise the benefits for improvements in condition of European sites.

#### **4.4.2.3      *Highways England's environment fund***

The Highways England's environment fund will in part be invested in addressing pollution from highway runoff (pollution from towns, cities and transport), but also physical modifications (to improve habitat). The measures from the programme are identified as contributing to securing additional outcomes for the environment. However, specific measures, or programmes for the Humber river basin district are not identified at this stage, therefore there are no measures identified for contributing to water body element improvements.

Highway runoff is detritus that collects on roads made up of silt and grits mixed with contaminants such as metals and oils, which can wash off the road and reach water bodies and harm the ecology of the water environment. Measures to address this are likely to comprise Sustainable Drainage Systems (SuDS), measures that can trap pollutants from highway outfalls through a swale (shallow grassy ditch) to large balancing ponds that regulate flow quantity as well as allowing pollutants to settle out. These measures are therefore anticipated to be primarily beneficial for European sites, reducing sediment, nutrient and chemical loadings, metal concentrations and improved dissolved oxygen levels, particularly for downstream water-dependent sites and features within areas of influence of the discharges. Potential hazards may arise from the construction of these measures, such as disturbance, physical damage and habitat loss, depending on their size / scale and proximity to European sites.

Measures to address physical modification pressures will be implemented, such as fish and eel passes installed to allow fish migration, and will therefore be of potential benefit for site features, particularly anadromous fish. The main potential hazards from these measures, similar to flood risk management (see section 4.4.2.4) relate to the physical works required to achieve the improvements primarily during their construction, and as such are likely to be short term in nature.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, which would be triggered by the consenting process, such as planning permission or flood defence consent where in proximity to main rivers. Highways schemes can be afforded permitted development powers; however, where such schemes potentially affect European sites, planning permission is required unless supporting assessment can demonstrate no likely significant effect on European sites.

Mitigation for these measures would be similar to that of flood risk management, focused on construction related mitigation, such as avoidance of sensitive habitats; use of screening / segregation; sensitive timing of construction works and appropriate sensitive construction working methods. Such mitigation can be tailored at the project level, informed by project-level HRA, to the habitat types, affected species and their sensitivities, in order to build mitigation in to the design of the scheme and the methods of working.

#### **4.4.2.4 Flood risk management investment programme**

There are 3 measures on the flood risk management investment programme which are identified as contributing to water body element improvements. These are a river restoration and fish pass project and 2 habitat creation projects.

There are additional RBMP measures from the flood risk management investment programme aimed at securing additional outcomes for the environment to improve modified habitats, through a combination of the removal or modification of engineering structures and barriers to fish migration and the improvement to the condition of the channel bed and riparian zone or shoreline. In total there are 26 such measures proposed across the Humber river basin district.

The main potential risks from this programme to designated sites and features relate to the physical works and interventions required to achieve the improvements. Some of the detail on the nature, scale and precise details of these interventions are not included in the plan. However, the hazards generated from the measures are likely to arise principally during their construction, and as such are likely to be short term in nature. The risks during operation are considered likely to be minimal, since the measures are proposed to improve habitat and supporting physical processes in order to achieve improvements in water body status. Protected species, in particular bird populations (of coastal / estuarine / freshwaters and wet grassland habitats), fish, mammals of riverine habitats and amphibian, are particularly susceptible to measures proposing physical modifications, with vascular plants and marine mammals considered generally less vulnerable. Habitats considered susceptible to physical modifications include riverine, fens, bogs and wet habitats and standing waters, and also coastal, estuarine and inter-tidal habitats.

Project level HRA would be required to support the consents where a European site could be affected. Consents could include planning permission for larger projects, flood defence consent for any physical works / modifications on or near a main river<sup>8</sup> and a marine licence for any works below the mean high water spring (MHWS) tidal limit. Some work can be undertaken under permitted development rights and should the measures be found to have likely significant effect on a European site then the application for consent is made to the local planning authority.

Construction-related mitigation could include avoiding working on or in proximity to sensitive habitats, screening works and adopting sensitive working methods to minimise visual and noise disturbance to sensitive species. Other mitigation includes timing works to avoid sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Project-level HRA will refine mitigation according to the habitat types, affected species and their sensitivities in order to build mitigation in to the design and operation of the project.

#### **4.4.2.5 Catchment level grant in aid funded improvements**

The RBMP measures under this funding stream identified as contributing to water body element improvements are 9 measures made up of fish pass projects, measures to address agricultural diffuse pollution and habitat improvement projects.

The main potential risks from this programme to designated sites and features relate to the physical works and interventions required to achieve the improvements. Some of the detail on the nature, scale and precise details of these interventions are not included in the plan. However, the hazards generated from the measures are likely to arise principally during their construction, and as such are likely to be short term in nature. The risks during operation are considered likely to be minimal, since the measures are proposed to improve habitat and supporting physical processes in order to achieve improvements in water body status. Protected species, in particular bird populations (of coastal / estuarine / freshwaters and wet grassland habitats), fish, mammals of riverine habitats and amphibian, are particularly susceptible to measures involving physical modifications, with vascular plants and marine mammals considered generally less vulnerable. Habitats considered susceptible to physical modifications include riverine, fens, bogs and wet habitats and standing waters, and also coastal, estuarine and inter-tidal habitats.

Project level HRA would be required to support the consents where a European site could be affected. Consents required could include planning permission for larger projects, flood defence consent for any physical works / modifications on or near a main river<sup>9</sup> and a marine licence for any works below the mean high water spring (MHWS) tidal limit.

Construction-related mitigation could include avoiding working on or in proximity to sensitive habitats, screening works and adopting sensitive working methods to minimise visual and noise disturbance to sensitive species. Other mitigation includes timing works to avoid

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<sup>8</sup> For works on or near ordinary watercourses, the equivalent ordinary watercourse consent from the Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) would be required, which would also trigger the need for HRA where European site/a were potentially affected.

<sup>9</sup> For works on or near ordinary watercourses, the equivalent ordinary watercourse consent from the Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) would be required, which would also trigger the need for HRA where European site/a were potentially affected.

sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Project-level HRA will refine mitigation according to the habitat types, affected species and their sensitivities in order to build mitigation in to the design and operation of the project.

#### **4.4.2.6 *Abandoned metal and coal mine programmes***

All of the measures in abandoned metal and coal mine programme are aimed at securing additional outcomes for the environment, through remediating and treating mine water discharge. There are 6 measures proposed across the Humber river basin district.

A potential risk from this programme to designated sites and features relates to the physical works. Remediating/treating mine water discharge is likely to involve construction of infrastructure to treat mine water. The scale of any construction activity is yet to be finalised but project level HRA would be required where a European site could be affected, with planning permission likely to be required for larger projects.

Construction-related mitigation could include avoiding working on or in proximity to sensitive habitats, screening works and adopting sensitive working methods to minimise visual and noise disturbance to sensitive species. Other mitigation includes timing works to avoid sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Project-level HRA will refine mitigation according to the habitat types, affected species and their sensitivities in order to build mitigation in to the design and operation of the project.

Another potential risk could be to any European sites which currently receive these mine waters. Changes to the quantity of water or the composition of the water (where for example metal-rich water is helping to maintain particular species diversity) could negatively affect downstream European sites. Conversely, mine water could present a risk to the interest features of European sites, considering for example the ability of certain metals to bioaccumulate and affect breeding success in some bird species. Any measure to remediate mine water should consider the risks to pathways to any interest features of downstream European sites and if necessary complete a project-level HRA.

#### **4.4.2.7 *Water resources sustainability measures***

There is one proposed measure for the Humber river basin district under water resources sustainability measures to control abstraction to prevent further saline intrusion in an aquifer and a further 6 measures aimed at securing additional outcomes for the environment, all of which are also to control and manage abstraction.

Measures required to control the pattern or timing of abstraction are considered to present a relatively low risk to designated European sites. Water-dependent features of European sites are more susceptible to water levels and changes in flow regimes than non water-dependent features. Any risks are likely to occur during operation, as little or no construction works are likely to be required to implement abstraction regime changes. These risks are generally considered likely to be minimal, since the purpose of the measures is to improve water body status. Where the water body includes a water-dependent European site, this is also a WFD protected area, and the measure is therefore expected to target flow / water



levels to protect and improve the status of these protected areas as part of the water body objective.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, which would be triggered by the abstraction licence consenting process for any abstraction licence variation.

The main mitigation for these measures relates to the consideration of operational changes in water levels, flows / velocities and physical regime, due to changed abstraction timings / patterns. This would be mitigated through consideration of flow / water level requirements for European site features as part of any appraisal of any abstraction licence variations. For example, depending on complexity of the proposed changes to the abstraction regime on river flow patterns, modelling may be required to assess changes to the flow and physical regime, potential secondary effects on channel morphology, and how this in turn may influence dependent European habitats and species. Such modelling and appraisal would be undertaken as part of project-level HRA, where required to support the abstraction licence variation.

#### **4.4.2.8 Local Measures from catchment partnerships**

All of the measures identified as local measures for delivery by catchment partnerships are aimed at securing additional outcomes for the environment. The measures are a mixed description of relatively small scale projects identified for delivery by the catchment partnerships. They include:

- river restoration and channel re-naturalisation, including improving in-channel diversity;
- improving existing and creating new habitat (for example moorland grip blocking and tree planting);
- installing fish passes; and
- measures to bring about improvement through investigation, monitoring and influencing.

The main risks to European sites are likely to arise from projects involving construction activities such as installing fish passes and using machinery to physically alter landscapes. In most cases however these are likely to be relatively small scale and managed by groups with a vested interest in the local environment. Nevertheless, the interest features most likely to be at risk could include riverine habitats as well as birds, fish, river mammals. Mitigation would come through project level HRA for projects in or close to European sites and could involve mitigation to avoid ecologically sensitive periods such as breeding / spawning and migratory periods. It is likely that in the vast majority of cases, the intended outcome will be to benefit existing habitats and species which could include the interest features of European sites where works are proposed in or adjacent to SPA, SAC or Ramsar sites. Project-level HRA would nevertheless be undertaken where a risk to a site features is identified and appropriate mitigation incorporated into the project.

#### **4.4.3 Measures to achieve outcomes for 2027 or beyond**

Where the programmes of measures expected to deliver outcomes by 2021 (section 4.4.2 above) are unable to include the further measures required to achieve all long-term WFD

objectives in the RBD (and that have been assessed as worthwhile), then these have been carried forward as future investments and programmes for 2027 and beyond. The plan summarises this required investment in future measures under government and key sectors, and is at a level of detail that does not relate to SWMI required measures. The HRA is thus unable to consider any more specific risks related to these future programmes.

#### 4.4.4 Additional measures for protected areas

The updated RBMP sets out the range of plans and programmes that are in place nationally to achieve the objectives of different protected areas – see Table 6 below. These are separate plans and programmes that will contribute to the RBMP objectives related to protected areas and have a range of lead organisations and authorities responsible for them. These plans and programmes will have had to consider HRA requirements as part of their development where required. Measures / projects taken forward that involve physical works will be subject to relevant consenting processes that will consider HRA requirements at a project level. The subsequent planning and consenting processes would be expected to address any potential effects on European sites at the level of detail of measures arising from these separate plans and programmes.

**Table 6 Summary of measures for Protected Areas**

Protected Area	Programme
<b>Drinking water protected areas - surface water and groundwater</b>	Safeguard zones have been established for water sources in drinking water protected areas where extra treatment is likely to be required in the future. Safeguard zone action plans have been developed including measures needed to manage activities that may threaten raw water quality for surface waters and ground waters.
<b>Economically significant species (shellfish waters)</b>	Shellfish water action plans have been produced for all designated shellfish waters, which include measures aiming to observe relevant microbial shellfish flesh standards.
<b>Recreational waters (bathing waters)</b>	Bathing water profiles have been produced for all designated sites. They include details of the measures needed to achieve compliance with the revised standards that come into force in 2015. Further information is available on the measures for those bathing waters at risk of not achieving sufficient in 2015 in the bathing water action plans (continuing at risk).
<b>Nutrient sensitive areas (Urban Waste Water Treatment Directive)</b>	Measures have been identified to make sure that all relevant discharges from waste water treatment plants within the sensitive area have appropriate phosphorus or nitrogen emission standards.
<b>Nutrient sensitive areas (nitrate vulnerable zones)</b>	Nitrate vulnerable zones have been designated in areas where water quality is affected by nitrates from agricultural sources. Measures to reduce nitrate concentrations within nitrate vulnerable zones include establishing a voluntary code of good agricultural practice and developing action programmes to reduce agricultural nitrate losses.
<b>Natura 2000: Water dependent Special Areas of</b>	Natural England has developed site improvement plans (SIPs) for water dependent sites. SIPs provide an overview of issues affecting the site condition;

Protected Area	Programme
<b>Conservation (SACs) and Special Protection Areas for Wild Birds (SPAs)</b>	identify priority actions, timescales for implementation and potential funding sources. Natural England monitors, reviews and updates SIPs where appropriate.

## 4.5 Consideration of results and conclusion

The assessment of likely significant effects has been carried out for required measures related to each SWMI from the consulted on updated RBMP, and for the programmes of measures drawn from government or key sector investment plans where further details could be considered by the HRA. The level of detail on the measures does not allow the assessment to consider effects on specific European sites. The HRA has considered potential hazards associated with the types of measures that are related to each SWMI in the RBMP, and indicates the potential levels of risk to the range of features of the European sites in the RBD.

The measures that may pose potentially higher risks to European sites have been identified in this HRA, and the range of mitigation options available have been explored, so that future project level assessment can consider these when the details of the nature and location of measures are known. For the Humber RBD, these measures are:

- Removal or easement of barriers to fish migration
- Removal or modification of engineering structure
- Improvement to condition of riparian zone and/or wetland habitats
- Improvement to condition of channel/bed and/or banks/shoreline.

The programmes of measures in the Humber RBMP that are more focussed on improving physical modifications in water bodies, and are more likely to include these potentially higher risk measures are:

- Flood risk management investment programme
- Catchment level grant in aid funded improvements
- Local measures from catchment partnerships.

The HRA has considered the range of controls and mitigation that would be expected to address these potential risks, focused particularly on the potential higher risk measures and their effects. In terms of controls, before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations; any plans or projects required to implement the measures must undergo an 'appropriate assessment' if they are determined to be likely to result in a significant effect in a European sites or sites. While the assessment has identified where there are likely to be higher risks, this requirement applies to any lower tier plan or project where there is the possibility of a likely significant effect on a European site.

As part of the various consenting mechanisms, where likely significant effects cannot be ruled out at the project level, the competent authority will undertake an appropriate assessment and the measures cannot receive approval to proceed until it has been

demonstrated that they will not result in adverse effects on integrity of any affected European sites. Or, where an adverse effect cannot be ruled out, and there are no alternative solutions to meeting the objectives of the project, a case for Imperative Reasons of Overriding Public Interest (IROPI), which includes the identification of compensatory measures, may be prepared, and must be approved by the Secretary of State. Appendix 2 provides additional detail on the consenting processes and the consideration of the Habitats Regulations as they relate to RBMP and SWMI required measures.

The updated RBMP does not constrain the nature, scale and/or location of the measures proposed in the plan, so they can be developed in a way that will avoid the likelihood of any significant effects on European sites, or if supported by an appropriate assessment and legal means of securing any mitigation required, can prevent an adverse effect on site integrity.

At this strategic plan level, this assessment has concluded, for the plan itself that there are no likely significant effects, and at this stage there is no requirement to consider further stages of the HRA on the RBMP programme of measures. This is a plan level conclusion and does not give weight to any future conclusion of HRAs at the lower tier/project level. Each must be assessed on their individual merits and the inclusion of any measures in this plan does not influence the conclusions being drawn for future HRAs, and does not give any weight where imperative reasons may be pursued. Any possible in-combination effects of the RBMP with other plans are considered in section 5 below.

## **5 In combination effects with other plans and projects**

Given the geographical scale of the RBMP, and the high level assessment being undertaken, it is not possible to undertake a comprehensive assessment of potential impacts in combination with other plans or projects. In-combination assessment requires the consideration of impacts that are not significant alone to be checked for the possibility of such impacts becoming significant when combined with the effects of other plans or projects. As this high level assessment has not been undertaken at a level of detail that allows for quantification of impacts, it is therefore not possible to judge whether potential effects will be significant alone, and whether they can be fully avoided or mitigated for, or that residual impacts may remain. In-combination assessment at this plan level therefore serves to highlight where such assessment may be relevant to future HRAs, and focuses on plans with a similar geographic scale to the river basin district (plans and projects of any scale should be considered at later stages when more detail on the project itself is available). The plans considered as part of the assessment of in-combination effects are taken from those reviewed as part of the Strategic Environmental Assessment (SEA). The SEA review generally found that the draft RBMP aligns very well with the objectives of other plans and programmes in the Humber region, particularly those aimed at promoting sustainability and nature conservation.

Table 7 below considers where such plans may potentially contribute to effects on European sites in combination with the Humber RBMP.

The risk of significant in combination effects on European sites with other plans is considered to be low, because the objectives and actions within the RBMP are aimed at improving the status of water bodies, and achieving favourable conservation status for water dependent European sites. Interactions with other strategic plans may potentially constrain the implementation of the RBMP objectives. However, the plans may also provide opportunities to co-deliver actions identified within the Site Improvement Plans (SIPs) for the Humber RBD to achieve favourable conservation status for water dependent European site features.

Habitats Regulations Assessments of measures or actions undertaken at later plan or project stages will still however require consideration of potential in combination effects, at an appropriate level of detail, i.e. in combination with plans or other relevant projects.

**Table 7 Other Strategic Plans and potential in-combination effects with the Humber RBMP**

Name of Plan	Potential in-combination effects with the RBMP on European sites
Flood Risk Management Plan (FRMP) for the Humber RBD	Where measures in the RBMP propose physical modifications, and to a lesser extent other SWMI required measures, there is potential for interaction with measures proposed within the FRMP that comprise physical intervention/s, where these are in proximity to European sites. Given RBMP actions are focused on WFD water bodies and, in relation to Natura 2000 protected areas, water-dependent European sites, and FRMP measures are focused on the water environment, the water-dependent European sites are likely to be more susceptible to potential in-combination effects. However, both the RBMP and FRMP also include catchment / land management measures, so potential in-combination effects on non water-dependent European sites cannot be ruled out. Such in-combination effects could include construction impacts, if the timing of the implementation of measures was to coincide, such as noise and visual disturbance, or impacts arising from operation such as changes to flows / water levels or the physical regime. At this spatial scale and level of detail of the plans, it is not possible to predict potential in-combination effects in particular European sites.
Water Company Water Resource Management Plans (Anglian Water, Yorkshire Water, South Staffordshire Water and Severn Trent)	The Humber RBMP and water company water resource management plans covering the river basin district contain similar objectives around the protection, improvement, sustainable management and use of the water environment in terms of quantity and quality. Interactions between the plans, particularly for water dependent European sites are likely. However, particularly given that water resource management plans are identified within the RBMPs as plans to work alongside the RBMP to address pressures on water body status and meet specific protection designation objectives, water resource management plans or actions arising from them should act as mechanisms to deliver RBMP objectives for water dependent European sites. At this spatial scale and level of detail of the plans, it is not possible to predict potential in-combination effects in particular European sites, but the potential risk of adverse in-combination effects between the RBMP and water resource management plans is considered to be low.
Local Authority Core Strategies National Park and AONB management plans	Promotion of growth within the core strategies, depending on location, may place pressure on both water dependent and non-water dependent European sites (more likely in coastal locations in the Humber where areas identified for growth are in proximity to European sites). Development activities arising from core strategies could result in impacts on European sites through disturbance during construction, adverse effects from encroachment on habitats or species displacement, or indirect effects such as alterations to drainage, increased surface water run-off and diffuse / point source pollution. Significant interactions with the Humber RBMP are unlikely, given that RBMP actions are focused on water body and water-dependent European site improvements. However, development activities arising from the core strategies may inhibit the ability of the RBMP to achieve objectives relating to European site protected areas. National Park and AONB management plans set out how the purposes and objectives for the area will be achieved between partners. Planning authorities are required to have regard to the management plan when determining planning applications. The protection and restoration of wildlife and habitats is part of the vision for national parks. There is the potential for unanticipated effects where plans focus on recreation and increasing visitor numbers.
Marine Plans East Inshore, East Offshore Marine Plans and developing marine plans for North East Inshore and North East Offshore	Marine plans form part of a new plan-led system for marine activities, providing a proactive and spatial planning approach to the management of marine areas, their resources and the activities and interactions that take place within them. All public authorities taking authorisation or enforcement decisions that potentially affect the marine area covered by the plan must do so in accordance with marine plan and its policies. The RBMP would only be expected to have interaction with the inshore marine plans. The East Inshore Marine Plan was published by Defra in April 2014; the North East plans are yet to be published. A HRA was undertaken alongside the development of the East Inshore Marine Plan, and concluded that subject to application of mitigation, including future project-level HRA, the plan would not have an adverse effect on the integrity of a European site (either alone or in-combination with other plans or projects). The geographical scope of the plan is focused on marine / coastal waters (doesn't extend to estuaries); therefore any interactions with the RBMP are only likely to affect the European sites in the coastal / estuarine

	<p>locations in the RBD. The plan has complementary objectives to the RBMP, with an overall objective to achieve 'Good Environmental Status' in marine waters by 2020, including the same objectives for good ecological and chemical status, but also covers broader environmental aspects (such as noise, litter, and aspects of biodiversity). Interactions between the two plans are therefore considered to primarily be beneficial, particularly for coastal/marine water-dependent European sites.</p>
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## 6 Conclusion and future HRAs

This HRA has been carried out at the level of published detail in the 2015 updated Humber RBMP. At this strategic plan stage of the RBMP the details of where and how the measures will be implemented are not included within the plan. This assessment has identified potential hazards to European sites associated with implementation of the SWMI required measures in the RBMP, and the potential risks to European site qualifying features. The assessment has considered how these risks relate to the proposed programmes of measures with a focus on the programmes to deliver WFD outcomes by 2021.

The RBMP does not constrain exactly where or how those measures should be implemented, which will be determined at either a lower-tier plan or project level. The range of mitigation options that will be available have been considered as part of this assessment, and given the options available, there is confidence at this plan level that the measures can be implemented whilst harm to European sites is prevented. The RBMP also makes it clear that before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations. A conclusion of no likely significant effect at the plan level does not infer any similar conclusion at the lower tier plan or project level and any plans, projects or permissions required to implement the measures must undergo an 'appropriate assessment' if they are likely to have a significant effect. Any mitigation measures required to ensure the project does not result in an adverse effect on the integrity of a site must be implemented. The Environment Agency will help and advise other parties on mitigation proposals as well as ensuring that they are incorporated into schemes it is responsible for.

The HRA has further considered the in combination effects of the updated RBMP with other plans at a strategic scale and determined that the risks are unlikely to be significant to European sites (see section 5). It is however acknowledged that it is not possible to do a comprehensive in-combination assessment at this strategic level, because the lack of detail available makes it impossible to adequately quantify any potential impacts. More robust in-combination assessment should be undertaken at the lower tier/project level.

**It is concluded that for the updated RBMP the proposed measures are not likely to have any significant effects on any European sites, alone or in-combination with other plans or projects.** This is a strategic plan level conclusion and relates to the plan only. Given this conclusion, there is no requirement to progress to the next stage of the Habitats Regulations assessment (an 'appropriate assessment' to examine the question of adverse effect on the integrity of European sites). This conclusion does not preclude the need for lower tier plan/project level appropriate assessment, nor does it give any weight to the conclusions that may be drawn at that level.

This HRA has been prepared in a way that should assist HRA at a subsequent level, i.e. lower tier strategies, plans or projects that implement measures. As local actions are developed at a project level and the details of their scope and scale are known, this may identify additional effects on European sites that have not been assessed here, or were not appropriate to consider at this spatial scale of plan.



Appendix 1 Table A1 - Potential Impacts of Measures on qualifying features of European sites in the Humber RBD

HUMBER		RBMP MEASURES for RBD		Physical modifications (to improve habitats)						Managing pollution from waste water				Manage pollution from towns, cities and transport			Changes to natural flow and levels of water				Managing invasive non-native species				Manage pollution from rural areas			Manage pollution from mines			
No of impacts (hazards) from measures on qualifying features		water dependent features Y/N	no. of occurrences of the feature within RBD	Measure type	Removal or easement of barriers to fish migration	Removal or modification of engineering structure	Improvement to condition of channel/bed and/or banks/shoreline	Improvement to condition of riparian zone and/or wetland habitats	Change to operations and maintenance	Vegetation management	Reduce diffuse source pollution at source	Reduce point source pathways (i.e. control entry to water environment)	Mitigate/Remediate point source impacts on receptor	Reduce point source pollution at source	Reduce diffuse pollution at source	Reduce diffuse pollution pathways (i.e. control entry to water environment)	Mitigate/Remediate diffuse pollution impacts on receptor	Use alternative source/relocate abstraction or discharge	Water Demand Management	Control pattern/timing of abstraction	Improvement to condition of channel/bed and/or banks/shoreline	Prevent introduction	Early detection, monitoring and rapid response (to reduce the risk of)	Mitigation, control and eradication (to reduce extent)	Building awareness and understanding (to slow the spread)	Reduce diffuse pollution at source	Reduce diffuse pollution pathways (i.e. control entry to water environment)	Mitigate/Remediate diffuse pollution impacts on receptor	Mitigate/Remediate point source impacts on receptor	No of Ops Cctchmt	% of all Ops Cctchmt
No. Of EUROPEAN SITES in RBD (45)					42	29	40	34	34	26	19	23	40	1	6	41	12	0	2	12	5	0	1	4	3	33	1	24	9		
		81%	56%	77%	65%	65%	50%	37%	44%	77%	4%	12%	79%	23%	0%	4%	23%	10%	0%	2%	8%	6%	63%	2%	46%	17%					
SAC (31)	Ramsar (5)	1.1 Fens and wet habitats not acidification sensitive*	Y	13	9	9	8	8	5	2	3	3	3		3	3	4	5	2	2	8		2	2		3	3	4	3		
		1.2 Bogs and wet habitats, acidification sensitive*	Y	16	6	6	6	6	5	2	3	3	3		3	3	3	5	2	2	6		2	2		3	3	3	3		
		1.3 Riverine habitats	Y	10	10	10	9	9	6	2	3	3	3		3	3	4	5	2	2	9		2	2		3	3	4	3		
		1.4 Standing Waters acidification sensitive*	Y	5	7	7	7	7	4	1	2	2	2		2	1	3	4	2	2	7		1	1		2	1	3	2		
		1.5 Standing waters not acidification sensitive*	Y	7	9	9	8	8	5	1	2	2	2		2	1	3	4	2	2	8		1	1		2	1	3	2		
		1.6 Dry woodlands*	N	12	3	3	2	2	2	1	2	2	2		2	2	2	2	0	0	2		1	1		2	2	2	2		
		1.7 Dry Grassland*	N	11	3	3	2	2	2	1	2	2	2		2	1	2	2	0	0	2		1	1		2	1	2	2		
		1.8 Dry heathland habitats*	N	12	2	2	2	2	2	1	2	2	2		2	1	2	2	0	0	2		1	1		2	1	2	2		
		1.9 Upland*	N	4	4	4	4	4	4	2	3	3	3		3	3	3	4	1	1	4		2	2		3	3	3	3		
		1.10 Coastal habitats*	N	6	6	6	5	5	4	2	3	3	3		3	2	3	3	0	0	5		2	2		3	2	3	3		
		1.11 Coastal habitats sensitive to abstraction*	Y	8	6	6	6	6	3	1	2	2	2		2	2	3	3	1	1	6		1	1		2	2	3	2		
		1.12 Estuarine and intertidal habitats	Y	6	8	8	8	8	5	2	3	3	3		3	2	4	5	2	2	8		2	2		3	2	4	3		
		1.13 Submerged marine habitats	Y	7	5	5	5	5	2	1	1	1	1		1	1	2	2	1	1	5		1	1		1	1	2	1		
	2.1 Vascular plants of aquatic habitats	Y	6	7	7	7	7	4	1	2	2	2		2	1	3	4	2	2	7		1	1		2	1	3	2			
	2.2 Vascular plants, lower plants and invertebrates, wet ha	Y	7	7	7	6	6	4	1	2	2	2		2	2	3	4	2	2	6		1	1		2	2	3	2			
	2.3 Vascular plants, grassland	N	1	3	3	3	3	2	1	2	2	2		2	1	2	2	0	0	3		1	1		2	1	2	2			
	2.4 * Liverworts – Western rustwort	Y	5	3	3	3	3	3	1	2	2	2		2	1	2	3	1	1	3		1	1		2	1	2	2			
	2.5 Anadromous fish	Y	7	10	10	10	10	6	2	3	3	3		3	2	4	5	2	2	10		2	2		3	2	4	3			
	2.6 Non-migratory fish and invertebrates of rivers	Y	10	9	9	10	10	6	2	3	3	3		3	2	4	5	2	2	10		2	2		3	2	4	3			
	2.7 Invertebrates of wooded habitats	N	0	2	2	2	2	2	1	2	2	2		2	1	2	2	0	0	2		1	1		2	1	2	2			
	2.8 Mammals wooded habitats	N	0	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3			
	2.9 Mammals of riverine habitats	Y	8	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3			
2.10 Amphibia	Y	8	8	8	8	8	5	2	3	3	3		3	3	4	5	2	2	8		2	2		3	3	4	3				
2.11 Coastal plants	N	0	5	5	5	5	4	1	2	2	2		2	2	2	4	2	2	5		1	1		2	2	2	2				
2.12 Marine mammals	Y	6	4	4	5	5	2	2	2	2	2		2	2	3	2	0	0	5		2	2		2	2	3	2				
SPA (9)	3.1 Birds of uplands	N	8	5	5	5	5	4	2	3	3	3		3	3	3	4	1	1	5		2	2		3	3	3	3			
	3.2 Birds of woodland & scrub	N	2	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3			
	3.3 Birds of lowland heaths & brecks	N	5	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3			
	3.4 Birds of lowland wet grassland	Y	9	7	7	7	7	6	2	3	3	3		3	3	3	5	2	2	7		2	2		3	3	3	3			
	3.5 Birds of lowland dry grassland	N	2	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3			
	3.6 Birds of lowland freshwaters & their margins	Y	8	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3			
	3.7 Farmland Birds	N	8	4	4	4	4	4	2	3	3	3		3	3	3	4	1	1	4		2	2		3	3	3	3			
	3.8 Birds of coastal habitats	Y	9	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3			
	3.9 Birds of estuarine habitats	Y	10	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3			
	3.10 Birds of open sea and offshore rocks	Y	4	3	3	4	4	3	2	3	3	3		3	2	3	3	0	0	4		2	2		3	2	3	3			

Colour coding used to indicate risk, assuming higher risk is associated with a higher number of hazards.

1 = 1 hazard / qualifying feature sensitivity

10 = 10 hazard / qualifying feature sensitivities

**Table A2 - Potential Hazards arising from Measures proposed within the Humber RBMP**

RBMP Measure	Type of Hazard																						
	Acidification	Change in water levels or table	Changed water chemistry	Changes in flow or velocity regime	Changes in physical regime	Competition from non-native species	Disturbance (noise or visual)	Entrapment	Habitat loss	Killing/injury or removal of fish or other animals	Nutrient enrichment	PH	Physical damage	Predation	Reduced dilution capacity	Salinity	Siltation	Smothering	Surface water flooding changes	Thermal regime changes	Toxic Contamination	Turbidity	
Managing pollution from waste water																							
Reduce diffuse pollution at source							✓		✓				✓										
Reduce point source pathways (i.e. control entry to water environment)							✓		✓				✓										
Mitigate/Remediate point source impacts on receptor							✓		✓				✓										
Reduce point source pollution at source																							
Manage pollution from towns, cities and transport																							
Reduce diffuse pollution at source							✓		✓				✓										
Reduce diffuse pollution pathways (i.e. control entry to water environment)							✓						✓							✓			
Mitigate/Remediate diffuse pollution impacts on receptor							✓		✓				✓										✓
Manage pollution from rural areas																							
Reduce diffuse pollution at source							✓		✓				✓										
Reduce diffuse pollution pathways (i.e. control entry to water environment)							✓						✓							✓			
Mitigate/Remediate diffuse pollution impacts on receptor							✓		✓				✓										✓
Manage pollution from mines																							
Mitigate/Remediate point source impacts on receptor							✓		✓				✓										
Improve the natural flow and level of water																							
Use alternative source/relocate abstraction or discharge		✓		✓			✓		✓				✓										
Water Demand Management		✓		✓																			
Control pattern/timing of abstraction		✓		✓																			
Improvement to condition of channel/bed and/or banks/shoreline		✓		✓	✓		✓		✓	✓			✓				✓	✓					✓
To improve modified habitat																							
Removal or easement of barriers to fish migration		✓		✓	✓	✓	✓		✓				✓				✓	✓					✓
Removal or modification of engineering structure		✓		✓	✓	✓	✓		✓				✓				✓	✓					✓
Improvement to condition of channel/bed and/or banks/shoreline		✓		✓	✓		✓		✓	✓			✓				✓	✓					✓
Improvement to condition of riparian zone and/or wetland habitats		✓		✓	✓		✓		✓	✓			✓				✓	✓					✓
Change to operations and maintenance		✓		✓	✓		✓		✓				✓										
Vegetation management							✓						✓										
To control or manage non native invasive/alien species																							
Prevent introduction																							
Early detection, monitoring and rapid response (to reduce the risk of establishment)							✓						✓										
Mitigation, control and eradication (to reduce extent)							✓						✓										
Building awareness and understanding (to slow the spread)																							
SCOPED OUT MEASURE OR HAZARD																							

**Table A3 – European site features against Hazards for the Humber RBD**

European site features (grouped) in the Humber RBD	Hazard Types																						
	Acidification	Change in water levels or table	Changed water chemistry	Changes in flow or velocity / regime	Changes in physical regime	Competition from non-native species	Disturbance (noise or visual)	Entrapment	Habitat loss	Killing/injury or removal of fish or other animals	Nutrient enrichment	PH	Physical damage	Predation	Reduced dilution capacity	Salinity	Siltation	Smothering	Surface water flooding changes	Thermal regime changes	Toxic contamination	Turbidity	
1.1 Fens and wet habitats not acidification sensitive																							
1.2 Bogs and wet habitats, acidification sensitive																							
1.3 Riverine habitats																							
1.4 Standing Waters acidification sensitive																							
1.5 Standing waters not acidification sensitive																							
1.6 Dry woodlands																							
1.7 Dry Grassland																							
1.8 Dry heathland habitats																							
1.9 Upland																							
1.10 Coastal habitats																							
1.11 Coastal habitats sensitive to abstraction																							
1.12 Estuarine and intertidal habitats																							
1.13 Submerged marine habitats																							
2.1 Vascular plants of aquatic habitats																							
2.2 Vascular plants, lower plants and invertebrates, wet habitats																							
2.3 Vascular plants, grassland																							
2.4 Mosses and Liverworts																							
2.5 Anadromous fish																							
2.6 Non-migratory fish and invertebrates of rivers																							
2.9 Mammals of riverine habitats																							
2.10 Amphibia																							
2.12 Marine mammals																							
3.1 Birds of uplands																							
3.2 Birds of woodland & scrub																							
3.3 Birds of lowland heaths & brecks																							
3.4 Birds of lowland wet grassland																							
3.5 Birds of lowland dry grassland																							
3.6 Birds of lowland freshwaters & their margins																							
3.7 Farmland Birds																							
3.8 Birds of coastal habitats																							
3.9 Birds of estuarine habitats																							
3.10 Birds of open sea and offshore rocks																							

The top row in the table represents hazard types; the table relates these to habitats or species in a group that may be significantly affected, with shaded squares in the table indicating that one or more of the habitats or species in a group may be affected by that hazard.

## Appendix 2 – Project level control and mitigation for SWMI required measures

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
Physical modifications (to improve habitats)	<ul style="list-style-type: none"> <li>• Change in water levels or table</li> <li>• Changes in flow or velocity regime</li> <li>• Changes in physical regime</li> <li>• Competition from non-native species</li> <li>• Disturbance (noise or visual)</li> <li>• Habitat loss</li> <li>• Killing/injury or removal of fish or other animals</li> <li>• Physical damage</li> <li>• Salinity</li> <li>• Siltation</li> <li>• Turbidity.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning permission from local planning authority under the Town &amp; Country Planning Act.</li> <li>• The Town and Country Planning (General Permitted Development) Order 1995 (as amended).</li> <li>• Flood Defence Consent from the Environment Agency for work on or near a main river, flood or sea defences (Water Resources Act 1991, Flood and Water Management Act 2010).</li> <li>• Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999.</li> <li>• Ordinary Watercourse Consent from either lead local flood authority or Internal Drainage Board (IDB) for work on or near all other watercourses that aren't main rivers.</li> <li>• Marine Licence from the Marine Management Organisation (MMO) for works below the mean high water spring tidal limit.</li> <li>• For each of the above consenting processes, there is a requirement for HRA where designated European sites are potentially affected.</li> </ul>	<ul style="list-style-type: none"> <li>• Consideration of existing habitats and use, and appropriate survey as necessary. Appraisal of projects for potential impacts on European sites, supported by appropriate levels of survey, investigation and impact assessment.</li> <li>• Avoidance of working on, or in proximity to sensitive habitats, wherever possible.</li> <li>• Use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities.</li> <li>• Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected).</li> <li>• Seek early advice and approval from Natural England where works in proximity to designated European sites, including scope of HRA / appraisal required, any supporting survey if necessary, building of mitigation in to the design, sensitive timings and construction methods of working.</li> <li>• Consider location and extent of activity, sensitive timing and methods of construction to minimise effects on designated habitats and species.</li> <li>• Seek assent from Natural England in advance of works within or affecting SSSIs (which underpin European sites).</li> <li>• Consider potential functioning role of habitat improvements in relation to relevant qualifying features of European sites in proximity / potentially affected, to avoid conflict and, where appropriate, incorporate habitat improvements complementary to site conservation objectives.</li> <li>• Appropriate methods of working including pollution prevention and control measures.</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, pressures and threats and site features affected, particularly those related to physical modification; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project / activity may help co-deliver any of the remedial measures / actions identified in the SIP/s.</li> </ul>

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
Managing pollution from waste water	<ul style="list-style-type: none"> <li>• Disturbance (noise or visual)</li> <li>• Habitat loss</li> <li>• Physical damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning permission from local planning authority under the Town &amp; Country Planning Act.</li> <li>• The Town and Country Planning (General Permitted Development) Order 1995 (as amended).</li> <li>• Water Resources Act 1991.</li> <li>• Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider appropriate methods of working including pollution prevention and control measures.</li> <li>• Avoidance of working on, or in proximity to sensitive habitats, wherever possible.</li> <li>• Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected).</li> <li>• Use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities.</li> <li>• Seek early advice and approval from Natural England (assent from Natural England in advance of works within or affecting SSSIs) where works in proximity to designated European sites, including scope of HRA / appraisal required, any supporting survey if necessary, building of mitigation in to the design, sensitive timings and construction methods of working.</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project / activity may help co-deliver any of the water quality related remedial measures / actions identified in the SIP.</li> </ul>
Manage pollution from towns, cities and transport	<ul style="list-style-type: none"> <li>• Disturbance (noise or visual)</li> <li>• Habitat loss</li> <li>• Physical damage</li> <li>• Surface water flooding changes</li> <li>• Turbidity.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning permission from local planning authority under the Town &amp; Country Planning Act.</li> <li>• The Town and Country Planning (General Permitted Development) Order 1995 (as amended).</li> <li>• Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010.</li> </ul>	<ul style="list-style-type: none"> <li>• Guidance within 'Port development and dredging in Natura 2000 estuaries and coastal zones' (European Commission guidance).</li> <li>• Guidance within 'Design Manual for Roads and Bridges', volume 11 environmental assessment, section 4.</li> <li>• Consider appropriate methods of working including pollution prevention and control measures.</li> <li>• Avoidance of working on, or in proximity to sensitive habitats, wherever possible.</li> <li>• Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected).</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, pressures and threats related to water quality, and site features affected; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project / activity may help co-deliver any of the water quality related measures / actions proposed in the SIP to remedy these issues.</li> </ul>

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
Changes to natural flow and levels of water	<ul style="list-style-type: none"> <li>• Change in water levels or table</li> <li>• Changes in flow or velocity regime</li> <li>• Changes in physical regime</li> <li>• Disturbance (noise or visual)</li> <li>• Habitat loss</li> <li>• Killing/injury or removal of fish or other animals</li> <li>• Physical damage</li> <li>• Salinity</li> <li>• Siltation</li> <li>• Turbidity.</li> </ul>	<ul style="list-style-type: none"> <li>• Flood Defence Consent from the Environment Agency for work on or near a main river, flood or sea defences.</li> <li>• Ordinary Watercourse Consent from either lead local flood authority or Internal Drainage Board (IDB) for work on or near all other watercourses that aren't main rivers.</li> <li>• Marine Licence from the Marine Management Organisation (MMO) for works below the mean high water spring tidal limit.</li> <li>• Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999.</li> <li>• Abstraction licence from the Environment Agency (Water Resources Act 1991 (as amended by Water Act 2003), Environment Act 1995, Water Resources (Abstraction and Impounding) Regulations 2006).</li> <li>• Impoundment licence from the Environment Agency (as for abstraction licence).</li> <li>• Drought Permits and Orders (Water Resources Act 1991, Environment Act 1995).</li> <li>• Environmental permit under the Environmental Permitting Regulations (England and Wales) 2010.</li> </ul>	<ul style="list-style-type: none"> <li>• Consideration of existing site qualifying features - habitats and species potentially affected, and their sensitivity to changes in water levels or water table, changes in flow or velocity regime and subsequent potential changes in geomorphology / physical regime.</li> <li>• Consider use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities.</li> <li>• Consider appropriate methods of working including pollution prevention and control measures.</li> <li>• Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected).</li> <li>• Timing of abstractions / flow changes to avoid ecologically sensitive periods for water dependent European sites and features; optimise proposed changes to target relevant qualifying features, particularly those identified in SIPs where water levels / flows identified as the priority pressures / threats.</li> <li>• Consider potential secondary water quality effects to changes to flow / water levels, such as potential WQ changes, increased / decreased siltation / turbidity, and sensitivity of features to changes, to inform appraisal of projects and influence their design, if appropriate.</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, pressures and threats related to water quality / quantity, physical regime and site features affected; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project / activity may help co-deliver any of the measures / actions proposed in the SIP to remedy these issues.</li> </ul>
Managing invasive non-native species	<ul style="list-style-type: none"> <li>• Disturbance (noise or visual)</li> <li>• Physical damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Operations affecting SSSI's require assent from Natural England (Wildlife and Countryside Act 1981).</li> <li>• Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999.</li> <li>• The Wildlife and Countryside Act 1981.</li> <li>• Environmental Protection Act 1990.</li> <li>• The Salmon and Freshwater Fisheries Act 1975.</li> </ul>	<ul style="list-style-type: none"> <li>• Timing of management activity to avoid sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected).</li> <li>• Appropriate methods and monitoring to reduce risk of unintentional spread of invasive non-native species, during management / control activities.</li> <li>• Seek early advice / approval from Natural England (assent in advance of works within / affecting SSSIs) where management activities planned in proximity to designated European sites, including sensitive timings and methods of management.</li> </ul>

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
			<ul style="list-style-type: none"> <li>• Consider location and extent of management activity, sensitive timing and methods of management to minimise effects on designated habitats and species.</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, particularly any related to invasive non-native species; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the management activity can help co-deliver any of the measures / actions proposed in the SIP to remedy these issues.</li> </ul>
Manage pollution from rural areas	<ul style="list-style-type: none"> <li>• Disturbance (noise or visual)</li> <li>• Habitat loss</li> <li>• Physical damage</li> <li>• Surface water flooding changes</li> <li>• Turbidity.</li> </ul>	<ul style="list-style-type: none"> <li>• Operations affecting SSSI's require assent from Natural England (Wildlife and Countryside Act 1981).</li> <li>• Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider guidance contained within 'Farming for Natura 2000' - Guidance on how to support Natura 2000 farming systems to achieve conservation objectives (European Commission 2014).</li> <li>• Consider timing of management activity to avoid sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected).</li> <li>• Any changes to land management practices to address diffuse pollution in rural areas within or affecting SSSIs (which underpin European Site designations) should involve consultation with Natural England to ensure no potential for adverse effects, checked against the list of operations likely to damage the SSSI and inform changes to SSSI management agreements, where appropriate.</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, particularly any related to water quality / diffuse pollution; consider whether any proposed actions or methods of working may exacerbate these issues, or whether the management activity can help co-deliver any of the measures / actions proposed in the SIP to remedy these issues.</li> </ul>
Manage pollution from mines	<ul style="list-style-type: none"> <li>• Disturbance (noise or visual)</li> <li>• Habitat loss</li> <li>• Physical damage.</li> </ul>	<ul style="list-style-type: none"> <li>• The Coal Industry Act 1994.</li> <li>• The Energy Act 2011.</li> <li>• Planning permission from local planning authority / minerals planning authority under the Town &amp; Country Planning Act.</li> <li>• Environmental permit under the Environmental Permitting Regulations (England and Wales) 2010.</li> <li>• The Town and Country Planning (General Permitted Development) Order 1995 (as</li> </ul>	<ul style="list-style-type: none"> <li>• Seek assent from Natural England in advance of works within or affecting SSSIs (which underpin European sites).</li> <li>• Consider whether any specific European site features are adapted to unique water quality determinants, for which mine remediation may result in changes to.</li> <li>• Adhere to the Mine Water Treatment Schemes Code of Practice (Coal Authority and Planning Officers Society, 2012).</li> <li>• Consideration the intervention / scheme in relation to the need for EIA +/- HRA, through consultation with the local planning authority / mineral planning authority and Natural England, and obtain an EIA</li> </ul>

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
		amended). <ul style="list-style-type: none"> <li>• Water Resources Act 1991.</li> </ul>	screening opinion as required. <ul style="list-style-type: none"> <li>• The LPA / MPA may need to conduct an appropriate assessment if it is possible that a mine water treatment scheme / intervention / remediation measures is likely to have a significant effect on a European site either individually or in combination with other plans or projects.</li> <li>• Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, particularly any related to water quality; consider whether any proposed actions or methods of working may exacerbate these issues, or whether the scheme / intervention / management activity can help co-deliver any of the actions proposed in the SIP to remedy these issues.</li> </ul>

\* Hazards are based on those used in Environment Agency's Habitats Directive Handbook; further detailed description is provided in Appendix 3.



### Appendix 3 - Descriptions of Hazards used within the HRA\*

<p><b>Acidification</b>            Could the action lead to activities that result in releases of sulphur dioxide, oxides of nitrogen and ammonia that cause acidification?</p>
<p><b>Change in water levels or table</b>            Could the action lead to changes in the water levels or water table?</p>
<p><b>Changed water chemistry</b>            Could the action lead to significant changes in water chemistry (BOD, COD, organic and inorganic pollutants) in the short and long term?</p>
<p><b>Changes in flow or velocity regime</b>            Could the action lead to changes in the flow or velocity regime of a water body?            Could the action lead to greater river or tidal flows under normal or extreme events?</p>
<p><b>Changes in physical regime</b>            Could the action alter physical processes that will alter the present characteristics of a site – e.g. coastal processes, fluvial and geomorphologic processes, erosion processes? This includes the pattern of sediment movement, erosion and deposition, bathymetry and hydrodynamic processes, which can result in direct loss of habitat and indirect effects on dependent species and habitats. Such changes can be caused by dredging activities or from construction activities.</p>
<p><b>Competition from non-native species</b>            Could the action result in increased competition from non-native species?            The introduction of non-native animals and plants may have a range of effects, from undetectable to changes in a community composition to the complete loss of native communities. The effects are highly unpredictable, but can be very serious.</p>
<p><b>Disturbance (noise or visual)</b>            Could the action lead to increased noise or visual disturbance at the European site from direct or indirect, continuous or intermittent effects? Disturbance from construction, operational activities, recreation, land management activities etc may cause sensitive birds and mammals to deviate from their normal, preferred behaviour. It is difficult to make generalisations about the likely effects of disturbance because a wide range of factors are involved and different species react differently. It is likely that the effects will depend on the type and timing of disturbance and the proximity of the sources to the sensitive populations.</p>
<p><b>Entrapment</b>            Could the action lead to impingement or entrapment of fish or other species.</p>
<p><b>Habitat loss</b>            Could the action lead to new structures whose footprint will impinge on the European site?            Could the action lead to land use change that will impinge on the European site?            Could the action lead to ongoing processes which will exacerbate habitat loss (e.g. coastal squeeze)?</p>
<p><b>Killing/injury or removal of fish or other animals</b>            Could the action cause the killing/injury or removal of fish or other animals?</p>
<p><b>Nutrient enrichment</b>            Could the action lead to nutrient enrichment? An addition of nutrients can lead to changes in vegetation, directly affecting protected habitats and species of flora, or protected species dependent upon the vegetation.</p>

<b>pH</b>
Could the action lead to changes in pH of a water body?
<b>Physical damage</b>
Could the action lead to temporary works of such a nature that will cause long-term damage to the existing habitat? Could the action lead to recurring operations and maintenance that will lead to disturbance?
<b>Predation</b>
Could the action encourage predators?
<b>Reduced dilution capacity</b>
Could the action lead to reduced dilution capacity of a water body?
<b>Salinity</b>
Could the action lead to a change in the salinity of a water body or other habitat? Changes in salinity of the water may affect the toxicity of other substances. It may also have a direct effect on the distribution of species across the site and the composition of biological communities. Change is of concern in coastal or estuarine waters where the zone of transition from freshwater to brackish or saltwater may be critical to the interest feature.
<b>Siltation</b>
Could the action lead to increased physical damage caused by the deposit of suspended solids from water? Siltation can cover food for birds and kill macro-invertebrates or render them inaccessible. It may also affect the feeding behaviour of birds and other animals that detect prey by sight. An increase in suspended sediment can affect filter-feeding organisms, through clogging and damage to feeding and breathing equipment. Young fish can also be damaged if sediment becomes trapped in the gills. Fine sediments can smother the gravel beds used by salmon for spawning.
<b>Smothering</b>
Could the action lead to physical damage caused by the deposit of solid material from the air?
<b>Surface water flooding changes</b>
Could the plan lead to a significant reduction or increase in the frequency of surface water flooding (fluvial, pluvial and tidal)? Consideration should be given to the potential to flood throughout the year, to greater depths, reduced frequency may lead to drying out or changes to sediment supply etc; and supply of water to seasonally ephemeral water bodies.
<b>Thermal regime changes</b>
Could the plan lead to a mean temperature change of more than 0.2°C in a water body?
<b>Toxic contamination</b>
Could the action lead to releases of substances that could be harmful to flora and fauna?
<b>Turbidity</b>
Could the plan lead to an increase in suspended sediments? Increased turbidity associated with suspended solids results in reduced light penetration, which may affect photosynthesis. This may affect invertebrates directly and species higher up the food chain indirectly e.g. birds. Turbidity can be a direct effect of activities such as agitation dredging or over-pumping, or an indirect effect e.g. through the removal of vegetation protecting a bed or bank.

\* The hazards and their descriptions that have been used in the HRA are based on those used in Environment Agency's Habitats Directive Handbook.

#### Appendix 4 – European sites within the Humber RBD

Site ID	Name of Site	SPA, SAC, Ramsar	Area (ha)*
UK0030142	Arnecliff and Park Hole Woods #	SAC	53
UK0030086	Beast Cliff – Whitby (Robin Hood's Bay) #	SAC	265
UK0030087	Bee's Nest and Green Clay Pits #	SAC	15
UK0012740	Birklands and Bilhaugh #	SAC	270
UK0030107	Cannock Chase #	SAC	1244
UK0012672	Cannock Extension Canal #	SAC	5
UK0014776	Craven Limestone Complex #	SAC	5326
UK0030036	Denby Grange Colliery Ponds #	SAC	19
UK0030039	Eller's Wood and Sand Dale #	SAC	4
UK0012646	Ensor's Pool	SAC	4
UK0030332	Fen Bog #	SAC	27
UK0013036	Flamborough Head #	SAC	6321
UK0012817	Gang Mine #	SAC	8
UK0030166	Hatfield Moor	SAC	1361
UK0030170	Humber Estuary #	SAC	36657
UK0030178	Kirk Deighton #	SAC	4
UK0012844	Lower Derwent Valley #	SAC	922
UK0030051	Mottey Meadows #	SAC	44
UK0014775	North Pennine Dales Meadows #	SAC	493
UK0030033	North Pennine Moors #	SAC	103131
UK0030228	North York Moors #	SAC	44095
UK0030234	Ox Close #	SAC	142
UK0012789	Pasturefields Salt Marsh #	SAC	8
UK0019859	Peak District Dales #	SAC	2337
UK0030253	River Derwent #	SAC	408
UK0030258	River Mease #	SAC	23
UK0030276	Skipwith Common #	SAC	295
UK0030280	South Pennine Moors #	SAC	65026
UK0030284	Strensall Common #	SAC	572
UK0012915	Thorne Moor #	SAC	1911
UK0013595	West Midlands Mosses #	SAC	185
UK9006101	Flamborough Head and Bempton Cliffs	SPA	207
UK9006171	Hornsea Mere #	SPA	232
UK0030170	Humber Estuary #	SPA	37630
UK9006092	Lower Derwent Valley #	SPA	1091
UK9006272	North Pennine Moors #	SPA	147278
UK9006161	North York Moors #	SPA	44095
UK9007021	Peak District Moors (South Pennine Moors Phase 1) #	SPA	45301
UK9007022	South Pennine Moors Phase 2 #	SPA	20944
UK9005171	Thorne and Hatfield Moors	SPA	2438
UK11031	Humber Estuary #	Ramsar	37988
UK11037	Lower Derwent Valley #	Ramsar	922
UK11038	Malham Tarn #	Ramsar	287
UK11043	Midland Meres and Mosses Phase 1 #	Ramsar	512
UK11080	Midland Meres and Mosses Phase 2 #	Ramsar	1593

# Denotes if the site is a WFD: Natura 2000 protected area site.

\*Area denoted is for the entire designated area rather than the area within the RBD boundary.

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