

Water for life and livelihoods



River basin management plan for the South West River Basin District Habitats Regulations Assessment Updated December 2015

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Published by:

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Executive summary

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

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 Conservation of Habitats and Species Regulations 2010 (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 effects 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.

Contents

1	Introduction	7
1.1	Introducing this report	7
1.2	Background to the RBMPs	7
1.3	The South West RBMP	8
1.4	Background to Habitats Regulations Assessment	10
2	European sites in the South West RBD.....	12
2.1	European sites that could be affected by the RBMP.....	13
2.2	European sites and their status for RBMPs	13
2.3	European sites and their management.....	15
3	Approach to HRA.....	16
3.1	Description of the RBMP Measures.....	16
3.2	Screening and Likely Significant Effects.....	18
3.2.1	Screening for SWMI required measures that will have potential effects	18
3.2.2	Screening of measures managing European sites	18
3.2.3	Assessment of SWMI required measures	19
3.2.4	Assessment of proposed programmes of measures	21
3.2.5	Controls and mitigation	21
3.3	Considering the need for further stages of assessment.....	22
4	Screening and Likely Significant Effects.....	23
4.1	Summary of SWMI required measures.....	23
4.2	The assessment of SWMI required measures.....	24
4.2.1	Measures required to address physical modifications	24
4.2.2	Measures required to manage pollution from waste water, from towns, cities and transport and from mines	27
4.2.3	Measures required for pollution from rural areas.....	29
4.2.4	Measures required to manage changes to natural flow and levels of water....	30
4.2.5	Measures required to manage invasive non-native species	31
4.3	The highest risk SWMI required measures for the South West RBD	31
4.3.1	Identification of the most sensitive European site features within the RBD.....	32
4.3.2	Potential project-level mitigation for highest risks.....	34
4.3.3	Example of mitigation.....	35
4.4	The specific programmes of measures in the updated RBMP	36
4.4.1	Measures to prevent deterioration.....	37
4.4.2	Measures to deliver 2021 outcomes	37
4.4.3	Measures to achieve outcomes for 2027 or beyond.....	45
4.4.4	Additional measures for protected areas.....	45

4.5	Consideration of results and conclusion	46
5	In combination effects with other plans and projects	49
6	Conclusion and future HRAs	53

APPENDICES

Appendix 1:

Table A1 - Potential Impacts of Measures on qualifying features of European Sites in the South West RBD

Table A2 - Potential Hazards arising from Measures proposed within the South West RBMP

Table A3 – European site features against Hazards for the South West 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 South West RBD

1 Introduction

1.1 Introducing this report

This report sets out the results of a Habitat Regulations Assessment (HRA) into the likely significant effects on designated 'European Sites' of the 2015 updated River Basin Management Plan (RBMP) for the South West 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, Food 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 and projects
- 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 South West RBMP

The South West River Basin District (RBD) covers over 21,000 square kilometres. It includes Cornwall, Devon, Dorset, parts of Somerset, Hampshire and Wiltshire (the Isles of Scilly, a group of islands 25 miles south west of Cornwall and Lundy Island are included in the district). The district is predominantly rural, but its population of 5.3million people populate urban areas such as Exeter, Plymouth, Torquay, Bournemouth and Poole. Agriculture is the most important sector in many rural areas and is also a major influence on the water environment. The economy is dominated by the service sector and the popularity of the district as a holiday destination means tourism makes a significant contribution to the local economy. The South West RBD has a particularly rich diversity of wildlife and habitats. These are recognised and protected by a large network of internationally, nationally and locally designated sites including the Dartmoor and Exmoor National Parks, internationally important rivers such as the Camel and Hampshire Avon, and the Jurassic Coast World Heritage Site. The South West RBD is made up of 9 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. There are also operational catchments specific to certain larger water bodies, for example groundwaters, which, due to their size, can cross

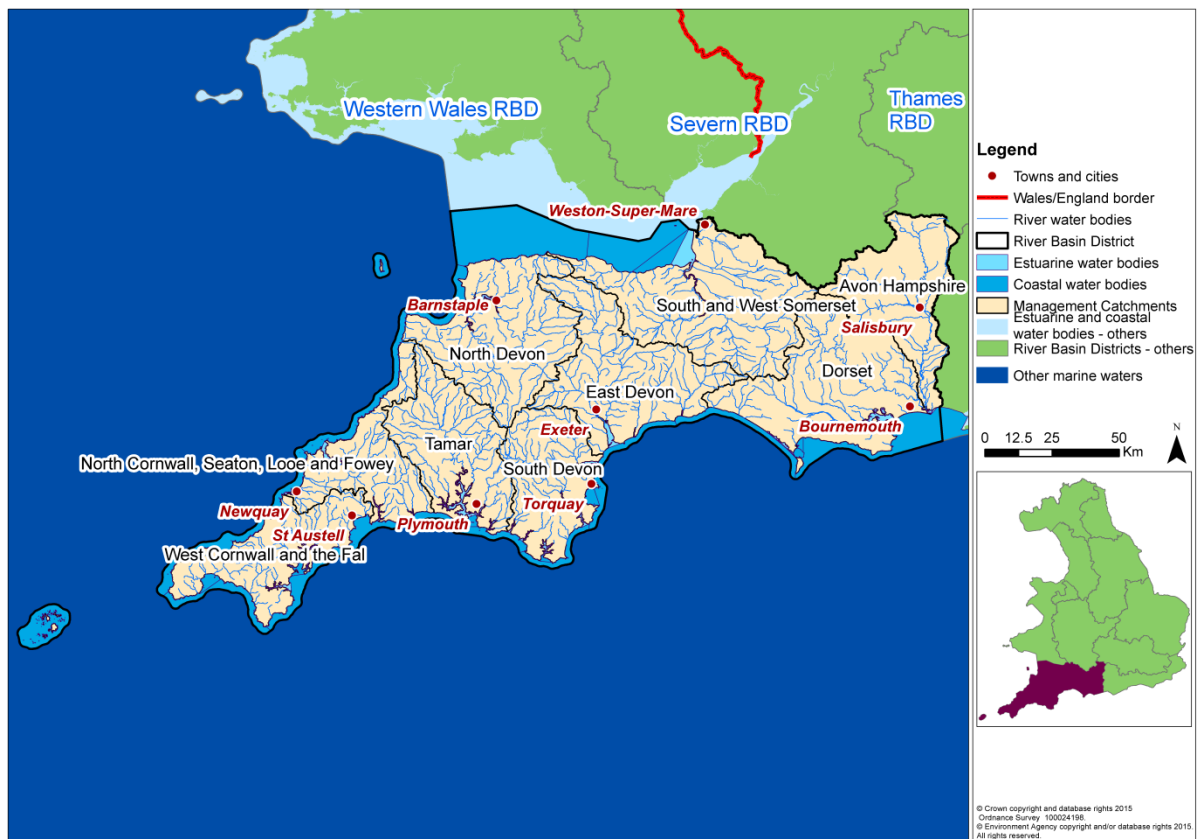
management catchment boundaries and even river basin districts. In the South West RBD there are 37 surface water operational catchments.

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

- **Physical modifications** – affect 22% of water bodies in the river basin district
- **Pollution from waste water** – affect 33% of water bodies in the river basin district
- **Pollution from rural areas** – affect 44% of water bodies in the river basin district
- **Changes to the natural flow and level of water** – affect 3% of water bodies in the river basin district
- **Pollution from towns, cities and transport** – affect 4% of water bodies in the river basin district
- **Pollution from abandoned mines** – affect 5% 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 South West RBD are described in section 4.1.

Figure 1 Map of the South West 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 the Wild 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(3) 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 South West RBMP is considered to fit within the definitions of a 'plan' as defined by the Habitats Directive, and requires a HRA. The RBMP is a high-level planning document for the South West 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.

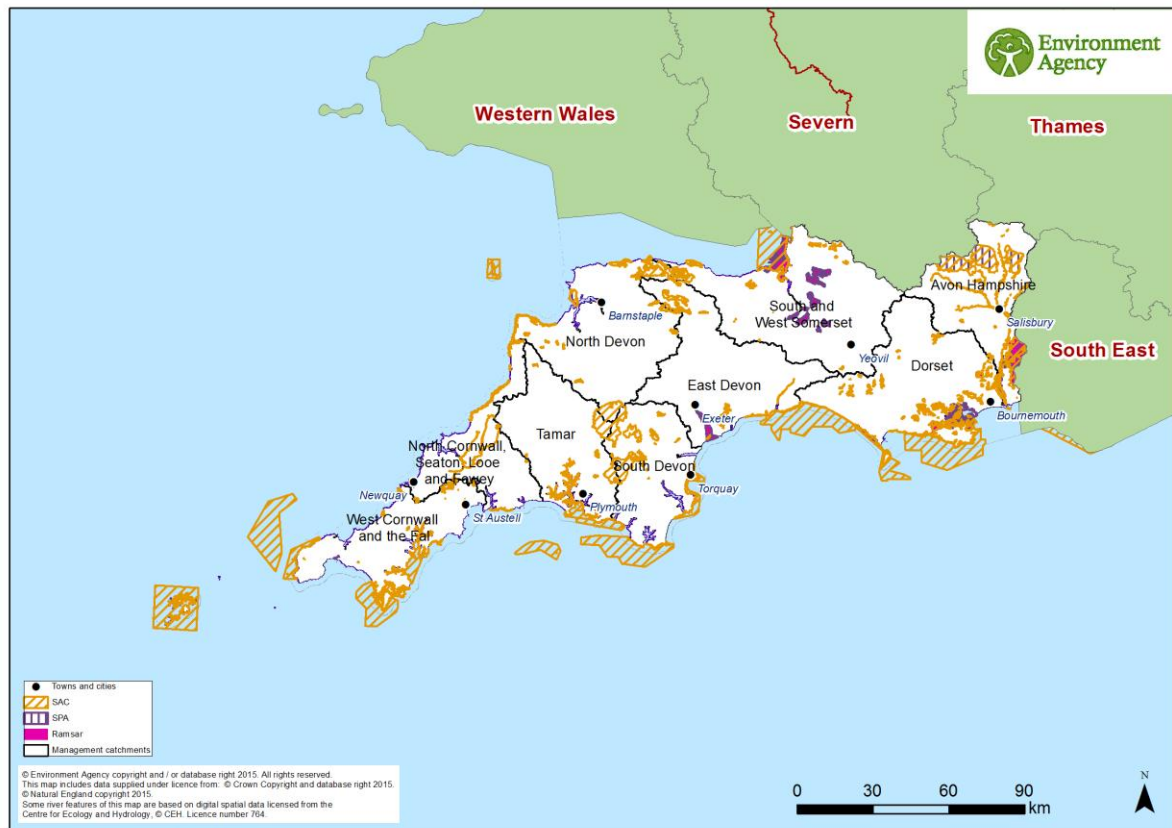
Stage 3: Assessment of alternative solutions is the process which examines alternative ways of achieving the objectives of the plan or project that would avoid adverse impacts on the integrity of the European site, should avoidance or mitigation be unable to avoid adverse effects.

Stage 4: Assessment where no alternative solutions exist and where adverse effects 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 South West RBD

Within the South West RBD there are 56 SACs, 5 Sites of Community Importance (SCI), 14 SPAs, in addition to one pSPA and 9 Ramsar sites. Some of the sites have more than one designation such as Chesil Beach and the Fleet, parts of which are designated as SPA, SAC and Ramsar.

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



The European Sites within the South West RBD encompass a wide diversity of habitat types, with a notable concentration of coastal and marine sites. In addition to freshwater habitats such as rivers, lakes and other wetlands, other frequently occurring habitat types within the RBD are heathlands, woodlands and grasslands.

The 9 Ramsar sites within the RBD are represented by inland and coastal sites in near equal proportion and are also designated as SPAs. Coastal sites include parts of the Severn Estuary as well as Poole Harbour and the Exe Estuary in addition to the Isles of Scilly and the shingle and lagoon habitats and species of Chesil Beach and the Fleet.

Inland Ramsar/SPA sites include the Avon Valley and its chalk river system and associated areas of floodplain grassland, as well as the complex of designated sites that comprise the Dorset Heathlands. The Somerset Levels and Moors Ramsar/SPA is similarly represented by series of designated sites that cover extensive areas of flood plain drained by a large network of ditches, rhynes, drains and rivers.

The South West RBD also includes parts of the extensive site of the New Forest and its intricate mosaic of habitats comprising streams, ponds and other wetland habitats, dry and wet heathlands and grasslands and pasture woodlands.

The SPAs within the RBD are equally represented by coastal and inland sites; inland SPA sites that support important populations of overwintering and breeding birds include the grasslands of Salisbury Plain, whilst sites that are of particular importance for their breeding birds include the East Devon Heaths and Porton Down. Coastal SPA sites within the RBD range in size from Marazion Marsh in Cornwall with its large expanse of reedbeds supporting important populations of breeding, wintering and migratory birds to the Tamar Estuaries complex which is of importance for overwintering bird populations.

Across the RBD there are slightly more inland SACs than coastal sites, although the area also includes 5 SCIs such as Studland to Portland and Lyme Bay to Torbay. Some SACs are designated primarily due to the species they support. This includes sites such as Crookhill Brick Pit and Holnest and their populations of great crested newts, the chalkland flora of Fontmell & Melbury Downs and Prescombe Down and the bat populations associated with former quarry sites, such as Beer Quarry and Caves.

Many of the sites with the RBD are designated SACs in respect of their qualifying habitats. In addition to the river SACs of the Avon and the Axe, the RBD is characterised by a wide diversity of coastal habitats, including coastal cliffs, estuarine and intertidal habitats and dune habitats. Other designated habitats represented in the RBD include heathland, chalk grasslands and woodlands, and sites with associated wetland habitats.

Appendix 4 contains a summary of the European sites present within the South West 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 South West 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 North West 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.

Table 1 WFD status of water dependent SSSIs for the South West RBD¹

Condition	South West (ha)
Favourable	33,792
Destroyed / Part destroyed	34
Unfavourable declining	2,036
Unfavourable no change	2,053
Unfavourable recovering	22,612
Total Area Unfavourable	26,735
% Unfavourable	44

This shows that for the South West RBD, 44% (by area) of water-dependent SSSI units of European protected area sites currently do not meet their SSSI conservation objectives.

The generic pressures on such sites in the South West region include forestry and woodland management and agricultural practices as, for example, levels of grazing and mowing regimes. These pressures can affect the condition and diversity of habitats present within a site as well as the particular species they support, such as the specialist plants, invertebrates and breeding birds associated with the Dorset Heathlands.

Pressures typically linked to river and wetland sites, such as the Camel, Axe and Avon rivers include pollution from discharges, diffuse pollution from agricultural runoff, siltation, abstraction, physical modification, inappropriate weed control and weirs and structures, and invasive species. These pressures can affect qualifying habitats in addition to the diversity of aquatic and wetland plant and animal species, including qualifying fish species such as bullhead, Atlantic salmon and sea and brook Lamprey. Estuary sites, such as Poole Harbour and Plymouth Sound and the Tamar Estuaries Complex, are also subject to pressures from local fishery activities and from coastal squeeze with the potential loss of intertidal habitats and consequent impacts on the breeding and overwintering bird

¹ Source: Extract from Natural England databases August 2015.

populations they support. Pressures identified for other coastal habitats, such as the sea cliffs of the Lizard and the dune habitats of Penhale, include invasive species and inappropriate coastal management resulting in the loss of the characteristic habitats and species of these areas.

Inappropriate water levels are identified as a pressure for certain sites, such as the Somerset Levels and Moors, because of the importance of the area's characteristic wetland habitats in supporting overwintering and migratory birds. Peat extraction is another identified pressure for this particular site as well as public access and the resulting disturbance to wintering birds. Other pressures associated with public access/disturbance and affecting sites in the RBD include boating and fishing activities along the coastline of the Isles of Scilly and illegal vehicle use in the Exmoor Heaths. More generally, pressures from new and existing development activities are identified as affecting a wide range of sites across the RBD. Air pollution from atmospheric nitrogen deposition is also widely highlighted as a pressure, with the potential to harm characteristic habitats such as the dry heaths and Oak woodlands of the South Dartmoor Woods.

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.

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 South West 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 Explorer² 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

Categories of Significant Water Management Issue	SWMI Required Measures (may be referred to as tier 2 measures)
Physical modification	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 Vegetation management

² 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.

	Changes to operation and maintenance
Manage pollution from waste water	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
Manage pollution from towns, cities and transport	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 at source
Improve the natural flow and level of water	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
Manage invasive non-native species	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)
Manage pollution from rural areas	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)
Manage pollution from mines	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 cycles³ 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 objectives. Other measures will make a contribution to improvements but without predicted

³ 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.

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 South West 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 South West 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 measure 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 to address 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 South West RBD (extract of Table A1 in Appendix 1)

SOUTH WEST		RBMP MEASURES for RBD		Physical modifications (to improve habitats)						
No. Of EUROPEAN SITES in RBD (79)		water dependent features Y/N	no. of occurrences of the feature within RBD	Measure type						
No. of impacts (hazards) from measures on qualifying features				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	
Qualifying features				28	7	16	17	11	4	
				90%	23%	50%	55%	35%	13%	
SAC (56)	Ramsar (9)	1.1 Fens and wet habitats not acidification sensitive*	Y	20	9	9	8	8	5	2
		1.2 Bogs and wet habitats, acidification sensitive*	Y	23	6	6	6	6	5	2
		1.3 Riverine habitats	Y	11	10	10	9	9	6	2
		1.4 Standing Waters acidification sensitive*	Y	12	7	7	7	7	4	1
		1.5 Standing waters not acidification sensitive*	Y	10	9	9	8	8	5	1
		1.6 Dry woodlands*	N	23	3	3	2	2	2	1
		1.7 Dry Grassland*	N	19	3	3	2	2	2	1
		1.8 Dry heathland habitats*	N	27	2	2	2	2	2	1
		1.9 Upland*	N	0	4	4	4	4	4	2
		1.10 Coastal habitats*	N	18	6	6	5	5	4	2
		1.11 Coastal habitats sensitive to abstraction*	Y	23	6	6	6	6	3	1
		1.12 Estuarine and intertidal habitats	Y	15	8	8	8	8	5	2
		1.13 Submerged marine habitats	Y	14	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 2nd 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 authority⁴ 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 (and Natural Resources Wales where European sites in Wales are potentially affected), as statutory conservation 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 Secretary of State for Environment, Food and Rural Affairs. This would need to include proposals for compensatory measures. The HRA report sets out the requirements for these levels of further consideration (see section 4.5).

⁴ 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 South West 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 South West

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
Physical modification	4	23-90%	1	35%	1	13%
Pollution from waste water					3	6 - 61%
Pollution from towns, cities and transport			1	10%	2	10 -19%
Changes to natural flow & levels of water	1	6%			2	0 -13%
Invasive non-native species					2	19%
Pollution from rural areas					1	100%
Pollution from mines					1	32%
<p>The 5 highest risk measures are (% occurrence in RBD catchments):</p> <p>Physical modification:</p> <ul style="list-style-type: none"> • Removal or easement of barriers to fish (90%) • Removal or modification of engineering structure (23%) • Improvement to condition of channel/bed and/or banks/shoreline (50%) • Improvement to condition of riparian zone and/or wetland habitats (55%) 						

Changes to natural flow and levels of water:

- Improvement to condition of channel/bed and/or banks/shoreline (6%)

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/Ramsar Fens and wet habitats not acidification sensitive (up to 20 sites)
- (2.5) SAC/Ramsar Anadromous fish (up to 15 sites)
- (3.6) SPA/Ramsar birds of lowland freshwaters & their margins (up to 21 sites)
- (3.8) SPA/Ramsar birds of coastal habitats (up to 19 sites)
- (3.9) SPA/Ramsar birds of estuarine habitats (up to 19 sites)

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

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 22% of water bodies in the South West RBD. The measures required to address this are present in up to 90% 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	28 (90%)
	Removal or modification of engineering structure	7 (23%)
	Improvement to condition of channel/bed and/or banks/shoreline	16 (50%)
	Improvement to condition of riparian zone and /or wetland habitats	17 (55%)
	Vegetation management	4 (13%)
	Changes to operation and maintenance	11 (35%)

Consideration of effects

Of the measures proposed within the South West RBD, the measures that make up the physical modifications (to improve habitats) have the greatest potential to lead to hazards, which could in turn present risks to designated site features. With the exception of vegetation management, which in general is considered to present a lower potential risk, these types of measures have a variable distribution across the operational catchments in the RBD. Measures for the removal / easement of barriers to fish migration, for example, are proposed in nearly all the operational catchments in the RBD, whilst less than a quarter of the operational catchments have proposals for the removal or modification of an engineering structure. Just over half the operational catchments in the RBD have proposals for improving the condition of the channel/bed and or banks/shoreline in addition to

measures for improving the riparian zone and/or wetland habitats. Although considered to present a slightly lower potential risk, changes to operations and maintenance are proposed in just over a third of the operational catchments in the RBD.

Given the focus of these measures, SAC habitats that are considered particularly susceptible to physical modifications are riverine, fens, bogs and wet habitats and standing waters, and also coastal, estuarine and intertidal habitats, and to a lesser extent submerged marine habitats. Of these habitats, the South West RBD has a particular high occurrence of coastal habitats (sensitive to abstraction) as well as fens, bogs and wet habitats. The most frequently occurring qualifying habitat in the RBD, however, is dry heathland with dry woodland and grassland also frequently represented. Overall, these habitats are considered less vulnerable to hazards arising from physical modifications.

Many of the SAC qualifying species are considered susceptible to proposed measures for physical modifications. These include anadromous fish, non-migratory fish and invertebrates of rivers, mammals of river habitats and amphibia, in addition to vascular plants of aquatic habitats and vascular and lower plants and invertebrates of wet habitats. This latter category of qualifying feature has the highest level of representation with the RBD reflecting the high occurrence of fen, bog and wet habitats. Qualifying species considered less vulnerable include vascular grassland plants, liverworts, mammals and invertebrates of wooded habitats. Coastal plants and marine mammals are also considered to be generally less sensitive to such measures.

In contrast, SPA bird populations such as birds of lowland freshwaters and their margins and birds of coastal and estuarine habitats are considered to be particularly susceptible to measures proposing physical modifications. All these qualifying bird species have high levels of occurrence in the RBD. Birds of lowland wet grassland and uplands also show some degree of sensitivity to these types of measures, although they are generally less frequently occurring in the RBD. In general, the sensitivities in relation to birds are more likely to relate to hazards arising from construction activities, and therefore of a short term nature and less likely once the construction phase of a measure / project has been completed.

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 authority⁵ under the Habitats

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

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 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 33% of water bodies in the South West RBD. The measures required to address this are present in up to 61% 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	Mitigate/remediate point source impacts on receptor	19 (61%)
	Reduce point source pollution at source	0 (0%)
	Reduce point source pollution pathways (i.e. control entry to the water environment)	3 (10%)
	Reduce diffuse pollution at source	2 (6%)

Consideration of effects

Measures to manage pollution from waste water are proposed from 61% to less than 10% of the operational catchments in the South West RBD. These types of measure are considered generally to present a relatively low risk to designated SAC and SPA qualifying features. Measures targeting the impact of diffuse pollution on receptors may present a slightly higher risk however they are only proposed to occur in 2 operational catchments in the RBD.

Pollution from towns, cities and transport affects 4% of water bodies in the South West RBD. The measures required to address this are present in up to 19% 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 (i.e. control entry to the water environment)	6 (19%)
	Mitigate/remediate diffuse pollution impacts on the receptor	3 (10%)
	Reduce diffuse pollution at source	0 (0%)

Consideration of effects

Reflecting the predominantly rural character of the South West RBD, measures to manage pollution from towns, cities and transport have a much more limited occurrence and are proposed in less than a fifth of its operational catchments. In general, these types of measures are considered to present a relatively low risk to designated SAC and SPA qualifying features. Measures for mitigating and or remediating the impacts of diffuse pollution on receptors may present a slightly higher risk for a number of qualifying species,

such as birds associated with coastal, estuarine and freshwater habitats, fish, amphibia and mammals of riverine habitats. These measures may also pose a slightly higher risk for qualifying habitats such as fen, riverine and estuarine and intertidal habitats.

Pollution from abandoned mines affects 5% of water bodies in the South West RBD. The measures required to address this are present in up to 32% 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	10 (32%)

Consideration of effects

Measures proposed to manage pollution from mines within the RBD are proposed in just over a third of its operational catchments. The measures are focused on addressing the impacts of point source pollution from these sources on receptors. In terms of potential risks to designated SPA / SAC features, the measures reflect a similar pattern to that of managing pollution from waste water and are considered generally to present a relatively low risk.

Controls and mitigation

Management of pollution from waste water, the limited measures for towns, cities and transport, in this typically rural RBD, and from mines are all likely to involve similar consenting and regulatory regimes. With regard to measures relating to waste water and mine water pollution environmental permits may also be required under the Environmental Permitting Regulations. At the project level mitigation measures would typically include avoidance of works on, or in close proximity to sensitive habitats as well as considering the timing of the activity to avoid sensitive periods, this depending on the European sites and qualifying features potentially affected. Measures proposed for managing pollution from mine waters would also need to consider whether any specific designated site features are adapted to the unique conditions provided by the mine workings and which could be impacted by any proposed remediation.

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 44% of water bodies in the South West RBD. The measures required to address this are present in up to 100% 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	31 (100%)
	Mitigate/remediate diffuse pollution impacts on the receptor	0 (0%)
	Reduce diffuse pollution pathways (i.e. control entry to the water environment)	0 (0%)

Consideration of effects

Measures to manage diffuse pollution (at source) from rural areas are the most prevalent across the South West RBD and proposed in all of its constituent operational catchments. Measures for reducing diffuse pollution at source are considered overall to present a relatively low risk to SPA/SAC features with little variation across their qualifying habitats, species and birds.

Controls and mitigation

For this measure the potential hazards include disturbance (noise/visual), habitat loss and physical damage. Consenting/ regulatory mechanisms may vary, depending on the nature and location of measures.

In this context a key consenting process would be consultation with and prior assent from Natural England under the Countryside and Rights of Way Act 2000 for works/activities that could impact SSSIs directly or indirectly. Any public body seeking assent is required to undertake their own HRA. SSSI designation underpins the majority of European sites and 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.

At the project level, mitigation measures would typically include considering the timing of the activity to avoid sensitive periods this depending on the European sites and qualifying features potentially affected. In addition, mitigation measures would typically focus on developing and agreeing implementation methods to reduce disturbance, habitat loss and physical damage. Careful consideration would also need to be given to the relevant SIP for any European sites potentially affected in order to identify any priority issues related to water quality/diffuse pollution and whether any proposed actions might exacerbate these issues or conversely help to address the issue.

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 3% of water bodies in the South West RBD. The measures required to address this are present in up to 13% 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
Improve the natural flow and level of water	Control pattern/timing of abstraction	4 (13%)
	Water demand management	0 (0%)
	Improvement to condition of channel/bed and/or banks/shoreline	2 (6%)
	Use alternative source/relocate abstraction or discharge	0 (0%)

Consideration of effects

The types of measures proposed to improve the natural flow and level of water are variable in their potential for hazards and consequent risks to designated site qualifying features. Measures for controlling the pattern or timing of abstraction are considered to present a relatively low risk to designated site qualifying features and are proposed in only 4 operational catchments. By contrast, measures proposed to improve the condition of channel/bed and or banks/shoreline are considered to present a much higher risk to SPA/SAC features and reflect a similar pattern of risk to qualifying features as physical modifications. The majority of SAC features are considered more vulnerable, with the exception of dry woodland, heathland and grassland, vascular grassland plants and woodland mammals and invertebrates. SPA features are also likely to be more sensitive to this type of measure, particularly birds of coastal and estuarine habitats, lowland freshwaters and to a lesser extent lowland wet grassland. Across the RBD, however, these types of measures are very limited in their distribution and only proposed in 2 operational catchments.

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, were identified as having the greatest potential to lead to hazards, with potential risks to SAC /SPA 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.

Changes to control the pattern /timing of abstraction are subject to an application for a water abstraction licence and any modifications to existing licences require environmental permits from the Environment Agency. 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 are 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 1% of water bodies in the South West RBD. The measures required to address this are present in up to 19% 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 invasive non-native species	Mitigation, control and eradication (to reduce extent)	6 (19%)
	Building awareness and understanding (to slow the spread)	3 (10%)
	Early detection, monitoring and rapid response (to reduce the risk of establishment)	6 (19%)
	Prevent introduction	3 (10%)

Consideration of effects

Measures proposed to manage invasive non-native species, are considered generally to present a low risk to designated SAC and SPA qualifying features, with two of the four (SWMI required) measures screened out, having been determined as likely to have little or no effect on European Sites. The remaining two SWMI required measures have identical patterns of potential risk to SPA/SAC site features and proposed in less than a fifth of the RBD's operational catchments.

4.3 The highest risk SWMI required measures for the South West 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 channel/bed and/or banks/shoreline
- Improvement to condition of riparian zone and/or wetland habitats

Each of these measures fall within the 'physical modifications' SWMI, with 'improvement to condition of channel/bed and/or banks/shoreline' also falling under the 'changes to natural flow and levels of water' SWMI.

These SWMI required measures under 'physical modifications' are proposed across a high proportion of the operational catchments in the RBD. Measures for the removal/easement of barriers to fish migration, for example, are proposed in 28 of the 31 operational catchments in the RBD, whilst measures for the removal or modification of an engineering structure are proposed in 7 catchments. Just over half of the operational catchments (16 to 17) in the RBD have proposals for improving the condition of the channel/bed and or banks/shoreline in addition to measures for improving the riparian zone and/or wetland habitats. Under the SWMI required measure 'changes to natural flow and levels of water', the similar measure for 'improvement to condition of channel/bed and/or banks/shoreline' is proposed in only two operational catchments.

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 South West RBD are highlighted in table 5, below.

The qualifying **habitat groups** considered to be most sensitive to the potential hazards arising from these types of measures comprise:

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

Of these qualifying habitats the most frequently occurring are fens and wet habitats, which are present in 20 of the designated (SAC/Ramsar) sites within the RBD. The other habitat types have similar levels of representation and occur in 10 to 15 of the designated sites (SAC/Ramsar) within the RBD.

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

RBMP Measures	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
Removal or easement of barriers to fish migration	28	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Removal or modification of engineering structure	7	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Improvement to condition of channel/bed and/or banks/shoreline	16/2	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Improvement to condition of riparian zone +/- wetland habitats	17	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Habitats	No. of occurrences in RBD											
Fens and wet habitats not acidification sensitive	20	✓	✓		✓	✓	✓		✓	✓	✓	✓
Riverine habitats	11	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Standing waters not acidification sensitive	10	✓	✓	✓	✓		✓		✓	✓	✓	✓
Estuarine and intertidal habitats	15	✓	✓			✓	✓		✓	✓	✓	✓
Species												
Anadromous fish	15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-migratory fish and invertebrates of rivers	12	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Mammals of riverine habitats	12	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Amphibia	15	✓	✓			✓	✓		✓	✓	✓	✓
Bird Species												
Birds of lowland freshwaters & their margins	21	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Birds of coastal habitats	19	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Birds of estuarine habitats	19	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

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.

These qualifying species have similar levels of occurrence across the designated (SAC/Ramsar) sites within the RBD and represented in 12 to 15 designated sites.

Within the RBD, the SPA/Ramsar **bird species groups** with the highest level of occurrence are:

- birds of lowland freshwaters and their margins
- birds of coastal and estuarine habitats.

Overall, these groups of bird species are the most commonly occurring qualifying feature in the RBD, occurring in 19 to 21 designated (SPA/Ramsar) sites in the RBD. They are also considered to be particularly vulnerable to the range of hazards that could result from the identified measures: 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 the level of the South West RBD, 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, which reflects the proposals and the particular sites and features that could be affected, should be identified as part of the project level HRA process in consultation with Natural England. This should take place as early as possible in a project's appraisal and design so that that mitigation measures can be incorporated as part of the initial consideration of options, detailed design, construction and operation/maintenance. In this way the mitigation hierarchy can be effectively applied throughout all stages of the project cycle seeking to avoid/remove potential adverse effects in the first instance and then aiming to reduce potential adverse effects through appropriate site specific mitigation measures.

Mitigation of risks to bird species

With regard to the groups of commonly occurring bird species in the RBD that have been identified as particularly vulnerable to the hazards arising from the highest risk SWMI required measures, project-level mitigation would typically consider potential impacts associated with the construction and operation/presence of the proposed project/measure and how these might affect (directly or indirectly) the qualifying features of a particular designated site and, where necessary, its wider surrounding area.

In order to determine the likely implications of a project / measure for birds of lowland freshwater, coastal and estuarine habitats and to identify appropriate mitigation measures, it would be particularly important at the project level to review and understand the distribution and ecology of a site's qualifying bird species. This information may be available from existing data sources and surveys, but may also need to be updated and or expanded through additional site surveys depending on the site, location, scale and complexity of a proposed project/measure. Within the South West RBD these spatial and temporal variations would be particularly important to consider for the complexity of habitats typically associated with its coastal and estuarine sites. Qualifying breeding birds such as terns utilise areas of shingle/sand, whilst extensive areas of inter-tidal mudflats and sandflats provide important feeding and roosting areas for breeding as well as assemblages of overwintering and migratory water birds, together with adjacent habitats such as saltmarsh, freshwater wetlands and coastal/floodplain grazing marsh.

Construction activities associated with a project/measure could result in disturbance to bird populations through noise as well as visual disturbance. To avoid potential disturbance to qualifying birds species a project's mitigation strategy should seek to avoid commencing works during sensitive periods, such as the breeding season and the main period for overwintering or migratory passage 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. In the South West RBD sites such as the Severn and Exe estuaries, Poole Harbour and the Somerset Levels and Moors, are designated due to regularly supporting at least 20,000 waterfowl and avoiding construction activities during the key overwintering period (October to March) should be considered. In addition to this it would be necessary to consider other potentially sensitive periods associated with a site's assemblage of bird species as well as bird species that are a specific qualifying feature. In the case of the Severn Estuary, for example, its internationally important assemblage of

water birds includes significant numbers of migrant waders, such as Ringed Plover, on passage during the Spring and Autumn up the west coast of Britain.

In addition to the general timing of construction activities, project-level mitigation to avoid or reduce potential disturbance to bird species through noise or visual intrusion could include: the use of site screening and minimising use of artificial lighting or night time working; establishing appropriate buffer zones within which no works or access would be allowed; restricting the length of time when works on a site can take place; and employing good working practices on-site as for example minimising activities capable of producing noise and using low noise/muffled plant and machinery. Early consultation with Natural England would enable local knowledge of the sites and wider areas of usage by qualifying bird assemblages present and the functioning habitats on which they depend.

Mitigation of risks to habitats

Proposed projects/measures could have potential direct and indirect impacts on the habitats that make up the qualifying features of the European designated sites. This may be through direct habitat loss or physical damage, or indirectly resulting from changes in physical processes such as changes in water levels, flow or velocity regime. These changes in regime can in turn lead erosion and deposition, or potential changes in salinity in marine environments, which can potentially affect the type of habitats present as well as their extent, diversity and species composition. Proposed measures may also serve to increase competition from non-native invasive species through accidental introduction or facilitating their spread, which in turn could have implications for the habitat structure / diversity, or the species which depend on them.

With respect to potential 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 the development of site sensitive construction techniques, such as avoiding the use of heavy plant in particular areas.

Potential changes in physical processes, such as water levels, flows and velocities as well as potential changes in salinity and water quality would need to be considered at the earliest stage at the project level. Proposals, such as the removal of a structure or existing barrier, may need to be subject to modelling to determine the likelihood and or extent of any changes both upstream and downstream of the project site and potential implications for habitats that support qualifying species. Specific investigations may also be needed, such as confirming whether there is a risk that removing an existing structure/barrier could serve to mobilise sediments that might be historically contaminated and of risk to bird species and their food sources. Mitigation may include refinement of a project's design and the programme for implementation so to avoid significant changes in the existing regime and or allow for a staged approach to the works to enable valued habitats such as saltmarsh to re-establish. During construction, mitigation measures such as pollution prevention procedures may also be appropriate to address potential temporary increases in siltation, sedimentation and turbidity.

4.3.3 Example of mitigation

The river restoration works at Upavon within the Upper Avon is an example of a site specific project delivered in the context of the South West RBMP (cycle 1). For the majority of its length the River Avon and its tributaries are designated as the River Avon System Site of

Special Scientific Interest (SSSI) and River Avon SAC. The river restoration works at Upavon form part of a wider programme of restoration works on the River Avon that seek to contribute to restoring favourable condition with the River Avon System SSSI and SAC, and to work towards achievement of Good Ecological Status to comply with WFD targets and objectives. The programme of restoration works has been informed by a strategic and project level environmental assessment process led by the Environment Agency. At the strategic level the programme of works for the whole of the River Avon and its tributaries is set out in an overarching Strategic Framework for the Restoration of the River Avon System together with the supporting River Avon Appraisal and Design Package that develops and prioritises site specific projects for each of the river's reaches. The details of each site specific project, such as the works at Upavon are also documented in Detailed Design Notes that set out the detailed design of the preferred option, the environmental impact assessment of the works and environmental opportunities. Site specific projects are also supported by a Constraints Plan and Environmental Action Plan.

The restoration objectives at Upavon were to improve floodplain connectivity and flow diversity, reduce siltation and encourage the growth of macrophytes such as *Ranunculus fluitantis*, through works involving the removal of a weir, bank re-grading, tree planting and narrowing the channel by using large woody debris and reconnecting a relict channel as a backwater habitat. All works were classed as improvement works under the Environmental Impact Assessment (EIA) (Land Drainage Improvement Works) Regulations 1999 and screened by the Environment Agency to determine whether a statutory EIA was required. The works at Upavon were screened as 'low risk' as minimal adverse impacts were anticipated. Due to the nature and location of the proposals assent was required from Natural England under the Countryside and Rights of Way Act 2000, as well as an assessment under the Habitats Regulations 2010. The HRA involved an assessment of likely significant effects that was completed by the Environment Agency in consultation with Natural England. Natural England agreed with the HRA conclusion that the project to restore the reach at Upavon was unlikely to have significant effect on the integrity of the River Avon SAC. Project-level mitigation measures to address potential hazards to sensitive features, including protected fish species, invertebrates and aquatic plant communities, were included in a project specific Environmental Action Plan and Method Statement agreed with Natural England. This identified site specific mitigation measures such as silt traps/silt curtains/floating booms to avoid sediment movement downstream; minimising in-channel machine working; agreeing designs and ecologically sensitive work programme; best practice guidance for the management of invasive species.

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 9 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 13 measures for water bodies across the South West river basin district. 12 of these measures comprise mitigating / remediating point source impacts on receptors, 1 measure targets the pattern/timing of abstraction. The investment programmes have been subject to HRA and it will be important to consider this assessment when implementing the measures. For the purposes of this strategic assessment, a consistent approach has been adopted to assessing all elements of the plan. The HRA of the investment programme has therefore not been specifically considered.

There are 23 measures to secure additional outcomes for the environment. Of these, 14 measures are to improve modified habitat, specifically through removal or easement of barriers to fish migration; 5 measures are to control or manage point source inputs, through mitigating / remediating point source impacts on receptors; and 1 measure is to control or manage diffuse source inputs, by reducing diffuse pollution at source. In addition, there are 3 national measures to control and manage abstraction, targeting 10 locations in the South West river basin district; the nature of these measures, e.g. whether controlling the pattern / timing of abstraction or improving the condition of channel / bed / banks, is not defined.

Potential risks from this programme to the SPA /SAC qualifying features vary depending on the nature of the measures. The measures required to mitigate / remediate point source impacts on receptors are considered to present a relatively low risk to European sites and features, as is the measure to reduce diffuse pollution at source.

The measures to remove or provide easement of barriers to fish migration, which make up the majority of the programme, are considered to present a higher risk, with water-dependent qualifying features more vulnerable to the potential hazards. The nature, scale and details of implementation of these measures are not included in the plan, although the potential hazards, such as disturbance, habitat loss, physical damage and siltation / turbidity, are likely to arise principally during construction, and therefore likely to be short term in nature.

Upstream / downstream water-dependent habitats are considered susceptible to these measures, in particular the riverine, fens, bogs and wet habitats and standing waters, and also potentially coastal, estuarine and inter-tidal habitats where measures are to be implemented in coastal / estuarine locations. Anadromous fish, mammals of riverine habitats and birds of lowland freshwater and their margins and coastal / estuarine birds are the qualifying fauna likely to be more susceptible to such at most risk.

Any changes in water levels, flows / velocities and physical regime, and potential water quality changes, maybe temporary in nature or more long term due to changes in behaviour of the flows/sedimentary regime due to the removal of a structure or change to profile of the riparian zone/channel / banks/or shoreline of the sensitive site features. However, since the measures are proposed to improve habitat / connectivity and supporting physical processes, protected habitats and species, fish in particular, are expected to benefit overall.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. For measures addressing point source pollution, this is likely to be the environmental permits from the Environment Agency under the Environmental Permitting Regulations. For measures involving any physical works / modifications on or near a main river⁶, flood defence consent from the Environment Agency and / or planning permission from the local planning authority would trigger the requirement for project level HRA where European sites were potentially affected.

Construction-related mitigation at the project level would consider sensitive timings and construction methods of working. For example the use of screening and sensitive working methods to minimise visual and noise disturbance to sensitive species, and also provide segregation / prevention of construction activity on or near sensitive habitats tailored to the European sites and qualifying features potentially affected . Appropriate timing of works would reduce potential risks by avoiding ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Such mitigation would be informed by the project level HRA in order to build mitigation in to the design of the scheme and the methods of working.

Mitigation measures would typically focus on developing and agreeing implementation methods to reduce disturbance, habitat loss and physical damage. Careful consideration would also need to be given to the relevant Site Improvement Plan (SIP) for any European sites potentially affected in order to identify any priority issues relating to water quality/diffuse pollution and whether any proposed actions might exacerbate these issues, or conversely help to address the issue.

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.

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 exact location of measures and their outcomes are not yet known, it is not possible to predict the likely impacts on European

⁶ 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.

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 South West 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

The RBMP measures from the flood risk management investment programme all relate to securing additional outcomes for the environment, and all target improving modified habitats, through the removal or modification of engineering structures; improvement to condition of channel bed and or banks shoreline; and improvement to condition of the riparian zone and/or wetland habitats. In total there are 24 such measures proposed across the South West RBD.

The hazards are broadly similar across the different SWMI required measures of this programme, reflecting potential changes in water levels, flows/velocities and physical regime, disturbance, loss of habitat, physical damage and potential changes to water quality.

As such 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.

Given the focus of these measures, SAC habitats that are considered particularly susceptible to physical modifications are riverine, fens, bogs and wet habitats and standing waters, and also coastal, estuarine and intertidal habitats and to a lesser extent submerged marine habitats. Of these habitats, the South West RBD has a particular high occurrence of coastal habitats (sensitive to abstraction) as well as fens, bogs and wet habitats. Many of the SAC qualifying species are considered susceptible to proposed measures for physical modifications. These include anadromous fish, fish and invertebrates of rivers, mammals of river habitats and amphibia, in addition to vascular plants of aquatic habitats and vascular and lower plants and invertebrates of wet habitats. This latter category of qualifying feature has the highest level of representation with the RBD reflecting the high occurrence of fen, bog and wet habitats.

SPA bird populations such as birds of lowland freshwaters and their margins and birds of coastal and estuarine habitats are considered to be particularly susceptible to measures proposing physical modifications. All these qualifying bird species have high levels of occurrence in the RBD. Birds of lowland wet grassland and uplands also show some degree of sensitivity to these types of measures, although they are generally less frequently occurring in the RBD. In general, the sensitivities in relation to birds are more likely to relate to hazards arising from construction activities, therefore be of a short term nature and less likely once the construction phase of a project has been completed.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. This would include planning permission where significant schemes were involved, and/or flood defence consent from the Environment Agency for any physical works / modifications on or near a main river⁷. 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. For any marine works, i.e. where inter-tidal habitat creation or improvement is proposed, any measures involving works below the mean high water spring (MHWS) tidal limit would require a marine licence, which would also trigger the requirement for project level HRA where European sites were potentially affected.

The main mitigation for these measures relate to the avoidance of working on, or in proximity to sensitive habitats; the use of fencing and screening to minimise visual and noise disturbance to sensitive species, and also segregation / prevention of construction activity on or near sensitive habitats. Appropriate timing of works would reduce potential risks by avoiding ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. 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.

4.4.2.5 Catchment level grant in aid funded improvements

The Catchment level Grant in Aid (GiA) funded improvements will deliver 23 measures. 5 of the measures are national and 18 proposed specifically for the South West RBD, identified as securing additional outcomes for the environment. Only one of the national measures relates to physical actions on the ground - the management of invasive non native species, considered to present a relatively low risk to site features (the other measures comprise nationally created roles to work on delivering outcomes nationally).

The RBD specific measures include 7 measures for management of pollution for rural areas, 9 measures to undertake physical modification to improve habitat, a measure to control non native invasive species and a measure to manage pollution from towns, cities and transport.

The measure to manage pollution from towns and cities and transport and 4 of the measures to manage pollution from rural areas will not directly lead to physical interventions on the ground (they relate to the development of roles within partnerships, studies and /or community engagement / education).

The remaining measures to manage pollution from rural areas and to control non-native invasive species are considered generally to present a low risk to designated SAC / SPA / Ramsar qualifying features.

The measures to improve modified physical habitats potentially generate a wider range of hazards and therefore potentially present higher risks, subject to their proximity to European sites and sensitive features. The hazards are likely to arise principally during their construction, and as such are likely to be short term in nature. The risks during operation

⁷ 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.

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. Susceptible habitats and species to such physical modifications are as for those identified under flood risk management (see section 4.4.2.4 above).

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. This would include planning permission where significant schemes were involved; flood defence consent from the Environment Agency for any physical works / modifications on or near a main river; and marine licence for any works below MHWS.

Mitigation for these measures would consider the avoidance of working on / in proximity to sensitive habitats; use screening to minimise disturbance to sensitive species where appropriate; and also segregation / prevention of construction activity on or near sensitive habitats. Timing of construction works would also reduce potential risks by avoiding ecologically sensitive (breeding or migratory) periods. 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.

4.4.2.6 Abandoned metal and coal mine programmes

The RBMP measures from the abandoned metal and coal mine programme are identified as securing additional outcomes for the environment. The 5 measures within the RBD involve mine water discharge remediation /treatment through the reduction in point source pollution at source. There are investigations underway or planned for most of the rivers in the RBD affected by metal mines, but no further measures comprising physical interventions are proposed at this stage.

The measures are considered to generally present a relatively low risk to European sites and features, with potential hazards such as disturbance, physical damage / habitat loss likely to be associated with the physical works to construct any mine water treatment / remediation scheme and measures to reduce diffuse metal inputs, if in proximity to a European site. These hazards and potential risks, where in proximity to European sites, would be short term in nature and manageable through construction mitigation. The risks during operation are considered likely to be minimal, since the measures are proposed to improve downstream water quality status, and therefore also benefit water-dependent European sites / protected areas. There may be rare exceptions where the flora of European sites is adapted to the water quality from mine water discharges, and water quality improvements may lead to adverse effects, but this is considered to be an exception, and is best addressed at the site / project level.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. For measures involving any physical works / modifications on or near a main river, flood defence consent from the Environment Agency would be required; planning permission from the local planning authority would also trigger the requirement for project level HRA where European sites were affected. If projects / schemes fell under Permitted Development powers but European sites were potentially affected, schemes would require planning permission supported by appropriate assessment, unless no likely significant effect could be

demonstrated. Where these schemes / measures affect SSSIs (which underpin European site designations) the prior assent from Natural England would be required, which may also trigger the need for scheme-level HRA.

Any mitigation is likely to be primarily construction-related, considering the need for avoidance of working on or in proximity to sensitive habitats; the use of screening and sensitive working methods to minimise visual and noise disturbance to sensitive species, and also provide segregation / prevention of construction activity on or near sensitive habitats. Appropriate timing of works would reduce potential risks by avoiding ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Mitigation for any potential operational effects is expected only to be necessary in exceptional circumstances where improved water quality may adversely affect the flora of European sites in proximity / downstream from mine water discharges. Such site-specific mitigation is best addressed at the project level.

4.4.2.7 *Water resources sustainability measures*

The water resources sustainability measures comprise 3 measures proposed across the South West RBD, all of which comprise controlling the pattern and/or timing of abstraction.

Measures required to control the pattern or timing of abstraction are considered to present a relatively low risk to designated SAC and SPA / Ramsar sites and their features. Some European site features are considered more sensitive to these measures, with water-dependent features more susceptible to water levels and changes in flow regimes than non water-dependent features. Due to the nature of the measures, risks are likely to occur during operation, with little or no construction works likely to be required to implement abstraction regime changes. The risks during operation are generally considered likely to be minimal, particularly 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

The local measures from the catchment partnerships all relate to securing additional outcomes for the environment. In total there are 26 such measures proposed across the South West RBD.

The local measures from the catchment partnerships will deliver multiple benefits and represent a wide spectrum of the SWMI required measures for the RBD. The measures address diffuse and point source pollution from agriculture and domestic/ urban sources, sediment and flow pathways; reduce siltation all with the aim of improving water quality for the benefit of habitats and species. The 'Upstream Thinking Programme 2015—20' is just one example which is taking place across a number of the operational catchments of the RBD. This programme will work with South West Water for the reduction of pesticides and nutrient inputs. Other examples include the Poole Harbour Diffuse Pollution Reduce Plan and the Sediment Pathways Project on the Hampshire Avon. The programmes and their measures are considered to present low risk to European sites, and will primarily benefit, particularly water-dependent, European sites through the improvements in water quality.

The catchment partnerships will also deliver a number of physical modifications for the improvement of habitat measures. This includes river restoration actions such as the creation or restoration of riffles and in channel habitats to increase diversity, marginal habitat management, and floodplain restoration or reconnection.

The hazards identified for physical modifications are anticipated to be similar to those identified for flood risk management (see section 4.4.2.4.), as would the consenting regimes that would trigger the need for project level HRA, where potential effects on European sites are identified.

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
Drinking water protected areas - surface water and groundwater	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.
Economically significant species (shellfish waters)	Shellfish water action plans have been produced for all designated shellfish waters, which include measures aiming to observe relevant microbial shellfish flesh standards.
Recreational waters (bathing waters)	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).
Nutrient sensitive areas (Urban Waste Water Treatment Directive)	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.
Nutrient sensitive areas (nitrate vulnerable zones)	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.
Natura 2000: Water dependent Special Areas of Conservation (SACs) and Special Protection Areas for Wild Birds (SPAs)	Natural England has developed site improvement plans (SIPs) for water dependent sites. SIPs provide an overview of issues affecting the site condition; 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 South West 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 South West 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 South West 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 South West 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 RBMP objectives. However, the plans may also provide opportunities to co-deliver actions identified within the Site Improvement Plans (SIPs) for the South West RBD to achieve favourable conservation status for water dependent European sites 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 South West RBMP

Name of Plan	Potential in-combination effects with the RBMP on European sites
Flood Risk Management Plan (FRMP) for the South West 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 water dependent European sites and FRMP measures focused on the water environment, these sites are likely to be more susceptible to in-combination effects. Such in-combination effects could include construction impacts, such as noise and visual disturbance, or impacts arising from operation such as changes to flows / water levels or the physical regime. The measures proposed in the South West FRMP may also provide opportunities for complementing those proposed in the RBMP and potentially deliver benefits for European Sites. Specific opportunities include measures promoting improved land management practices, upper catchment habitat creation, landfill protection, delivery of measures for heavily modified water bodies and catchment scale approaches.
South West Water, Wessex Water, Bristol Water, Sembcorp Bournemouth Water, Water Resource Management Plans	The RBMP and water resource management plans 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.
Local Authority Local Development Plans	Promotion of growth within local development plans, depending on location, may place pressure on both water dependent and non-water dependent European sites. Development activities arising from local plans 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. Some local authorities have planning frameworks to manage pressure on designated sites resulting from development. One such example is the Dorset Heathlands Planning Framework 2015-2020 which has been put together by south east Dorset Local Authorities to manage pressures on sensitive heathlands its purpose is to ensure that there is no net increase in urban pressures on the heaths as a result of additional residential development between 400 metres and five kilometres of heathland. Significant interactions with the South West 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.

Name of Plan	Potential in-combination effects with the RBMP on European sites
<p>Marine Strategy Framework Directive, South West (inshore) Marine Plan, South (inshore) Marine Plan</p>	<p>The South West (inshore) Marine Plan is not yet publicly available and in preparation. The South Inshore Marine Plan is further advanced in its preparation and the MMO expects to publish a consultation draft of the plan at the end of 2015, this supported by a HRA. The principles that will be applied to the marine plans are set out in the Marine Strategy Framework Directive (MSFD) and the UK Marine Policy Statement. The geographical scope of the MSFD is focused on marine / coastal waters; therefore any interactions with the RBMP are only likely to affect the European sites in the coastal / estuarine locations in the RBD. The MSFD 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. However, the MSFD also covers broader environmental aspects, such as noise, litter, and aspects of biodiversity, therefore is likely to complement objectives in the RBMP aimed at achieving favourable conservation status for European site protected areas. The UK Marine Policy Statement is the framework for marine planning and taking decisions about the marine environment, such as informing marine licensing decisions. High level objectives include living within environmental limits, ensuring a strong healthy and just society and achieving a sustainable marine economy. Marine Plans, as part of their objective of sustainable development, will help to implement measures for GES and therefore serve to complement the RBMP. Their objective for living within environmental limits is also considered to be compatible with the RBMP's objectives for European sites and improving their conservation status. Potential conflicts could arise, however, in connection with development, resource extraction and infrastructure activities enabled by the policy framework set out in the emerging plans.</p>
<p>Shoreline Management Plans (SMP 2):</p> <p>Rame Head to Hartland Point SMP2 [Cornwall and Isles of Scilly]</p> <p>Hartland Point to Anchor Head - SMP2</p> <p>Durlston Head to Rame Head SMP2 [South Devon Dorset]</p>	<p>The Shoreline management Plans (SMPs) set out a strategic view of how coastal flood risk should be managed in the future. Policy options typically applied include: no active intervention, hold the line, and management realignment. Impacts that could potentially arise as a result of the implementation of SMPs include:</p> <ul style="list-style-type: none"> • changes in the physical regime, flow or velocity regime and resulting in coastal or estuarine erosion or deposition and altered flooding regimes; • changes to water chemistry resulting from alternations in salinity or an increased risk of pollution from, for example, the flooding of landfill sites or other contaminated land; • habitat severance; • disturbance during construction or maintenance; and • habitat loss/physical damage as a result of coastal squeeze, sea level rise, the creation of new defences or conversely the retreat of the defence line. <p>With the exception of the Rame Head to Hartland Point SMP, the HRAs of the SMPs determined that it was not possible to conclude there will be no adverse effects to protected sites and the plans were progressed to a Statement of Case for imperative reasons of overriding public interest (IROPI) and submitted to the Defra Secretary of State. Apart from the Hartland Point to Anchor Head SMP2, the SMPs have subsequently been approved.</p>

Name of Plan	Potential in-combination effects with the RBMP on European sites
Hurst Spit to Durlston Head SMP2 [Poole and Christchurch Bays]	In the case of the Hartland Point to Anchor Head SMP2 and the Anchor Head to Lavernock Point SMP2 (Severn Estuary) (in the Severn RBD) a joint IROPI (Imperative Reasons of Overriding Public Interest) Statement of Case and compensatory habitat proposals for the SMPs has been prepared due to the overlap of the two SMPs with European sites. The Statement of Case is being considered by Defra and the Welsh Government. Pending sign off of the SMP it, nevertheless, provides a strategic direction for managing coastal flood risk, on the basis that it cannot be put into effect until more detailed appraisal and assessment has taken place on plans or projects arising out of this SMP to show it and they have met the requirements of the Habitats Regulations. Compensatory habitat will also be delivered through the Habitat Delivery Plan of the Severn Estuary Coastal Erosion and Flood Risk Management Strategy (SEFRMS) (see below).
Severn Estuary Flood Risk Management Strategy	<p>The emerging Severn Estuary FRMS has been developed as part of a strategic approach to the management of flood and coastal erosion. The Strategy is needed because climate change is expected to increase risk of tidal flooding. It responds to and further develops the broad policy options set out in the SMPs and is intended to provide a framework for the implementation of individual projects and schemes to manage coastal flooding and erosion risks over a period of 100 years. The HRA for the Strategy concluded that the following significant adverse effects on European sites cannot be ruled out:</p> <ol style="list-style-type: none"> 1. Habitat loss / damage to the Severn Estuary SAC / SPA / Ramsar, resulting from: <ul style="list-style-type: none"> • Coastal squeeze • Footprint of defences 2. Loss of supporting habitat to the Severn Estuary SAC / SPA / Ramsar and Somerset Levels and Moors SPA / Ramsar, resulting from: <ul style="list-style-type: none"> • Coastal squeeze • Footprint of defences 3. Loss of estuary form or function, affecting the Severn Estuary SAC / SPA / Ramsar and Somerset Levels and Moors SPA / Ramsar, resulting from loss of habitat / supporting habitat. <p>Consequently the preferred policy options are being progressed through a Statement of Case of Imperative Reasons of Overriding Public Interest and compensatory habitat requirements (these based on the assumption that sea level rises continue at the predicted rate). Priority habitat compensation schemes (to meet the first epoch of 0-20 years) have already been delivered near Stroat and the Steart Peninsula (South West RBD).</p>
National Park and Area of Outstanding Natural Beauty Management Plans	The purpose of National Park and AONB Management Plans is primarily to secure the conservation and enhancement of natural beauty, wildlife and cultural heritage, promote public enjoyment and understanding, whilst supporting the social and economic wellbeing of communities. Designated landscapes in the RBD encompass many different European Sites, including water dependent sites, which contribute to the areas' conservation interest, natural beauty and recreational value. In relation to the RBMP, National Park and AONB management plans typically incorporate compatible objectives for promoting sustainable development, conserving and enhancing biodiversity & natural resources (including the water environment), managing development and tackling climate change. The implementation of the management plans may offer opportunities to deliver RBMP objectives for water dependent European Sites.

6 Conclusion and future HRAs

This HRA has been carried out at the level of published detail in the 2015 updated South West 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 South West RBD

SOUTH WEST		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 EUROPEAN SITES in RBD (79)	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 channelled 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 channelled 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 Ctohmt	% of all Ops Ctohmt		
				28	7	16	17	11	4	2	3	19	0	0	6	3	0	0	4	2	3	6	6	3	31	0	0	10				
				90%	23%	50%	55%	35%	13%	6%	10%	61%	0%	0%	19%	10%	0%	0%	13%	6%	10%	19%	19%	10%	100%	0%	0%	32%				
Qualifying features																																
SAC (56)	Ramsar (9)	1.1 Fens and wet habitats not acidification sensitive*	Y	20	9	9	8	8	5	2	3	3	3	3	3	4	5	2	2	8	2	2	3	3	4	3	3	3				
		1.2 Bogs and wet habitats, acidification sensitive*	Y	23	6	6	6	6	5	2	3	3	3	3	3	3	5	2	2	6	2	2	3	3	3	3	3	3				
		1.3 Riverine habitats	Y	11	10	10	9	9	6	2	3	3	3	3	3	4	5	2	2	9	2	2	3	3	4	3	3					
		1.4 Standing Waters acidification sensitive*	Y	12	7	7	7	4	1	2	2	2	2	2	2	1	3	4	2	2	7	1	1	2	1	3	2	2				
		1.5 Standing waters not acidification sensitive*	Y	10	9	9	8	8	5	1	2	2	2	2	2	1	3	4	2	2	8	1	1	2	1	3	2	2				
		1.6 Dry woodlands*	N	23	3	3	2	2	2	1	2	2	2	2	2	2	2	0	0	2	1	1	2	2	2	2	2	2				
		1.7 Dry Grassland*	N	19	3	3	2	2	2	1	2	2	2	2	2	1	2	2	0	0	2	1	1	2	1	2	2	2				
		1.8 Dry heathland habitats*	N	27	2	2	2	2	2	1	2	2	2	2	2	1	2	2	0	0	2	1	1	2	1	2	2	2				
		1.9 Upland*	N	0	4	4	4	4	4	2	3	3	3	3	3	3	4	1	1	4	2	2	3	3	3	3	3	3				
		1.10 Coastal habitats*	N	18	6	6	5	5	4	2	3	3	3	3	3	2	3	3	0	0	5	2	2	3	2	3	3	3				
		1.11 Coastal habitats sensitive to abstraction*	Y	23	6	6	6	6	3	1	2	2	2	2	2	2	3	3	1	1	6	1	1	2	2	3	2	2				
		1.12 Estuarine and intertidal habitats	Y	15	8	8	8	8	5	2	3	3	3	3	3	2	4	5	2	2	8	2	2	3	2	4	3	3				
1.13 Submerged marine habitats	Y	14	5	5	5	5	2	1	1	1	1	1	1	1	2	2	1	1	5	1	1	1	1	2	1	2	1					
SPA (14)		2.1 Vascular plants of aquatic habitats	Y	9	7	7	7	7	4	1	2	2	2	2	2	1	3	4	2	2	7	1	1	2	1	3	2	2				
		2.2 Vascular plants, lower plants and invertebrates, we	Y	23	7	7	6	6	4	1	2	2	2	2	2	2	3	4	2	2	6	1	1	2	2	3	2	2				
		2.3 Vascular plants, grassland	N	7	3	3	3	3	2	1	2	2	2	2	2	1	2	2	0	0	3	1	1	2	1	2	2	2				
		2.4 * Liverworts – Western rustwort	Y	15	3	3	3	3	3	1	2	2	2	2	2	1	2	3	1	1	3	1	1	2	1	2	2	2				
		2.5 Anadromous fish	Y	15	10	10	10	10	6	2	3	3	3	3	3	2	4	5	2	2	10	2	2	3	2	4	3	3				
		2.6 Non-migratory fish and invertebrates of rivers	Y	12	9	9	10	10	6	2	3	3	3	3	3	2	4	5	2	2	10	2	2	3	2	4	3	3				
		2.7 Invertebrates of wooded habitats	N	1	2	2	2	2	2	1	2	2	2	2	2	1	2	2	0	0	2	1	1	2	1	2	2	2				
		2.8 Mammals wooded habitats	N	8	3	3	3	3	3	2	3	3	3	3	3	2	3	3	0	0	3	2	2	3	2	3	3	3				
		2.9 Mammals of riverine habitats	Y	12	9	9	10	10	6	2	3	3	3	3	3	3	4	5	2	2	10	2	2	3	3	4	3	3				
		2.10 Amphibia	Y	15	8	8	8	8	5	2	3	3	3	3	3	3	4	5	2	2	8	2	2	3	3	4	3	3				
		2.11 Coastal plants	N	7	5	5	5	5	4	1	2	2	2	2	2	2	4	2	2	5	1	1	2	2	2	2	2	2				
		2.12 Marine mammals	Y	11	4	4	5	5	2	2	2	2	2	2	2	2	3	2	0	0	5	2	2	2	2	3	2	2				
SPA (14)		3.1 Birds of uplands	N	14	5	5	5	5	4	2	3	3	3	3	3	4	1	1	5	2	2	3	3	3	3	3	3					
		3.2 Birds of woodland & scrub	N	4	3	3	3	3	3	2	3	3	3	3	3	2	3	3	0	0	3	2	2	3	2	3	3	3				
		3.3 Birds of lowland heaths & brecks	N	12	3	3	3	3	3	2	3	3	3	3	3	2	3	3	0	0	3	2	2	3	2	3	3	3				
		3.4 Birds of lowland wet grassland	Y	17	7	7	7	7	6	2	3	3	3	3	3	3	5	2	2	7	2	2	3	3	3	3	3	3				
		3.5 Birds of lowland dry grassland	N	3	3	3	3	3	3	2	3	3	3	3	3	2	3	3	0	0	3	2	2	3	2	3	3	3				
		3.6 Birds of lowland freshwaters & their margins	Y	21	9	9	10	10	6	2	3	3	3	3	3	3	4	5	2	2	10	2	2	3	3	4	3	3				
		3.7 Farmland Birds	N	15	4	4	4	4	4	2	3	3	3	3	3	3	4	1	1	4	2	2	3	3	3	3	3	3				
		3.8 Birds of coastal habitats	Y	19	9	9	10	10	6	2	3	3	3	3	3	3	4	5	2	2	10	2	2	3	3	4	3	3				
		3.9 Birds of estuarine habitats	Y	19	9	9	10	10	6	2	3	3	3	3	3	3	4	5	2	2	10	2	2	3	3	4	3	3				
		3.10 Birds of open sea and offshore rocks	Y	8	3	3	4	4	3	2	3	3	3	3	3	2	3	3	0	0	4	2	2	3	2	3	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 South West 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 South West RBD

European site features (grouped) in the South West 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"> • 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. 	<ul style="list-style-type: none"> • Planning permission from local planning authority under the Town & Country Planning Act. • The Town and Country Planning (General Permitted Development) Order 1995 (as amended). • 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). • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. • Ordinary Watercourse Consent from either local flood authority or Internal Drainage Board (IDB) for work on or near all other watercourses that aren't main rivers. • Marine Licence from the Marine Management Organisation (MMO) for works below the mean high water spring tidal limit. • For each of the above consenting processes, there is a requirement for HRA where designated European sites are potentially affected. 	<ul style="list-style-type: none"> • 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. • Avoidance of working on, or in proximity to sensitive habitats, wherever possible. • Use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities. • 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). • 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. • Consider location and extent of activity, sensitive timing and methods of construction to minimise effects on designated habitats and species. • Seek assent from Natural England in advance of works within or affecting SSSIs (which underpin European sites). • 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. • Appropriate methods of working including pollution prevention and control measures. • 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.

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"> • Disturbance (noise or visual) • Habitat loss • Physical damage. 	<ul style="list-style-type: none"> • Planning permission from local planning authority under the Town & Country Planning Act. • The Town and Country Planning (General Permitted Development) Order 1995 (as amended). • Water Resources Act 1991. • Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010. 	<ul style="list-style-type: none"> • Consider appropriate methods of working including pollution prevention and control measures. • Avoidance of working on, or in proximity to sensitive habitats, wherever possible. • 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). • Use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities. • 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. • 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.
Manage pollution from towns, cities and transport	<ul style="list-style-type: none"> • Disturbance (noise or visual) • Habitat loss • Physical damage • Surface water flooding changes • Turbidity. 	<ul style="list-style-type: none"> • Planning permission from local planning authority under the Town & Country Planning Act. • The Town and Country Planning (General Permitted Development) Order 1995 (as amended). • Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010. 	<ul style="list-style-type: none"> • Guidance within 'Port development and dredging in Natura 2000 estuaries and coastal zones' (European Commission guidance). • Guidance within 'Design Manual for Roads and Bridges', volume 11 environmental assessment, section 4. • Consider appropriate methods of working including pollution prevention and control measures. • Avoidance of working on, or in proximity to sensitive habitats, wherever possible. • 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). • 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.

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"> • Change in water levels or table • Changes in flow or velocity regime • Changes in physical regime • Disturbance (noise or visual) • Habitat loss • Killing/injury or removal of fish or other animals • Physical damage • Salinity • Siltation • Turbidity. 	<ul style="list-style-type: none"> • Flood Defence Consent from the Environment Agency for work on or near a main river, flood or sea defences. • 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. • Marine Licence from the Marine Management Organisation (MMO) for works below the mean high water spring tidal limit. • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. • 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).. • Impoundment licence from the Environment Agency (as for abstraction licence). • Drought Permits and Orders (Water Resources Act 1991, Environment Act 1995). • Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010. 	<ul style="list-style-type: none"> • 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. • Consider use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities. • Consider appropriate methods of working including pollution prevention and control measures. • 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). • 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. • 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. • 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.
Managing invasive non-native species	<ul style="list-style-type: none"> • Disturbance (noise or visual) • Physical damage. 	<ul style="list-style-type: none"> • Operations affecting SSSI's require assent from Natural England (Wildlife and Countryside Act 1981).Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. • The Wildlife and Countryside Act 1981. • Environmental Protection Act 1990. • The Salmon and Freshwater Fisheries Act 1975. 	<ul style="list-style-type: none"> • 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). • Appropriate methods and monitoring to reduce risk of unintentional spread of invasive non-native species, during management / control activities. • 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.

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
			<ul style="list-style-type: none"> • Consider location and extent of management activity, sensitive timing and methods of management to minimise effects on designated habitats and species. • 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.
Manage pollution from rural areas	<ul style="list-style-type: none"> • Disturbance (noise or visual) • Habitat loss • Physical damage • Surface water flooding changes • Turbidity. 	<ul style="list-style-type: none"> • Operations affecting SSSI's require assent from Natural England (Wildlife and Countryside Act 1981). • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. 	<ul style="list-style-type: none"> • Consider guidance contained within 'Farming for Natura 2000' - Guidance on how to support Natura 2000 farming systems to achieve conservation objectives (European Commission 2014). • 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). • 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. • 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.
Manage pollution from mines	<ul style="list-style-type: none"> • Disturbance (noise or visual) • Habitat loss • Physical damage. 	<ul style="list-style-type: none"> • The Coal Industry Act 1994. • The Energy Act 2011. • Planning permission from local planning authority / minerals planning authority under the Town & Country Planning Act. • Environmental permit under the Environmental Permitting Regulations (England and Wales) 2010. • The Town and Country Planning (General Permitted Development) Order 1995 (as 	<ul style="list-style-type: none"> • Seek assent from Natural England in advance of works within or affecting SSSIs (which underpin European sites). • Consider whether any specific European site features are adapted to unique water quality determinands, for which mine remediation may result in changes to. • Adhere to the Mine Water Treatment Schemes Code of Practice (Coal Authority and Planning Officers Society, 2012). • 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

Measure Type	Potential hazards*	Legal / consenting processes	Specific mitigation / mitigation approaches for implementation of measures
		amended). <ul style="list-style-type: none"> • Water Resources Act 1991. 	screening opinion as required. <ul style="list-style-type: none"> • The LPA / MPA may need to conduct an appropriate assessment if it is possible that a minewater 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. • 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.

* 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>Acidification Could the action lead to activities that result in releases of sulphur dioxide, oxides of nitrogen and ammonia that cause acidification?</p>
<p>Change in water levels or table Could the action lead to changes in the water levels or water table?</p>
<p>Changed water chemistry Could the action lead to significant changes in water chemistry (BOD, COD, organic and inorganic pollutants) in the short and long term?</p>
<p>Changes in flow or velocity regime 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>Changes in physical regime 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>Competition from non-native species 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>Disturbance (noise or visual) 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>Entrapment Could the action lead to impingement or entrapment of fish or other species.</p>
<p>Habitat loss 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>Killing/injury or removal of fish or other animals Could the action cause the killing/injury or removal of fish or other animals?</p>
<p>Nutrient enrichment 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>

pH
Could the action lead to changes in pH of a water body?
Physical damage
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?
Predation
Could the action encourage predators?
Reduced dilution capacity
Could the action lead to reduced dilution capacity of a water body?
Salinity
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.
Siltation
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.
Smothering
Could the action lead to physical damage caused by the deposit of solid material from the air?
Surface water flooding changes
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.
Thermal regime changes
Could the plan lead to a mean temperature change of more than 0.2°C in a water body?
Toxic contamination
Could the action lead to releases of substances that could be harmful to flora and fauna?
Turbidity
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 South West RBD

Site ID	Name of Site	SPA, SAC, Ramsar	Area (ha)*
UK9011091	Avon Valley	SPA #	1351
UK0012585	Beer Quarry and Caves	SAC	31
UK0030091	Blackstone Point	SAC #	8
UK0030095	Bracket's Coppice	SAC #	54
UK0012570	Braunton Burrows	SAC #	1340
UK0030098	Breney Common and Goos & Tregoss Moors	SAC #	824
UK0012795	Carrine Common	SAC #	46
UK0030115	Cerne & Sydling Downs	SAC	372
UK0017076	Cheshil & the Fleet	SAC #	1635
UK9010091	Cheshil Beach & the Fleet	SPA #	747
UK0016373	Chilmark Quarries	SAC	10
UK0030349	Crookhill Brick Pit	SAC #	5
UK0030329	Crowdy Marsh	SAC #	93
UK0012679	Culm Grasslands	SAC #	774
UK0012929	Dartmoor	SAC #	23198
UK0030130	Dawlish Warren	SAC #	59
UK9010101	Dorset Heathlands	SPA	8186
UK0030038	Dorset Heaths (Purbeck and Wareham) and Studland Dunes	SAC #	2231
UK0019857	Dorset Heaths	SAC #	5720
UK9010121	East Devon Heaths	SPA #	1124
UK0012602	East Devon Pebblebed Heaths	SAC #	1124
UK9010081	Exe Estuary	SPA #	2367
UK0030148	Exmoor & Quantock Oakwoods	SAC #	1895
UK0030040	Exmoor Heaths	SAC #	10700
UK0013112	Fal & Helford	SAC #	6363
UK0012550	Fontmell & Melbury Downs	SAC	263
UK0012549	Godrevy Head to St Agnes	SAC #	128
UK0012770	Great Yews	SAC	29
UK0030168	Hestercombe House	SAC	0.1
UK0012883	Holme Moor & Clean Moor	SAC #	8
UK0030350	Holnest	SAC #	55
UK0019861	Isle of Portland to Studland Cliffs	SAC #	1446
UK0030064	Lower Bostraze and Leswidden	SAC	2
UK9020288	Isles of Scilly	SPA #	401
UK0013694	Isles of Scilly Complex	SAC #	26849
UK0013114	Lundy	SAC #	3071
UK9020289	Marazion Marsh	SPA #	55
UK9011031	New Forest	SPA	2799
UK0030203	Mendip Limestone Grasslands	SAC	417
UK0030048	Mendip Woodlands	SAC	254
UK0030065	Newlyn Downs	SAC #	115
UK0030052	North Somerset and Mendip Bats	SAC	561
UK0012559	Penhale Dunes	SAC #	622
UK0012552	Pewsey Downs	SAC	154
UK0030238	Phoenix United Mine and Crow's Nest	SAC	49
UK0013111	Plymouth Sound and Estuaries	SAC #	6387
UK0030241	Polruan to Polperro	SAC #	214
UK9010111	Poole Harbour	SPA #	2314
UK9011101	Porton Down	SPA	1562
UK0012553	Prescombe Down	SAC	76
UK0030242	Quants	SAC #	20

Site ID	Name of Site	SPA, SAC, Ramsar	Area (ha)*
UK0013016	River Avon	SAC #	468
UK0030248	River Axe	SAC #	25
UK0030056	River Camel	SAC #	620
UK0012681	Rocksmoor	SAC #	62
UK0012683	Salisbury Plain	SAC	21466
UK9011102	Salisbury Plain	SPA	19716
UK9015022	Severn Estuary	SPA #	24663
UK0013030	Severn Estuary / Mor Hafren	SAC #	73715
UK0019864	Sidmouth to West Bay	SAC #	898
UK9010031	Somerset Levels and Moors	SPA #	6388
UK0012749	South Dartmoor Woods	SAC #	2159
UK0030060	South Devon Shore Dock	SAC #	339
UK0012650	South Hams	SAC #	130
UK0019863	St Albans Head to Durlston Head	SAC #	285
UK0030282	St Austell Clay Pits	SAC	1
UK9010141	Tamar Estuaries Complex	SPA #	1945
UK0012799	The Lizard	SAC #	3085
UK0012557	The New Forest	SAC #	29254
UK0013047	Tintagel–Marsland–Clovelly Coast	SAC #	2380
UK0012604	Tregonning Hill	SAC	5
UK0030299	West Dorset Alder Woods	SAC	329
UK0030375	Lands End and Cape Bank	SCI	30172
UK0030374	Lizard Point	SCI	13988
UK0030372	Lyme Bay and Torbay	SCI	31248
UK0030373	Start Point to Plymouth Sound and Eddystone	SCI	34076
UK0030382	Studland to Portland	SCI	33191
tbc	Falmouth Bay to St Austell Bay	pSPA	tbc
UK11005	Avon Valley	Ramsar	1390
UK11012	Chesil Beach and Fleet	Ramsar	747
UK11021	Dorset Heathlands	Ramsar	6682
UK11025	Exe Estuary	Ramsar	2367
UK11033	Isles of Scilly	Ramsar	401
UK11054	Poole Harbour	Ramsar	2480
UK11081	Severn Estuary	Ramsar	24663
UK11064	Somerset Levels and Moors	Ramsar	6388
UK11047	The New Forest	Ramsar	27998

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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