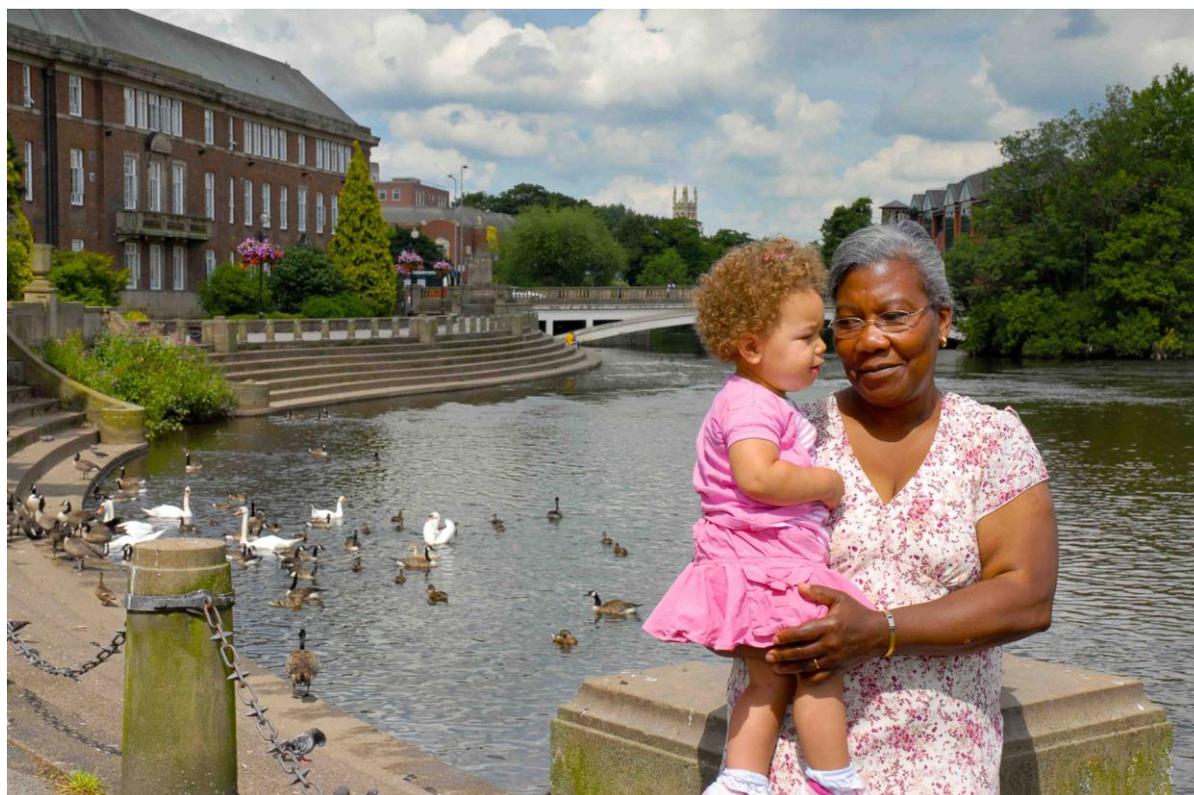




Water for life and livelihoods



River basin management plans

Part 2: River basin management planning overview and additional information

Updated: December 2015

We are the Environment Agency. We protect and improve the environment and make it **a better place** for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local councils, other agencies, civil society groups and the communities we serve

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Further copies of this report are available on the river basin management plan web pages:

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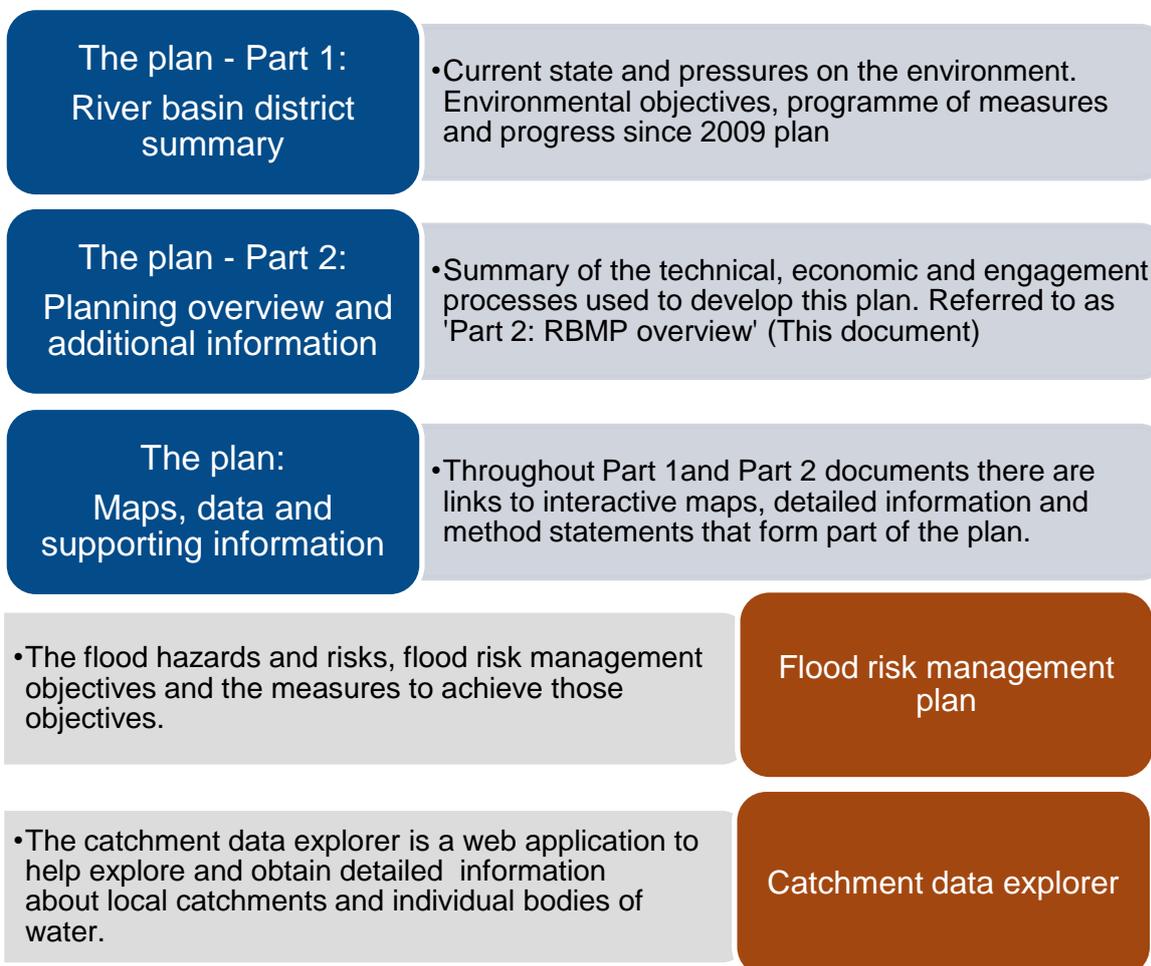
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Using the plans: accessing the most relevant information

The river basin management plans consist of a number of different documents, maps and datasets, of which this is just one. Below is a summary of the statutory components of the river basin management plans (in blue) along with associated documents and data sources (in brown) that are not part of the river basin management plans:



Throughout this document there are light green boxes containing links to the further information relevant to each section.

Further information

- You can access the river basin management plans and associated documents through the river basin management web pages here: <https://www.gov.uk/government/collections/river-basin-management-plans-2015>.
- A guide to accessing river basin management is available on the river basin management web pages here: <https://www.gov.uk/government/collections/river-basin-management-plans-2015>.

1. Introduction

The European Water Framework Directive, referred to in this document as the WFD, established a legal framework for managing the water environment across Europe. At its heart is an ecosystem approach requiring measures to be taken to encourage the sustainable use of water and to protect and improve inland surface waters, groundwater and coastal waters with the aim of achieving good status. It recognises that interested groups need to work together to design and implement improvements, taking a holistic and integrated approach to managing the water environment.

The WFD calls for a management plan to be developed for each river basin district. In England the Environment Agency is the competent authority for the WFD and it published the first river basin management plans in December 2009 (referred to within this document as the 2009 plans). The 2009 plans outlined the measures needed to bring more waters to good status by 2015 and what needed to be investigated to test whether all waters could justifiably achieve this aim by 2021 or 2027.

The plans, including the objectives and measures they contain, must be reviewed and updated every 6 years. The Environment Agency, working with others, started the process of updating the 2009 plans in 2012. A consultation on a draft update to the plans was published in October 2014. The consultation ran for 6 months and closed in April 2015. The updated plans were published and submitted to the Secretary of State for their consideration, and if content approval, at the end of October 2015.

The approved plans were published alongside a wide range of supporting information that was made available online at the same time. The plans will be reported to the European Commission by 22 March 2016.

The plans complement the work underway to develop a wider 25-year plan for the environment. This will harness the potential of data, local partnerships, environmental technology and environmental markets to deliver more improvements to our environment in tandem with economic growth

This document contains, or links to, information that the WFD requires to be part of each plan; see 'Using the plans' for more information. It also provides more detail about the process the Environment Agency and others have followed in reviewing and updating the plans. This will help the reader understand how the objectives and programmes of measures have been derived. This document also puts river basin management planning and the plans into the wider context of managing the water environment in England.

Section 2 'Managing the water environment' describes why water is such an important resource and summarises the policies, both European and domestic, which shape how the water environment in England is managed.

Section 3 'The Water Framework Directive' describes the aims and objectives of the WFD including the application of exemptions. The river basin management planning process used in England is summarised, including how the Environment Agency is working with others. This section also describes how the plans were developed following the consultation on the draft update to the plans.

Section 4 'Defining and describing the water environment' describes how the water environment is divided up and characterised for the purposes of implementing the WFD. It sets out how the environment is monitored and how results of that monitoring are used to assess and report on the status of the water environment. The later parts of the section describe the main challenges affecting the management of the water environment in England, how future risks have been assessed and the current causes of problems identified.

Section 5 'Identifying measures and updating objectives' sets out the overall process used for determining environmental objectives, including water body status objectives. It describes the role of economic appraisal and the objectives that are included within the plans.

Section 6 'Programme of measures' describes the background to the programme of measures. It also contains links to further information on programmes of measures and supporting documents.

Further information

The following data for every water body in England is available in Excel spreadsheet format:

- 2015 status assessments
- reasons for not achieving good status
- objectives
- reasons for alternative status objectives

The data is listed for each water body and each element for which a status and objective is available. You can access the data here: <https://ea.sharefile.com/d/s7e378d3187741f2b>

1.1. Components of the river basin management plan

The WFD stipulates that river basin management plans must contain certain information. These are set out in Annex VII of the directive. The table below lists these requirements and identifies where these can be found within this plan.

WFD Annex VII requirement	Location within plans
<p>A1. a general description of the characteristics of the river basin district required under Article 5 and Annex II. This shall include:</p> <p>A1.1 for surface waters:</p> <ul style="list-style-type: none"> - mapping of the location and boundaries of water bodies - mapping of the ecoregions and surface water body types within the river basin - identification of reference conditions for the surface water body types 	<p>Linked data (GeoPDF on sharefile) from Part 1 section 2.1; Part 2 section 4.3</p> <p>Linked data (GeoPDF on sharefile) from Part 1 section 2.5</p> <p>Part 2 section 4.1.1 and linked documents</p>
<p>A1.2 for groundwaters:</p> <ul style="list-style-type: none"> - mapping of the location and boundaries of water bodies 	<p>Linked data (GeoPDF on sharefile) from Part 1 section 2.1; Part 2 section 4.3</p>
<p>A2. a summary of significant pressures and impact of human activity on the status of surface water and groundwater, including:</p> <ul style="list-style-type: none"> - estimation of point source pollution - estimation of diffuse source pollution, including summary of land use 	<p>Part 1 section 1.4 and 3.2; Part 2 section 4.4</p> <p>Part 1 section 1.4 and 3.2; Part 2 section 4.4</p>
<ul style="list-style-type: none"> - estimation of pressures on the quantitative status of water including abstractions 	<p>Part 1 section 1.4 and 3.2; Part 2 section 4.4</p>

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WFD Annex VII requirement	Location within plans
- analysis of other impacts of human activity on the status of water	Part 1 section 1.4 and 3.2; Part 2 section 4.4
A3. identification and mapping of protected areas as required by Article 6 and Annex IV	Part 1 linked data from section 2.4 and 3.6; Part 2 section 3.1.2 and linked document
A4. a map of the monitoring networks established for the purposes of Article 8 and Annex V and a presentation in map form of the results of the monitoring programmes carried out under those provisions for the status of:	
A4.1 surface water (ecological and chemical)	Linked data from Part 1 section 2.5
A4.2 groundwater (chemical and quantitative)	Linked data from Part 1 section 2.5
A4.3 protected areas	Linked data from Part 1 section 2.4
A5. a list of the environmental objectives as established under Article 4 for surface waters, groundwaters and protected areas, including in particular identification of instances where use has been made of Article 4.4, 4.5, 4.6 and 4.7 and the associated information required under that Article	Part 1 section 2 (summary and linked data); Part 2 section 5 and linked data set from section 1
A6. a summary of the economic analysis of water use as required by Article 5 and Annex III	Part 2 section 5.3 and linked document
A7. a summary of the programme or programmes of measures adopted under Article 11, including the ways in which the objectives established under Article 4 are thereby achieved	
A7.1 a summary of the measures required to implement Community legislation for the protection of water	Part 1 section 3
A7.2 a report on the practical steps and measures taken to apply the principle of recovery of the costs of water use in accordance with Article 9	Part 2 section 3.6
A7.3 a summary of the measures taken to meet the requirements of Article 7	Part 1 section 3
A7.4 a summary of the controls on abstraction and impoundment of water, including reference to the registers and identification of the cases where exemptions have been made under Article 11.3(e)	Part 1 section 3
A7.5 a summary of the controls adopted for point source discharges and other activities with an impact on the status of water in accordance with the provision of Article 11.3(g) and 11.3(i)	Part 1 section 3
A7.6 an identification of the cases where direct discharges to groundwater have been authorised in accordance with the provision of Article 11.3(j)	Part 1 section 3
A7.7 a summary of the measures taken in accordance with Article 16 on priority substances	Part 1 section 3
A7.8 a summary of the measures taken to prevent or reduce the impact of accidental pollution incidents	Part 1 section 3

WFD Annex VII requirement	Location within plans
A7.9 a summary of the measures taken under Article 11(5) for bodies of water which are unlikely to achieve the objectives set out under Article 4	Part 1 section 3
A7.10 details of the supplementary measures identified as necessary in order to meet the environmental objectives established	Part 1 section 3
A7.11 details of the measures taken to avoid increase in pollution of marine waters in accordance with Article 11.6	Part 1 section 3
A8. a register of any more detailed programmes and management plans for the river basin district dealing with particular sub-basins, sectors, issues or water types, together with a summary of their contents.	No supplementary plans have been produced
A9. a summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence	Part 2 section 3.3 and linked document
A10. a list of competent authorities in accordance with Annex I	Part 2 section 3.8
A11. the contact points and procedures for obtaining the background documentation and information referred to in Article 14.1 and in particular details of the control measures adopted in accordance with Article 11.3(g) and 11.3(i) and of the actual monitoring data gathered in accordance with Article 8 and Annex V	Part 1 and Part 2 contain contact details on page 2; links to further information in 'Using the Plans' section in Part 1 and Part 2; measures in Part 1 section 3, Part 2 section 6 and links from those sections
B. the first update of the river basin management plan and all subsequent updates shall also include	
B1. a summary of any changes or updates since the publication of the previous version of the river basin management plan, including a summary of reviews to be carried out under Article 4(4), (5), (6) and (7)	Part 1 section 4
B2. an assessment of the progress made towards the achievement of the environmental objectives, including presentation of the monitoring results for the period of the previous plan in map form, and an explanation for any environmental objectives which have not been reached	Part 1 section 4
B3. a summary of, and an explanation for, any measures foreseen in the earlier version of the river basin management plan which have not been undertaken	Part 1 section 4
B4. a summary of any additional interim measures adopted under Article 11(5) since the publication of the previous version of the river basin management plan	Part 1 section 4

2. Managing the water environment

Summary of this section

This section provides an introduction to the management of the water environment, describes why water is such an important resource, and highlights the policies (European and domestic) that shape how the water environment is managed in England.

Topics covered:

Importance of water management; management of the water environment in England; the Environment Agency's role.

2.1. Water – a vital resource

Water is essential for life and livelihoods. It allows the natural environment to flourish, and businesses, agriculture and the economy to grow and prosper.

Rivers, lakes, estuaries, coastal areas, wetlands and groundwater provide many different benefits to society; from supplying drinking water and supporting fisheries to providing an essential resource for business and agriculture, transport routes and a source of recreation that promotes wellbeing.

It is critical that this precious resource is managed properly to ensure that the needs of society, economy and wildlife can be met and maintained over the long-term.

2.2. Managing the water environment in England

Much of the policy relating to water management results from European Directives that have been introduced over the last 40 years, resulting in major improvements in the quality of the water environment and the protection of some of its most valued uses. Over recent years there has been a move to introduce a more strategic approach to water management policy. The WFD (see section 3) provides an overarching framework for river basin management. The Floods Directive (see section 2.2.2.) sets out a strategic approach to flood risk management planning. As competent authority for implementing these directives, the Environment Agency has an important role in coordinating their implementation in England (see section 2.3). The Marine Strategy Framework Directive (see section 2.2.3) establishes an integrated policy for achieving good environmental status in European seas.

The European Commission's Blueprint to safeguard Europe's water resources is overseeing a programme to develop measures to enable member states to improve the way they manage water. These measures include addressing over abstraction, managing leakage and improving the potential for natural water retention measures. It also aims to draw together measures under the Water, Floods and Marine Strategy Framework directives.

The Department for Environment, Food and Rural Affairs (Defra) is the main government department responsible for policy on water management in England. Defra developed several policy initiatives that are important in shaping the future of water management. The Water White Paper, 'Water for Life', sets out a vision for managing water as a valued and finite resource. Important commitments include reforming the water abstraction system and a new catchment-based approach to water quality and wider environmental issues.

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In parallel with the development of river basin management plans, the government is considering future policy mechanisms needed to protect and improve the water environment.

Some directives relate to the quality of water such as drinking water and bathing waters. Some set requirements to protect wildlife such as the Habitats Directive and Birds Directive. Others concern the control of pollution from particular chemicals such as nitrates and hazardous substances.

There is also EU legislation that sets standards for the performance of sewerage systems and wastewater treatment plants and emissions from industrial processes.

The Climate Change Act 2008 legally binds the UK to reduce emissions of carbon by at least 80% by 2050, compared to 1990 levels. It also sets the legal framework for adaptation policy in the UK. It requires a UK Climate Change Risk Assessment (CCRA) to be conducted and a National Adaptation Programme (NAP) to be developed to tackle the most pressing climate change risks to England. The first NAP was published in July 2013. It outlines the use of the WFD as an important element in helping the water environment adapt to climate change. In the current NAP the Environment Agency commits that “the second cycle of the river basin management plans will integrate climate change risk assessment and adaptation”.

The UK government’s 2012 CCRA identifies impacts on water as a high risk across each of its 5 central themes as shown in the table below.

Table 1: Impacts on water as a high risk identified in the UK Climate Change Risk Assessment 2012

Theme	Main risks
Agriculture and forestry	Drier soils, reducing crop and timber yields, extra demand for water for irrigation, loss of agricultural land for flood plain.
Business	Flooding, increased competition for water, disruption of transport networks and communication links and indirect risks from changes in agriculture and the natural environment.
Health and wellbeing	Injury, death and stress/mental health problems due to flooding. Increase in water-borne diseases and food poisoning.
Buildings and infrastructure	Flooding of road, rail, river bridges, water supply and energy infrastructure. Performance of buildings in higher temperatures and urban heat island effect in urban areas.
Natural environment	Lower summer river flows may lead to poor water quality. Warmer rivers and lakes may suit some species but others will not thrive, invasive species may gain advantage, native species may not be able to move to track favoured conditions. More rain falling in intense bursts might increase agricultural runoff.

The Natural Environment White Paper, ‘The Natural Choice’, sets out the government’s ambitions to protect and improve the natural environment, to support sustainable growth and to re-connect people with nature. The England Biodiversity Strategy describes how the government will implement EU and international commitments on biodiversity. Both of these policies introduce important changes, placing more emphasis on the need for an ecosystem approach in managing catchments and the waters that flow through them.

Supporting information

- The European Commission's Blueprint to safeguard Europe's water resources can be found here: http://ec.europa.eu/environment/water/blueprint/index_en.htm
- The Climate Change Act 2008 can be found here: <http://www.legislation.gov.uk/ukpga/2008/27/contents>
- The UK Climate Change Risk Assessment can be found here: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report>
- The National Adaptation Programme can be found here: <https://www.gov.uk/government/publications/adapting-to-climate-change-national-adaptation-programme>
- The government's Water White Paper 'Water for life' can be found here: <https://www.gov.uk/government/publications/water-for-life>
- The government's Natural Environment White Paper 'The natural choice: securing the value of nature' can be found here: <https://www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature>
- The England Biodiversity Strategy 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' can be found here: <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services>

2.2.1. Government guidance on river basin management planning

The government issued updated statutory guidance to the Environment Agency on the practical implementation of the WFD in July 2014. The guidance set out government's expectations in relation to the steps and principles of the river basin management planning process and the content of the documents the Environment Agency has to produce.

The guidance considers an increased emphasis on the catchment based approach (CaBA), impacts of climate change, the transition to new environmental standards and revised water-body classifications, details on objectives and exemptions (following the repeal of the Shellfish Waters Directive and the Freshwater Fish Directive), integrating requirements relating to protected areas, introduction of beneficiaries to pay for ecosystem services under certain circumstances, and a requirement for coordination between the implementation of the WFD and the Floods Directive.

There is also guidance on river basin planning within the government's Statement of Obligations for the 2014 Price Review (PR14). This Statement of Obligations outlines the main environmental statutory obligations that apply to water only and water and sewerage undertakers over 2015-2020.

Supporting information

- The Ministerial guidance to the Environment Agency on river basin planning can be found here: <https://www.gov.uk/government/publications/river-basin-planning-guidance>
- The Defra Statement of Obligations can be found here: <https://www.gov.uk/government/publications/statement-of-obligations>

2.2.2. Managing flooding in England

The Flood and Water Management Act 2010 sets out the roles and responsibilities for managing flood and coastal erosion risk in England. The Act gives the Environment Agency a strategic overview role for all forms of flooding and coastal erosion and specific responsibility for managing flooding from main rivers, the sea and large raised reservoirs. The act gives Lead Local Flood Authorities (County Councils and Unitary Authorities) responsibility for managing local flooding from surface water, groundwater and ordinary watercourses. Coastal Authorities have responsibility for coastal erosion. It also sets out the requirement for the Environment Agency to develop, maintain, apply and monitor a national strategy for flood and coastal erosion risk management. The national strategy was published in 2011 and provides the national policy framework for managing flood and coastal erosion risk in England.

i. Implementing the European Floods Directive

The European Floods Directive (EFD) aims to provide a consistent approach to managing flood risk across Europe. The EFD is implemented through the Flood Risk Regulations 2009 which require some Local Lead Flood Authorities (LLFAs) and the Environment Agency to publish flood risk management plans (FRMPs). These plans are important because they set out how Risk Management Authorities and communities will work together to manage and reduce the risk of flooding. FRMPs set out the main objectives and measures for the 6 year planning cycle to 2021.

The Environment Agency published FRMPs for flooding from main rivers, the sea and reservoirs for England. LLFAs must publish FRMPs covering local sources of flooding for those locations identified as Flood Risk Areas. The latter have largely been incorporated into FRMPs published by the Environment Agency.

The main milestones in the preparation of FRMPs have included:

- **December 2011** - LLFAs published Preliminary Flood Risk Assessments (PFRAs). These identified areas at significant risk of flooding from groundwater, surface water runoff and ordinary watercourses (Flood Risk Areas). The PFRAs were reported to the European Commission in March 2012. There are 8 Flood Risk Assessments (FRAs) wholly in England plus 1 cross-border FRA with each of Wales and Scotland, covering 65 LLFAs.
- **December 2013** - flood hazard and flood risk maps covering flooding from main rivers and the sea were published for each river basin district in England. Surface water flood risk maps were produced for FRAs only. The Environment Agency's updated Flood Map for Surface Water (uFMfSW), also published in 2013, contains the flood hazard information. Maps showing the extent of and hazard from flooding from reservoirs were published in December 2013 and April 2014 respectively. The flood hazard and flood risk maps were reported to the European Commission in March 2014.
- **October 2014** – a 3 month consultation on draft FRMPs was launched alongside the draft river basin management plans. A joint summary of the responses received was published in autumn 2015.

ii. The approach to developing flood risk management plans

Guidance on what FRMPs are, who is responsible for them and how to prepare them was developed by Defra, Welsh Government, Environment Agency and Natural Resources Wales. It was published in May 2014 and sets out the need to coordinate with the river basin management plans.

The Environment Agency consulted on the approach to developing FRMPs in August 2012. At the same time, the Environment Agency launched a consultation called 'challenges and

choices' to update the river basin management plans. Both consultations asked how to coordinate consultation on the river basin management plans and the FRMPs. As a result of the feedback the first FRMPs were developed separately from the river basin management plans but they were aligned to ensure objectives and measures were as consistent as possible. Subsequent work in 2015 has aligned the plans further by describing the main areas where outputs contribute to the other plans objectives and deliver integrated outcomes.

The consultation on FRMPs also considered the best ways of coordinating FRMPs for each river basin district with the plans for FRAs prepared by LLFAs. The results of the consultation were published in June 2013.

In June 2014, the Environment Agency published scoping reports for each FRMP. These set out where LLFAs would prepare FRMPs for local sources of flooding separately from the plans prepared by the Environment Agency. The scoping reports also set out the timescales for consultation.

Both the river basin management plans and FRMPs are subject to strategic environmental assessment (SEA), with reporting requirements at a common river basin district scale. Separate SEA reports have been produced for each plan. Common approaches to SEA have been used and the environmental effects of the plans are reported in a consistent way, for example, by:

- using a common ecosystem services method of environmental assessment to identify potential wider benefits or adverse effects of both plans
- using the same evidence base for the current environmental context for the river basin district
- reviewing other organisations' plans for how they relate to both plans
- identifying where the implementation of the FRMP may result in opportunities or risks to the improvement of water bodies and where further assessment of these at a project level would be required.

Supporting Information

- The Flood and Water Management Act is available here: <http://www.legislation.gov.uk/ukpga/2010/29/contents>
- The European Floods Directive is available here: http://ec.europa.eu/environment/water/flood_risk/
- The Flood Risk Regulations are available here: <http://www.legislation.gov.uk/uksi/2009/3042/contents/made>
- A map of Flood Risk Areas and the Preliminary Flood Risk Assessments published for England are available here: <https://www.gov.uk/government/publications/preliminary-flood-risk-assessments-and-flood-risk-areas>
- Flood Risk Maps published for river basin districts in England are available here: <https://www.gov.uk/government/collections/river-basin-districts-flood-risk-maps>
- Information and guidance on flood risk management plans is available here: <https://www.gov.uk/government/collections/flood-risk-management-plans-frmps>
- You can view a summary of the consultation responses on the draft FRMPs here: https://consult.environment-agency.gov.uk/portal/ho/flood/draft_frmf/consult
- Final FRMP documents are available here: www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021

2.2.3. Estuarine and coastal waters and the Marine Strategy Framework Directive (2008)

The Marine Strategy Framework Directive (MSFD) establishes an integrated policy for the protection of the marine environment in a similar manner to the WFD and requires the achievement of 'good environmental status' in marine waters. The scope of the MSFD is broader than that of the WFD, covering a greater range of environmental components and indicators. There are some significant areas of overlap with the WFD, particularly in relation to chemical quality, eutrophication and aspects of ecological and hydromorphological quality. Where both directives apply in coastal waters, the MSFD covers those aspects not covered by the WFD, including noise, litter and aspects of biodiversity.

Most of the human activities which cause significant pressures relating to contaminants and eutrophication are either terrestrial in nature or are taking place in the coastal zone. It is therefore considered likely that measures taken under the WFD and related directives will be sufficient to achieve and maintain good environmental status under the MSFD across the UK's wider marine area.

For hydrographical conditions, it is considered that the application of the WFD in the coastal area, plus the wider application of the Environmental Impact Assessment Directive through the marine licensing process will be sufficient to achieve good environmental status under the MSFD.

In recognition of the role that the WFD measures will play in achieving MSFD objectives, the reporting on programmes of measures to the European Commission under both directives is closely linked.

The MSFD is implemented by the Marine Strategy Regulations 2010. The Secretary of State is the competent authority. The Environment Agency is working with Defra and others to ensure complementary implementation of both directives. The UK targets and indicators in MSFD for good environmental status have been aligned, as far as possible, with existing WFD assessment tools.

The UK's overall approach to implementing the MSFD is set out in the UK Marine Strategy Part 1. The UK's marine monitoring programme to monitor progress towards good environmental status was completed in July 2014 with the publication of the UK's Marine Strategy Part 2. The third stage is the implementation of management measures to maintain or achieve good environmental status by 2020. A public consultation on the programme of measures was run from January to April 2015. The aim is to publish the final programme by December 2015 and implement it by December 2016.

The Marine and Coastal Access Act 2009 established the Marine Management Organisation (MMO) to produce marine plans, administer marine licensing and manage marine fisheries. It introduced marine planning in the UK through production of a marine policy statement and more detailed marine plans setting spatial policy at a more local level. It is anticipated that there will be 11 marine plans covering English waters by 2021.

Marine plans will inform and guide marine users and regulators across England, managing the sustainable development of marine industries such as wind farms and fishing, alongside the need to conserve and protect marine species and habitats. At its landward extent, a marine plan will apply up to mean high water springs, including estuaries and the tidal extent of rivers. All public bodies making authorisation or enforcement decisions capable of affecting the marine area must do so in accordance with the marine policy statement or marine plans (where they are in place) or state reasons for not doing so.

The East Inshore and East Offshore areas were the first marine plans to be produced in England and were adopted by government in April 2014. Planning is currently underway in the South marine plan areas.

The Act also enabled the introduction of national marine protection areas called ‘marine conservation zones’. These will help to protect nationally important biodiversity, supporting the achievement of MSFD and also WFD objectives in protecting important parts of estuaries and coastline. Some nursery grounds for juvenile fish have already been designated.

Supporting information

- A definition of marine waters can be found here: <http://www.legislation.gov.uk/ukxi/2010/1627/regulation/3/made>
- Further information on the Marine Strategy Framework Directive including consultation processes, timescales and links with the Water Framework Directive can be found here: <https://www.gov.uk/government/policies/protecting-and-sustainably-using-the-marine-environment/supporting-pages/implementing-the-marine-strategy-framework-directive>
- You can find more information on Marine Planning here: <http://www.marinemangement.org.uk/marineplanning/>
- You can find more information on Marine Licensing here: <https://www.gov.uk/topic/planning-development/marine-licences>
- Further information on Marine Conservation Zones can be found here: <https://www.gov.uk/government/publications/2010-to-2015-government-policy-marine-environment/2010-to-2015-government-policy-marine-environment#appendix-4-marine-protected-areas>

2.2.4. Abstraction and flow

Sustainable abstraction is important to support growth in businesses, the wider economy and population. It is the Environment Agency’s role to make sure that abstraction is sustainable and does not damage the environment; how much, where and when water is abstracted is managed through the abstraction licensing system. This system was introduced by the Water Resources Act 1963 and has been refined and changed as a result of the Water Resources Act 1991 and the Water Acts 2003 and 2014. Abstraction licensing is one of several mechanisms in place that support WFD objectives. Some abstractors will need to take action to contribute to improving and protecting the environment.

The Environment Agency recognises the challenges faced in addressing environmentally unsustainable abstraction licences and the importance of not licensing new abstractions that damage the environment under existing powers and duties. Action is being taken on abstraction and flow pressures to support a healthy ecology, protect special sites including Natura 2000 and Sites of Special Scientific Interest (SSSIs), maintain a healthy groundwater balance and ensure the passage of fish and eels through river systems. Progress has been made in addressing unsustainable abstraction licences through the Restoring Sustainable Abstraction (RSA) programme (as of 31 March 2015, the Environment Agency has made changes to over 200 abstraction licences). There remains however, a significant environmental challenge that must be addressed to achieve sustainable water resources within all catchments.

During the period of the second cycle river basin management plans the Environment Agency will:

- Ensure abstraction licensing strategies and actions fully incorporate all environmental objectives and align with river basin management plans helping stakeholders understand the risks to the environment from current and future abstraction.
- Assess all licence applications and only issue licences that adequately protect and improve the environment.

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- Only grant replacement licences where the abstraction is environmentally sustainable and abstractors can demonstrate they have a continued need for the water and that they will use it efficiently. The Environment Agency is aware that around 2300 time limited licences are due to end, either wholly or partially, during the period covered by the plans. This means that many abstractors will be seeking replacement licences.
- Take risk based action to revoke licences that have not been used for over four years to reduce future risk and the scale of action that might be needed on other abstractions licences.
- For existing licences, prioritise actions to protect and improve Natura 2000 sites and address the most seriously damaging abstractions during this plan period. Where serious damage occurs, or may occur, and investigations show the need to take action, abstraction licences will be constrained. All abstractors in surface water and groundwater bodies where serious damage is occurring or could occur without action should expect that their licences will be constrained over the next 6 years.
- Take action to address any outstanding issues from about 200 licences remaining in the RSA programme by March 2020. Those abstractors whose licence is associated with Natura 2000 sites will need to have either offered a voluntary change to their licence or notice will be served to compulsorily change their licences by 22 December 2015.

Required water company infrastructure investment changes will be funded through customer bills (price reviews) and licences will be changed, setting out clear actions required by specified dates. Where infrastructure changes take time, water companies will be expected to better manage systems to minimise pressure on the most sensitive areas. Improved demand management and water efficiency is expected from all abstractors.

Government is preparing to implement the Water Act 2014 which makes a number of reforms to help society face future challenges arising from a growing population and changing climate. The Act includes reforms to increase resilience to help ensure water is always available to supply to customers without damaging the environment and a new Ofwat duty to promote long-term resilience in the water supply and sewerage sector.

Defra currently anticipate bringing currently exempt abstractions under regulatory control (New Authorisations). It is estimated there could be as many as 5000 applications. The extent of environmental issues that will be addressed has been subject to government consultation.

The Environment Agency is also supporting government in developing its proposals for Abstraction Reform to meet the challenges of an increasingly varied climate, increasing demand for water and a growing population supporting economic growth and increased resilience of water supply.

2.2.5. Agriculture

A healthy water environment and healthy soils are fundamental to the rural economy and the sustainable production of food. In order to achieve this, actions to address pollution will need to be taken up in sufficient numbers at a catchment scale. Government has made available a mix of advice, regulation and incentives, as shown in Figure 1. When underpinned by local knowledge and leadership these measures can deliver the environmental protection and improvements society needs.

i. Adoption of good practice

A range of good practice actions will provide baseline levels of protection for the water environment and are applicable to all farmers and land managers.

More farmers and rural land managers will take significant steps towards adopting good practice through routine business decisions, participation in farm assurance schemes, and

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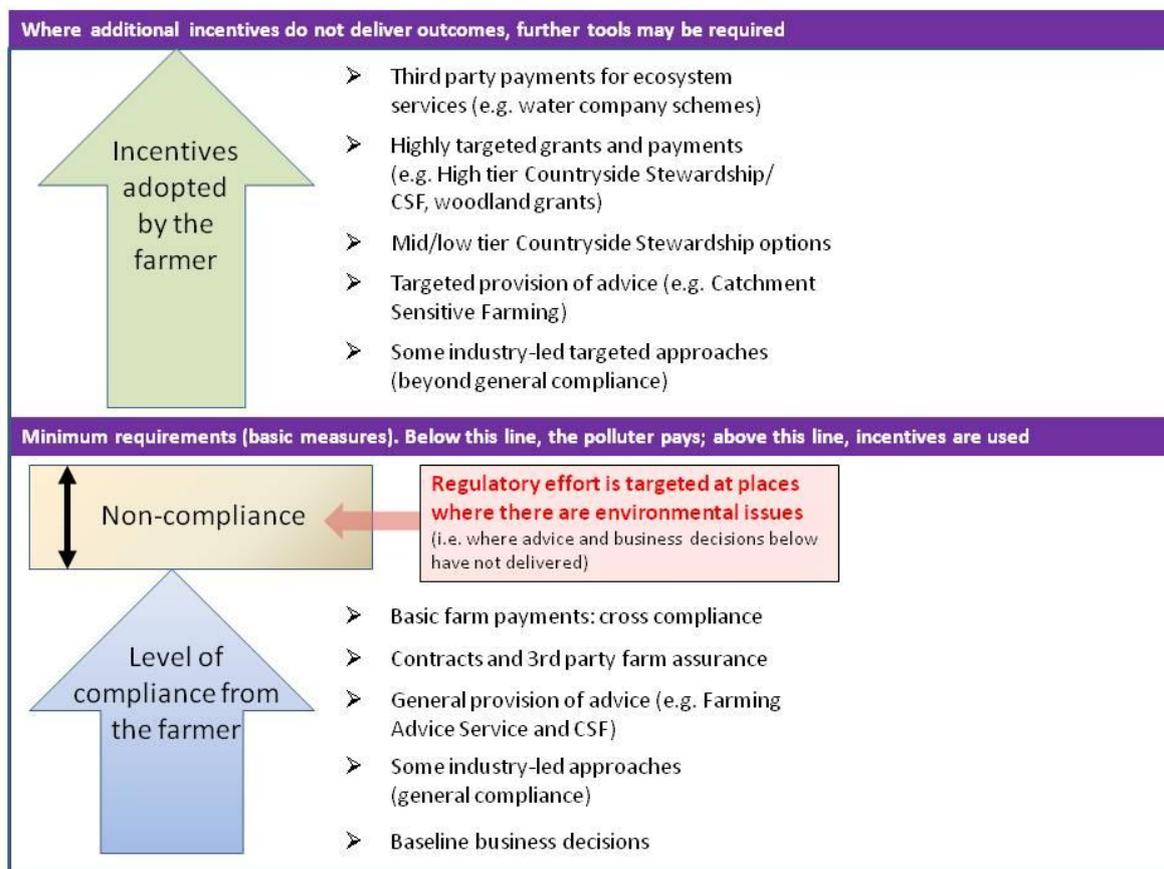
through industry initiatives designed to provide advice on efficient use of water, nutrients and pesticides.

Common Agricultural Policy includes fiscal incentives to meet basic environmental protection conditions, for example, managing land to prevent soil erosion and providing small buffer strips. Government supports an advice service to help recipients of these payments to comply with these rules.

Where agricultural businesses fall short of the standards required engagement and enforcement of regulation is needed to ensure the minimum of good practice. Compliance with regulation will be improved as a result of:

- improved data sharing between Defra delivery bodies
- better targeting of farm inspections
- enforcement that is risk-based and recognises good performance

Figure 1: Farming and the water environment – the delivery landscape



The main requirements of domestic legislation to address agricultural pressures on the water environment are set out in section 3.2 of Part 1 the river basin management plans. These include:

- Safe and adequate storage for slurry, silage, manure and chemicals
- Compliance with the nitrates action programme where a farm is in a designated Nitrate Vulnerable Zone
- Operating within the terms of licences and permits (for example, complying with conditions in abstraction licences, and permits relating to the application of pesticides and operation of sheep dips)

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ii. Additional actions

Additional actions will help achieve protected area objectives and improve water bodies not achieving good status.

This includes actions that go beyond the minimum level of good practice and incentives from government, for example, Countryside Stewardship and the private sector encouraging land managers to adopt best practices or to provide ecosystem services.

These incentives will encourage beneficial practices through voluntary action, such as sensitive management of fields or targeted land use change. Incentives are prioritised where the greatest environmental benefits can be achieved. Examples include creating sediment traps and wetlands, and utilising some land for the many benefits of woodland creation. Countryside Stewardship measures will bring benefits to water quality, improve biodiversity and ensure landscape is more resilient to flooding.

A Catchment Based Approach that encourages catchment scale engagement with farmers, such as Catchment Sensitive Farming, can and has made significant reductions in some pollutants where farmers engage and are effectively encouraged by workshops, capital grants and one-to-one advice. These schemes also assist with improved targeting of supplementary measures and facilitate better practice in soil and nutrient management.

Farming industry led initiatives such as the Campaign for the Farmed Environment have engaged in voluntary action by motivating farmers to implement measures to protect water. Their work to promote voluntary retention of expiring environmental stewardship options can help reduce the risk of any deterioration and raise awareness of other schemes that will improve water quality.

Action through initiatives from the water industry, rivers and wildlife trusts and farming industry led campaigns supplement government led initiatives. In some cases additional funding is available but in all cases local initiatives are used to engage with land owners, explore water quality issues and target the best measures to the right place.

iii. Additional regulation

Government keeps regulatory measures under review. Defra has been working with interested parties to identify some basic actions farmers could take which reduce diffuse pollution from agriculture.

Supporting information

- Further information on Cross Compliance can be found here: <https://www.gov.uk/government/publications/cross-compliance-guidance-for-2015>
- Further information on Countryside Stewardship can be found here: <https://www.gov.uk/guidance/countryside-stewardship-manual>
- Further information on Catchment Sensitive Farming can be found here: <https://www.gov.uk/catchment-sensitive-farming-reduce-agricultural-water-pollution>
- Further information on Farm Advice Service can be found here: <https://www.gov.uk/government/groups/farming-advice-service>
- Further information on Campaign for the Farmed Environment can be found here: <http://www.cfeonline.org.uk/home>

2.2.6. Chemicals

Chemicals are used extensively in modern lifestyles, whether it is to increase agricultural productivity or in businesses or everyday products used in the home, such as flame retardants applied to household items to prevent fires. Many of these useful chemicals pose

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little risk to humans or the environment but a few can be very harmful. The WFD takes a 'precautionary approach' to reducing risks presented by chemicals, in which the primary goal is to prevent harm. The approach to "source control", limiting the availability of chemicals to minimise risks to humans and the environment, is mainly determined at European Union (EU) level. For chemicals used in everyday products and industrial processes, the main way this is done is through 'REACH', an EU Regulation concerning the Registration, Evaluation, Authorisation and restriction of Chemicals. REACH aims to ensure that companies demonstrate how to safely use the chemicals they supply, and that the use of chemicals of the greatest concern is tightly controlled (and phased out if appropriate). Many chemicals are already subject to legally-binding control measures set at EU level, and the list is expected to grow as more data become available for chemicals that have been poorly studied up until now.

Monitoring chemicals under WFD is one of the main ways of assuring the effectiveness of EU chemicals source control legislation for reducing environmental risks. There will however, always be a time delay between controls being imposed and changes being observed in the environment. This can take decades for some chemicals that persist in the environment, such as mercury and organic chemicals such as polychlorinated biphenyls.

Harmful chemicals presenting a significant risk to or via the water environment may be identified as priority substances under the WFD. Compliance with environmental quality standards (EQS) for priority substances is used to determine chemical status of water bodies on a pass or fail basis. Risk and status assessments, together with trend information, enable the success of EU measures to be reviewed and to drive national measures. The EC list of priority substances is reviewed every 6 years to ensure that relevant pollutants and their EQSs are up to date.

Member States are also required to identify other significant national pollutants (specific pollutants) and include these in assessment of good ecological status.

The Environment Agency uses EQSs to characterise, monitor and classify water bodies and establish measures to progress water bodies to good status.

Improvements in the contaminant load of chemicals in water bodies and their potential environmental effects will be achieved by a combination of:

- EU or national reduction strategies and source control (e.g. REACH)
- Tackling pollution from prioritised sources such as abandoned metal mines and highway drainage
- Application of best available technologies under the Industrial Emissions Directive
- Applying numeric permits on local point sources

Supporting information

- You can find more information on the EU REACH regulation here: <http://www.hse.gov.uk/reach/>
- You can find the amended Environmental Quality Standards Directive here: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013L0039>

2.2.7. Managing pollution from abandoned mines

Mining has taken place across the country for hundreds of years and has left a legacy of pollution from abandoned waste and mine water drainage tunnels which impact over 1,700km of rivers. Almost all mines closed before 2000 and legislation provides that no one can be required to clean up land or water contaminated by mines in such cases.

Abandoned metal mines damage aquatic life and cause many water bodies to fail to achieve good chemical and ecological status, particularly in the Northumbria, Humber, North West and South West River Basin Districts. The main pollutants are cadmium, lead, zinc, copper and iron. Defra is working in partnership with the Coal Authority and Environment Agency to develop a programme of measures to address this source of pollution; this 'Water and Abandoned Metal Mines Programme' is described in more detail in Part 1 of the relevant RBMPs. In 2015 to 2016, £4.5 million was allocated to this programme; further funding to 2021 is subject to the government spending review.

In the Humber, Northumbria and North West River Basin Districts, abandoned coal mines cause significant, but localised, pollution of rivers which can severely affect fish and river insects. In some areas, aquifers that lie above abandoned coal mines and supply drinking water are threatened by pollution. In 2015 to 2016, the Department of Energy and Climate Change (DECC) has allocated £10.5 million to the programme. Further funding to 2021 is subject to the government spending review. This funding would be used to implement 4 schemes that will reduce the impact of iron in 11km of river, prevent new pollution of rivers and protect groundwater used for drinking water supplies.

The Environment Agency and Coal Authority have prioritised discharges from abandoned coal mines causing significant pollution for clean-up, and identified where schemes are needed to prevent new pollution of rivers or groundwater. The Coal Authority carries out studies to identify feasible measures at priority sites, and where funding allows and the environmental and economic benefits outweigh the costs, builds minewater treatment schemes.

- In the Humber RBD, 14 existing discharges remain on the priority list. 4 measures are being developed to prevent deterioration and clean up existing pollution and could be built by 2020 if funding is available.
- In the Northumbria RBD, 3 existing discharges remain on the priority list. 1 new measure is being implemented to protect a drinking water supply aquifer in 2015.
- In the North West RBD, 7 existing discharges remain on the priority list. No new measures are planned by 2020.

Most treatment schemes harness natural processes to remove iron from the minewater, particularly settlement ponds and engineered wetlands. These wetlands provide a rich habitat for birds, significantly enhance biodiversity, are visually attractive and can also be used as a public amenity. Co-treatment of minewater with sewage or other effluents is considered where appropriate. The Coal Authority carries out research to improve the efficiency of its programme, and investigates opportunities for minimising costs and raising revenue from each scheme. In identifying treatment options, climate change mitigation is considered.

2.2.8. Taking account of climate change

River basin management planning is a long-term process and climate change needs to be incorporated throughout. This is a view widely supported in responses to the 'Challenges and choices' consultation. European Common Implementation Strategy guidance on 'river basin management in a changing climate' guides member states to integrate climate change adaptation into each of the steps of river basin management planning, in particular in the assessment of pressures and selection of measures. Information on how this has been done can be found in the following sections:

- section 3.7.1 Assessments of the river basin management plans
- section 4.4.1 Significant water management issues
- section 6 Programme of measures

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The evidence base available to assist climate change related decision making relevant to river basin planning is continually growing. Sources include:

- UK Climate Change Risk Assessment (UK CCRA): This is the first comprehensive assessment of the main risks and impacts of climate change on different sectors.
- Living with Environmental Change (LWEC) water and biodiversity report cards. These are summaries of impacts and issues for the water and terrestrial environment based on a number of scientific papers from leading experts inspired by the existing marine climate change report cards.
- Research such as the Future Flows and Groundwater Levels projects. This provides an assessment of the impact of climate change on river flows across 282 catchments in the UK. The model takes into account different assumptions of possible climate behaviours and feedback to provide an indication of the uncertainty associated with climate projections. There are different patterns of change but annual low flows (Q95) are expected to decrease under all scenarios and in almost all locations by 2050. Outputs from the Future Flows project can be used to inform catchment scale planning.
- A growing body of academic research examining the impact of climate change on the UK environment

Initial light touch assessments for each management catchment in England have been undertaken by the Environment Agency. These use local expert judgement to consider which aspects of climate change are likely to pose a long-term risk for the catchment. The Environment Agency will review the provision of these assessments and other information during cycle 2.

Supporting information

- For further information on UK CCRA see here: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report>
- You can find the LWEC water and biodiversity report cards here: <http://www.lwec.org.uk/resources/report-cards> and the marine report cards here: <http://www.mccip.org.uk/annual-report-card.aspx>
- Further information and flow projections from the Future Flows and Groundwater Levels project can be found here: http://192.171.153.213/sci_programmes/Water/FutureFlowsandGroundWaterLevels.html
- To find out more about the light touch catchment climate change assessments, contact the National Customer Contact Centre by email at: enquiries@environment-agency.gov.uk

2.2.9. Water industry and the National Environment Programme

The National Environment Programme (NEP) is a multi million pound water company investment programme developed by the Environment Agency through consultation with the water industry and a number of other stakeholders. The NEP lists the environmental improvement measures that ensure that water companies contribute to meeting the obligations of EU Directives including WFD and national legislation related to the water environment. The NEP forms part of the final Asset Management Plan (AMP) that determines the overall level of investment that water companies need to make over a five year period, which is set by Ofwat and funded through customer bills. The NEP is an important element of the river basin management plans and helps deliver the requirements of the WFD.

The NEP is made up of a programme of monitoring and improvement measures that will bring about water quality, water resources, and biodiversity outcomes. For water quality, the

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NEP includes both continuous discharges, for example, from sewage treatment works, and intermittent discharges such as combined sewer overflows. NEP water quality measures could include action to protect the waters where shellfish are commercially harvested, improving the quality of bathing waters, reducing the risk of eutrophication (excessive plant growth and decay), improving the quality of water that is discharged from sewage treatment works as well as improving inland waters for fish. The NEP includes specific schemes to achieve good status through improvements to the quality of the water environment. The water companies are also funded to implement schemes to ensure that their activities do not result in a deterioration of water body status.

The NEP also includes measures to reduce the impact of water abstraction on the environment. The aim is to achieve a balance between the water companies' requirements to maintain public water supply and adequate protection of the environment. Part of this is to ensure water company abstraction is sustainable and does not impact on the aims of the WFD.

Over-abstraction of water can create low river flows that in turn can cause deterioration in river quality and a reduction in wildlife. Continuing to change the way water is abstracted; the treatment of sewage and the upgrading of sewers will significantly improve the quality of rivers and coastal waters, and help to achieve improvements in water bodies and overall improvement in status.

The NEP also includes actions to ensure water companies meet their obligations under the Eel Regulations by installing screens on river abstractions and fish passage routes.

The Environment Agency monitors and reports on water company performance against the NEP to ensure that the outcomes are achieved and to inform the next programme of measures.

2.2.10. Eel management plans

The European eel (*Anguilla anguilla*) population has declined by as much as 95% across Europe since the 1980s. In 2007, the European Union adopted a new Regulation establishing measures for the recovery of the eel stock. In 2009 the UK and other member states produced an eel management plan for each of their river basin districts. These plans are currently being reviewed.

These plans aim to achieve an increase in escapement of adult eel to the sea to spawn. The objective is to achieve at least 40% of pristine escapement levels in the long term. These plans address the causes of the decline by implementing management actions which are achievable. The UK must continue to implement the actions described in the eel management plans. A report on progress is sent to the European Commission every 3 years. The latest report was produced in June 2015.

Supporting information

- You can see the European Council Regulation, EC 1100/2007 here: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:248:0017:0023:EN:PDF>
- You can find the 15 UK eel management plans and the 2012 progress report here: www.gov.uk/government/policies/managing-freshwater-fisheries/supporting-pages/increasing-eel-stocks

2.2.11. Biodiversity conservation

Implementing the WFD contributes to outcomes for nature conservation and biodiversity by improving the water environment. The WFD also includes specific requirements to meet the objectives of water dependent aspects of Natura 2000 sites. These requirements are detailed in section 3.1.2.

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The river basin management plans provide an opportunity to integrate other requirements for improvements in biodiversity such as national legislation and policy to meet the objectives for water dependent Sites of Special Scientific Interest (SSSIs) and priority habitats and species identified in 'Biodiversity 2020: a strategy for England's wildlife and ecosystem services'.

i. Biodiversity 2020

The river basin management plans will contribute to achieving habitat quality, habitat creation and restoration outcomes of Biodiversity 2020 for priority water dependent species and habitats. UK priority species and habitats are those listed under Section 41 of the Natural Environment and Rural Communities Act (2006) as being of principal importance for conserving biodiversity. Priority habitats cover a wide range of semi-natural habitat types, and can exist within or outside Natura 2000 protected areas or SSSIs.

New priority river and lake habitat maps have identified streams, rivers and lakes that are still the most natural in character, containing a dynamic mosaic of habitats and associated species. These maps can be used to help avoid deterioration and to target restoration measures to help conserve and enhance these habitats within a wider programme of action to improve ecological status.

The Biodiversity 2020 strategy recommends that habitat creation and funding needs to be refocused by putting larger and more cost effective schemes in the most appropriate places. For example, wetlands should provide multiple benefits such as flood storage, mitigating diffuse pollution, restoring more natural hydrological regimes, storing carbon, and protecting groundwaters. This is in addition to the government's Biodiversity 2020 outcomes which target floodplain restoration activities on sites identified as having greatest potential for development as priority wetland habitat.

Supporting information

- More information on Biodiversity 2020 can be found here: <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services>
- Supporting information for priority habitats can be found here for rivers: <http://publications.naturalengland.org.uk/publication/5104941191397376?category=432368> and here for lakes: <http://publications.naturalengland.org.uk/publication/5630174502584320?category=430388>
- Detailed maps can be found here: <http://publications.naturalengland.org.uk/publication/6722357675687936?category=432368>
These include the maps of priority river and lake habitat; restoration priorities beyond mapped priority habitat; and lakes requiring further evaluation.
- You can find information on UK Biodiversity Action Plans here: <http://jncc.defra.gov.uk/page-5718>
- Opportunities for wetland creation can be viewed at: www.wetlandvision.org.uk

ii. Ramsar sites

Ramsar sites are wetland sites of international importance. The Environment Agency applies the same considerations to environmental water objectives for Ramsar sites as to WFD protected areas (designated under Article 6 and annex IV of the WFD). Most Ramsar sites in England are also Natura 2000 protected areas and it is likely that, for the majority of these sites, only a few additional measures will be required to meet Ramsar site objectives, in addition to the measures required for the Natura 2000 designation. This is because meeting the conservation requirements for water dependent Natura 2000 protected area interest

features will also meet the conservation requirements for any overlapping water dependent Ramsar features.

For sites that are Ramsar only, criteria are generally broader than for Natura 2000 protected areas. Natural England's designated site database should be used as the principal reference for determining the required measures under the WFD, for any Ramsar sites that are not also Natura 2000 protected areas.

Supporting information

- More detailed information on the measures being used to maintain or restore Ramsar features can be obtained from your local Natural England area team:
http://www.naturalengland.org.uk/about_us/contact_us/

iii. Other non-Natura 2000 and non-Ramsar Sites of Special Scientific Interest (SSSIs)

SSSIs that are not designated as Natura 2000 or Ramsar sites are not treated as WFD 'protected areas'. SSSIs are designated under UK national legislation. Many water dependent SSSIs (except some wetlands and smaller waters) are also WFD 'water bodies'. The attainment of good ecological status for these water bodies, whilst not necessarily equivalent to a SSSI achieving its conservation objectives (as targets for SSSIs may in some case be more stringent), is likely to be an important step towards meeting objectives on those sites and will therefore contribute to delivery of 'Biodiversity 2020'.

The Environment Agency and Natural England work together to ensure the setting of WFD ecological status objectives on these water bodies also complements the requirements for meeting SSSIs objectives and does not present any risk to their achievement.

Supporting information

- For more information on SSSI see:
<http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm>

2.2.12. Invasive non-native species

An invasive non-native, or "alien", species (INNS) is defined as a species introduced outside its normal past or present distribution. INNS are those which threaten ecosystems, habitats or species with environmental or socio-economic harm. The presence of most invasive species is the result of human activity. The presence of high impact INNS prevent a water body achieving high ecological status and the impacts of many INNS prevent water bodies achieving good ecological status.

Water body risk assessments found over 70% of water bodies across all surface categories in England are at risk of deterioration as a consequence of INNS. Reducing the risk of the introduction and spread of INNS can make space for other WFD measures, which in turn will increase the resilience of water bodies to new invasions of INNS and lessen their impacts.

River basin management planning supports the delivery of the aims of the Invasive Non-native Species Framework Strategy for Great Britain which underpins action on invasive species. The key aims of the strategy are: prevention; early detection; surveillance; monitoring and rapid response; mitigation, control and eradication. Control or eradication of an invasive species once it is established is often extremely difficult and costly, while prevention and early intervention have been shown to be more successful and cost-effective.

During cycle 2 of the WFD, the EU invasive Alien Species Regulation will come into force and, depending on the species listed, could help deliver aspects of the Invasive Non-native Species Framework Strategy for Great Britain.

Supporting information

- For more information on invasive species and a link to the Invasive Non-native Species Framework Strategy for Great Britain see: www.nonnativespecies.org
- Species considered high impact for the WFD are listed here: <http://www.wfduk.org/resources/classification-alien-species-according-their-level-impact-revised-list>
- More information and progress updates on the EU invasive species regulation can be found here: http://ec.europa.eu/environment/nature/invasivealien/index_en.htm

2.3. The Environment Agency's role in managing the water environment

The Environment Agency was established under the Environment Act 1995. It is the lead organisation for water management and environmental regulation in England and its principal aim is to protect or improve the environment, and to contribute towards achieving sustainable development.

The Environment Agency's responsibilities include:

- managing flood risk to protect people and property
- overseeing the strategic planning of water resources so that supplies of water are secure and environmental impacts are minimised
- maintaining, improving and developing salmon and freshwater fisheries
- maximising the social, economic, environmental and heritage benefits of the waterways for which the Environment Agency is the navigation authority
- helping to conserve and enhance the diversity of native wildlife and habitats, the landscape and historic environment
- promoting the recreational use of inland and coastal waters and associated land
- protecting, enhancing and restoring the environmental quality of inland and coastal surface water and groundwater

The Environment Agency works within a framework of government policy and legislation (see section 2.1) that defines its powers and duties and environmental aims, objectives and standards. Much of this is based on EU legal requirements.

Managing the water environment involves targeting effort and resources to reduce risks and to provide the greatest benefits for people and wildlife. The Environment Agency brings together different water management functions through a number of iterative activities including:

- monitoring the environment to understand the state it is in and the reasons for this
- planning the measures needed to achieve agreed objectives
- taking action and working with others to achieve these objectives
- checking compliance with standards and permit conditions, and carrying out enforcement activities, if necessary, to make sure that legal requirements are met

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Some of these water management responsibilities are summarised in the diagram below.

Figure 2: Environment Agency regulatory activities



3. The Water Framework Directive

Summary of this section

This section provides an introduction to WFD and gives an overview of the approach to river basin management planning in England. The important role of stakeholders and work in catchments is discussed. The impact assessment and strategic environmental assessment that support the updated plans are discussed.

Topics covered:

WFD and its objectives, river basin management planning, working with others, catchment based approach, river basin management planning timetable, assessments to support the updated river basin management plans

3.1. The Water Framework Directive

The WFD is focused on establishing an integrated approach for the protection and sustainable use of the water environment. This requires a holistic approach to managing waters, looking at the wider ecosystem and taking into account the movement of water through the hydrological cycle.

The WFD is implemented through river basin management and planning that involves setting environmental objectives for groundwater and surface waters (including estuaries and coastal waters) and devising and implementing programmes of measures to meet those objectives.

The WFD also requires that other environmental priorities, economic considerations and social issues are considered and taken into account when setting water management objectives.

WFD aims (Article 1)

- prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands
- promote the sustainable consumption of water
- reduce pollution of waters from priority substances and phasing out of priority hazardous substances
- prevent the deterioration in the status and to progressively reduce pollution of groundwater
- contribute to mitigating the effects of floods and droughts

WFD environmental objectives (Article 4)

- prevention of deterioration in status of surface waters and groundwater
- achievement of objectives and standards for protected areas
- aims to achieve good status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027 or set a less stringent objective
- aims to achieve good ecological potential and good surface water chemical status for heavily modified water bodies and artificial water bodies

WFD environmental objectives (Article 4) continued

- reversal of any significant and sustained upward trends in pollutant concentrations in groundwater
- cessation of discharges of priority hazardous substances into surface waters
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants

WFD additional objectives (Article 7)

- to prevent deterioration in the water quality in the protected area in order to reduce the level of purification treatment required
- the water treatment regime will meet the requirements of Directive 80/778/EEC as amended by Directive 98/83/EC

3.1.1. Preventing deterioration

Under the WFD member states must prevent deterioration of the status of water bodies, except in specified circumstances. Deterioration is formally assessed and reported over the 6 years of a river basin management planning cycle. Sections 4 and 5 of Part 1 of the river basin management plans summarise the cases where deterioration of status has occurred between 2009 and 2015. Measures to prevent deterioration and restore the status of water bodies that have deteriorated are summarised in section 3 of Part 1.

For the updated 2015 plans, the environmental baseline from which the preventing deterioration objective applies is the 2015 classification status for each water body. The 2015 classification status replaces the baseline reported in the plans published in December 2009.

In line with government guidance (see section 2.2.1), the main aspects of the Environment Agency's approach to implementing the preventing deterioration requirements of the WFD are:

- Deterioration from one status class to a lower one is not permitted.
- While deterioration within a status class does not contravene the requirements of the WFD, (except for Drinking Water Directive parameters in drinking water protected areas, and provided that the objectives and requirements of other domestic or European Community legislation are complied with) action should be taken to limit within status class deterioration as far as practicable. For groundwater quality, measures must also be taken to reverse any environmentally significant deteriorating trend, whether or not it affects status.
- Where the water body is already in the lowest status class (bad ecological status or potential, fail to achieve good chemical status, poor groundwater chemical status, poor groundwater quantitative status or protected area not achieving relevant standards) no deterioration will be permitted.
- The preventing deterioration requirements are applied independently to each of the elements that come together to form the water body classification as required by Annex V of the WFD and Article 4 of the Groundwater Daughter Directive. This requirement may not apply to elements at high status.
- To manage the risk of the deterioration of the status of the biological elements for surface waters, the preventing deterioration requirements are applied to the environmental standards for the physico-chemical elements, including those for the moderate/poor and poor/bad status boundaries.

- To manage the risk of deterioration from water abstraction by ensuring river flows continue to support the existing biological elements status and environmental objectives.
- For groundwater the preventing deterioration requirements are applied to each of the 4 component tests for quantitative status and the 5 component tests for chemical status.
- Elements at high status may be permitted to deteriorate to good status provided:
 - the water body's overall status is not high
 - the river basin management plans have not set an objective for the water body of high status
 - the objectives and requirements of other domestic or European Community legislation are complied with
 - action is taken to limit deterioration within the high and good status classes as far as practicable
- As an exception, where the morphology element is at high status, deterioration to good status is not permitted.

Article 4(7) can be used to justify deterioration caused by new modifications to the physical characteristics of a surface water body or alterations to the level of groundwater in specified circumstances.

As the climate changes there may be fundamental alterations to the character of some water bodies. For example, streams might become ephemeral (only flowing in winter) or coastal freshwater water bodies might become saline due to sea-level rise. Without better information on the direction and timing of these changes it is not appropriate to proactively change the objectives that river basin management plans seek to achieve. The priority is on building a baseline understanding of the state of the water bodies and monitoring the performance of measures (such as fish passes, abstraction changes) to ensure they deliver the benefits and resilience required. This approach is in line with European guidance. In line with Defra's catchment based approach the Environment Agency wants to work with catchment partners to clarify the impacts of climate change and implement appropriate measures accordingly. This adaptive management approach is consistent with Defra's guidance on river basin planning and the National Adaptation Programme.

3.1.2. Protected areas

The objectives for protected areas are either governed by the other EU legislation under which they are designated, such as the Habitats Directive for Natura 2000 protected area sites, or under WFD, for example Drinking Water Protected Areas.

The WFD requires member states to establish a register of protected areas. The types of protected areas that must be included in the register are:

- areas identified for the abstraction of water for human consumption (Drinking Water Protected Areas)
- areas designated for the protection of economically significant aquatic species (Shellfish)
- bodies of water designated as recreational waters, including Bathing Waters
- nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive and areas designated as sensitive under Urban Waste Water Treatment Directive (UWWTD)
- areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 protected area sites

Information elsewhere in the river basin management plans

- The register of protected areas was first published in 2004 and has been updated for this plan. You can access the register at <https://ea.sharefile.com/d-s487ae61bf2a4b4fb>

i. Drinking Water Protected Areas

The objectives for drinking water protected areas are to ensure that:

- under the water treatment regime applied, the drinking water produced meets the standards of the Drinking Water Directive plus any UK requirements to make sure that drinking water is safe to drink
- the necessary protection to prevent deterioration in the water quality in the protected area in order to reduce the level of purification treatment required

These objectives are at risk when increasing pollution levels caused by human activity could lead to more treatment being needed in future and where measures are needed to reduce pollution. Safeguard zones are non statutory areas established for 'at risk' abstractions where land use, management practices and other activities can affect the quality of the raw water. Measures to prevent and reduce pollution are targeted within these zones. Safeguard zone action plans are available that detail the issues in the safeguard zones and the work planned to address these issues.

Information elsewhere in the river basin management plans

- You can access surface water safeguard zone action plans here: <https://ea.sharefile.com/d-scac3ff7da4a424eb>
- You can access groundwater safeguard zone action plans here: <https://ea.sharefile.com/d-sa22fd79de304532a>
- You can access DrWPA Safeguard Zones pressure maps here: <https://ea.sharefile.com/d/s7530ff39d5b452db>

ii. Economically Significant Species

In the 2009 plans, waters containing freshwater fish and shellfish were designated as protected areas under their respective European directives. Since then both directives have been repealed and their requirements transferred to the WFD. Designated shellfish protected areas are being retained but there will not be any freshwater fish protected areas and there are no further requirements for areas that were designated under the Freshwater Fish Directive. The WFD is designed to give more relevant and up to date standards for protection of freshwater fish.

The objective for waters designated as shellfish waters protected areas is to protect and, where needed, improve the quality of shellfish waters in order to support shellfish (bivalve and gastropod molluscs) life and growth, and thus contribute to the high quality of shellfish products directly edible by humans. This objective will be achieved by aiming to observe relevant microbial shellfish flesh standards.

Action plans have been drafted for the 97 shellfish waters in England. These action plans describe the issues at each shellfish water and work planned to address these issues.

Information elsewhere in the river basin management plans

- You can access shellfish water action plans here: <https://ea.sharefile.com/d-s84c5554e50947dbb>
- To access maps of shellfish waters for each river basin district please refer to Section 2.4 in the relevant river basin district Part 1 document and use link for the Environment Agency's ShareFile platform

iii. Recreational Waters (Bathing Waters)

The objective for bathing waters as defined by the Bathing Water Directive (BWD) (2006/7/EC) is to preserve, protect and improve the quality of the environment and to protect human health by complementing the WFD. The BWD requires designation of bathing waters which are used by large numbers of people; the bathing waters are then monitored and classified according to standards in the directive for 4 classes “poor”, “sufficient”, “good” and “excellent”. The objective is to ensure that all bathing waters achieve at least the “sufficient” class, and to take such realistic and proportionate measures considered appropriate with a view to increasing the number of bathing waters classified as “excellent” or “good”.

The Environment Agency is focusing on bathing waters that are likely to be poor at the end of 2015, to ensure that the bathing waters with the most severe problems are addressed, but waters at risk of deteriorating in quality are also being prioritised. Plans are in place that include water company improvements, working with the agricultural sector, tackling urban runoff and misconnections and making investigations in those areas where causes and effects of pollution are uncertain.

Measures including water company actions are also being developed to increase the number of bathing waters that are classified as good or excellent.

Information elsewhere in the river basin management plans

- You can access more information on recreational waters on the bathing water explorer here: <http://environment.data.gov.uk/bwq/profiles/>
- You can also access information on recreational waters in the bathing water action plans (continuing at risk) here: <https://ea.sharefile.com/d-s2c9919e38f04798b>

iv. Nutrient Sensitive Areas (Urban Waste Water Treatment Directive)

A sensitive area in the Urban Waste Water Treatment Directive (UWWTD) is a water body identified as affected by eutrophication, or having a surface water abstraction affected by elevated nitrate concentrations from waste water treatment works. Designating a sensitive area is a trigger for action to reduce or prevent further pollution caused by nutrients.

The general objective of the UWWTD is to protect the environment from the adverse effects of urban waste water discharges and waste water discharges from certain industrial sectors.

This is to be achieved by ensuring that discharges from relevant urban waste water treatment plants meet the appropriate emission standards set out in the Directive. For areas affected by eutrophication this includes phosphorus and/or nitrogen reduction measures.

v. Nutrient Sensitive Areas and Nitrate Vulnerable Zones

The general objective of the Nitrates Directive is to reduce water pollution caused or induced by nitrates from agricultural sources and prevent further such pollution. Nitrate pollution is of concern because it has to be removed before water can be supplied to consumers. It can also cause eutrophication (excessive growth of weeds and algae which starves the water of oxygen). Over 60 per cent of nitrate enters water from agricultural land, particularly as

nitrates are spread on agricultural land as fertiliser. Manures and man-made fertilisers all contain nitrates.

This objective is to be achieved either through designating Nitrate Vulnerable Zones (NVZs) within which action programmes to reduce agricultural nitrate losses are implemented, or by applying measures throughout the national territory. In addition a code of good agricultural practice must be established for voluntary implementation by all farmers. In England, instead of designating the whole country for the application of measures, NVZs have been identified which comprise all land draining to 'polluted waters' or waters which may become polluted, as defined by the Directive. 'Polluted waters' are fresh surface waters or groundwaters which do, or could, exceed 50 mg/l nitrate. They are also defined as waters which are, or may become, eutrophic due to nitrates from agricultural sources.

Supporting information

- You can access more information on Nitrate vulnerable zones here: <https://www.gov.uk/nitrate-vulnerable-zones>

vi. Natura 2000 Protected Areas

Natura 2000 is the centrepiece of EU nature and biodiversity policy. It is an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 (as amended) Birds Directive. Natura 2000 is not a system of strict nature reserves where all human activities are excluded. Natura 2000 sites make a significant contribution to achieving favourable conservation status of the habitats and species of European interest in England and the UK.

Natural England is the statutory nature conservation body for England and has responsibility for ensuring that England's unique natural environment including its flora and fauna, land and seascapes, geology and soils is protected and improved. This includes ensuring the protection, improvement and management of Natura 2000 protected areas to meet the requirements of the Habitats and Wild Birds Directives. Natural England has a lead role in implementing these directives and oversees the appropriate management for Natura 2000 protected area sites and provides advice on complying with their objectives.

There are approximately 540 thousand hectares of terrestrial and coastal Natura 2000 protected areas (241 sites) in England which have water dependent features (there are an additional 10 marine Natura 2000 protected areas that fall partly within the WFD 1 nautical mile boundary). Terrestrial and coastal Natura 2000 protected area sites are underpinned by SSSIs that are broken down into management units.

Approximately 96% by area of the underpinning SSSIs units are either in 'favourable condition' or 'unfavourable but recovering condition', whilst 4% are unfavourable and not yet recovering. To achieve favourable condition, and so ensure that the conservation objectives of the Natura 2000 sites are being met, further or ongoing action will be needed on some 42% of recovering sites by area. Continued management of some of those currently in 'favourable' condition (54% by area) may also be required to ensure they maintain this status.

Since the first river basin management plans were published in 2009 the Improvement Programme for England's Natura 2000 Sites (IPENS) has developed site improvement plans (SIPs) for all Natura 2000 sites in England, including the subset that are protected areas under WFD. IPENS also published 'theme plans', which are high-level plans aimed at improving the way in which the Natura 2000 network issues are managed.

SIPs, along with information on existing measures to maintain or restore Natura 2000 sites (held in Natural England's designated site database), need to be considered together to understand the full range of pressures and measures relevant to these sites.

Supporting information

- Further information on the Natura 2000 protected areas is available here: <http://jncc.defra.gov.uk/page-4> and <https://www.gov.uk/protected-or-designated-areas>
- The Natura 2000 site improvement plans are available on Natural England's web site here: <http://publications.naturalengland.org.uk/category/4878851540779008>

3.1.3. Artificial and heavily modified water bodies

Some water bodies contain features that provide valuable social and economic benefits or uses, for instance flood risk management schemes or reservoirs that supply drinking water. In many cases significant physical modifications have been required to support this use, for example, installing a weir or a dam. To achieve good ecological status in many of these water bodies, the existing modifications would have to be altered to such an extent that their function was compromised, such as removing a weir installed for flood defence purposes. It is important to protect the uses that benefit society and the economy. Therefore these water bodies can be designated as artificial or heavily modified (under Article 4.3 of the WFD) and their objectives determined accordingly. An exception to this is if there are other options for achieving the same benefits for society. In these cases designation would not be allowed (European Union CIS guidance document 4, 2003).

Once designated, artificial and heavily modified water bodies are required to reach the objective of good ecological potential. Good ecological potential provides a sustainable balance between the socio-economic, heritage or conservation interests that cause hydromorphological pressures and doing all that can be done to improve the ecological condition of the water body.

To assess ecological potential the pressures, impacts and mitigation measures within a water body are identified by answering a simple set of questions. This mitigation measures assessment was applied to each artificial or heavily modified water body and identified the issues relevant to the physical characteristics of that water body. The mitigation measures assessment is considered alongside the classification of the other elements to determine whether the water body has an overall status of good ecological potential.

For a water body to be able to reach good ecological potential, all of the reasonable mitigation measures to improve and protect the environment have to be in place and functioning. Some mitigation measures may already be in place, but one or more may be missing. If this is the case, the mitigation measures assessment would not support good ecological potential and the water body can only be classified at moderate ecological potential at best.

If a specific mitigation measure would have a significant adverse impact on the designated use or the socio-economic benefits of that water body it is excluded from the classification process and thus would not prevent a water body from achieving good ecological potential. If every possible mitigation measure would create a significantly adverse impact on socio-economic, heritage or conservation interests, then a sustainable balance has already been reached and the mitigation measures assessment in the water body is considered to support good ecological potential.

Artificial and heavily modified water bodies are still required to aim to achieve good chemical status and, if also designated as a protected area, the protected area objectives.

Information elsewhere in the river basin management plans

- Further information on how significant adverse impact on use is assessed is available here: <https://ea.sharefile.com/d-s68d152d0d2e4bb09>

Supporting information

- Further Information on the Mitigation Measures Assessment is available here: <http://www.wfduk.org/resources%20guidance-defining-good-ecological-potential>

3.1.4. Exemptions to the environmental objectives

i. Alternative objectives

In specific circumstances (set out in Article 4.4 and 4.5 of the WFD) member states may deviate from achieving the default objectives. Objectives which are different from the default objectives are referred to as alternative objectives.

Use of alternative objectives is the mechanism which the WFD provides for:

- considering other environmental, social and economic priorities alongside water management priorities
- prioritising measures over successive river basin management planning cycles

The alternative objectives and their conditions are the only relevant considerations when justifying the prioritisation of action under the WFD.

The types of alternative objective are:

- an extended deadline (for example, achieving good status by 2027)
- a less stringent objective (for example, achieving moderate status by 2021)

In some circumstances both may apply to a water body objective (for instance, achieving moderate status by 2027). The table below lists the reasons that can be used for setting alternative objectives.

Table 2: Reasons for setting alternative objectives

Reason	Sub-reason	Guidance notes
Technically infeasible	No known technical solution is available	Applies where there is no practical technique for making the necessary improvement. Does not include financial considerations. Techniques which may be under development but which are not yet known to be effective in practice will fall into this category.
	Cause of adverse impact unknown	Applies where a water body is classed as worse than good but the reason (the pressure or the specific source of the pressure) for this failure has not yet been determined. This may signal the need for an investigation or may reflect genuine scientific uncertainty. Consequently, a solution cannot feasibly be identified.

Reason	Sub-reason	Guidance notes
	Practical constraints of a technical nature prevent implementation of the measure by an earlier deadline	Includes administrative constraints in terms of commissioning, gaining permission for, and undertaking the necessary works. Does not include constraints due to a lack of legislative mechanisms or of funding.
	Problem cannot be addressed because of lack of action by other countries	<p>Application expected to be very limited in the UK. May possibly be applicable:</p> <ul style="list-style-type: none"> (a) in the international river basin districts shared between Northern Ireland and the Republic of Ireland if the problem cannot be resolved through the established partnership working arrangements for those basins. (b) where problems are caused by aerial deposition of transboundary pollutants and (a) local mitigation cannot solve the problem; and (b) discussions with the other countries have not led to effective action. <p>Where this reason is applied, the Commission must be informed about the issue under Article 12.</p>
Disproportionately expensive	Unfavourable balance of costs and benefits	Attaining the default objective is not justified because the costs of the measures exceed the benefits, taking into account qualitative as well as quantitative information.
	Disproportionate burdens	<p>Applies where the measure would be:</p> <ul style="list-style-type: none"> (a) unaffordable to implement within a particular timetable without creating disproportionate burdens for particular sectors or parts of society; or (b) the only solution would be significantly at odds with the polluter pays principle.
Natural conditions	Ecological recovery time	<p>Applies where there is expected to be a delay before the biological quality of the water body recovers.</p> <p>The delay may be due to the time taken for the plants and animals to re-colonise and become established after the hydromorphological, chemical and physicochemical conditions have been restored to 'good'; or the time taken for the habitat conditions to stabilise after improvement works.</p>

Reason	Sub-reason	Guidance notes
	Groundwater status recovery time	Applies where the climatic or geological characteristics dictate the rate at which groundwater levels recover or saline (or other) intrusions reverse once over-abstraction has been addressed.
	Background conditions	Applies where natural background levels of a substance in the environment are such that the level in water body cannot be reduced sufficiently to meet WFD standard.

When applying exemptions for the reasons listed above, additional conditions under Article 4.4 and 4.5 must also be met:

- Article 4.4(b) requires that the reasons for any extension of the deadline are set out and explained in the river basin management plans:
 - Water body and element objectives, including the reasons for any extended deadlines, are summarised in section 2.5 of Part 1 of the river basin management plans
 - Water body and element objectives for every water body in England are available on the Environment Agency's Sharefile service via links in the Part 1 and Part 2 documents.
 - The circumstances in which the above reasons have been used to justify extended deadlines are described in section 5.4.3 of this Part 2 document.
- Article 4.4(c) states that deadlines cannot be extended beyond 2027 except in cases where natural conditions are such that the objectives cannot be achieved by that date:
 - The objective setting process described in section 5.2 of Part 2 takes this condition into account and extensions beyond 2027 have only been set in cases where groundwater or ecological recovery time mean that the objective cannot be achieved before 2027.
- Article 4.4(d) requires a summary of the measures envisaged as necessary to bring water bodies progressively to the required status by the extended deadline to be set out in the river basin management plan:
 - A summary of the programmes of measures to meet objectives for water bodies with extended deadlines is provided in sections 3.2 and 3.5 of Part 1 of the plans.
 - A list of the measures needed to achieve water body objectives for 2027 and beyond is available on the Environment Agency's Sharefile service via links in the Part 1 and Part 2 documents.
 - More information about the mechanisms used to implement measures is available on the Environment Agency's Sharefile service via links in the Part 1 and Part 2 documents.
- Article 4.5(a) states that less stringent objectives can only be set where the environmental and socioeconomic needs served by the human activity that is preventing the achievement of good status cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs:
 - The circumstances in which less stringent objectives have been set are described in section 5.4.3 of this Part 2 document, including identification of the human activities for which no significantly better environmental option can be identified.

- Article 4.5(b) requires that once allowance has been made for the impacts of the human activity or pollution that cannot be avoided, the best possible status must be achieved for the water body
 - The objective setting process described in section 5.2 of Part 2 takes this condition into account. Justifications for alternative objectives are applied at the element level. All elements in a water body that do not have a less stringent objective will have an objective of reaching good or better status.
- Article 4.5(c) requires that no further deterioration occurs in the status of the water body:
 - The objective setting process described in section 5.2 of Part 2 takes this condition into account.
- Article 4.5(d) requires that the reasons for the establishment of less stringent objectives are specifically mentioned in the plans and are reviewed every six years:
 - Water body and element objectives, including the reasons for any less stringent objectives, are summarised in section 2.5 of Part 1 of the river basin management plans
 - Water body and element objectives for every water body in England are available on the Environment Agency's Sharefile service via links in the Part 1 and Part 2 documents.
 - The circumstances in which the above reasons have been used to justify less stringent objectives are described in section 5.4.3 of this Part 2 document.
 - All water body objectives, including less stringent objectives, will be reviewed and where necessary updated as part of the next update of the river basin management plans in 2021.

Information elsewhere in the river basin management plan

- You can view the status objectives for all water bodies in England here: <https://ea.sharefile.com/d-s0faa355450243538>
- You can find a list of the measures needed to achieve water body objectives for 2027 and beyond and more information about the mechanisms used to implement measures on the Environment Agency's ShareFile service here: <https://ea.sharefile.com/d-sabbd14301a44d5e9>

ii. Temporary deterioration in status

In certain circumstances (set out in Article 4.6 of the WFD) a temporary deterioration in status of a water body, caused by exceptional or unforeseen events such as extreme floods, prolonged droughts or accidents, is allowed. The exception does not apply to those effects of extreme floods and prolonged droughts which could reasonably have been planned for and prevented, nor does it apply in the case of accidents which could reasonably have been foreseen.

This exemption requires responsible authorities to demonstrate that:

- all practicable steps were taken to prevent further deterioration in status
- the measures to be taken under exceptional circumstances are included in the programme of measures and will not compromise the recovery of the quality of the body of water once the circumstances are over
- all practicable measures are taken to restore the body of water to its status prior to the effects of those circumstances as soon as reasonably practicable

- a summary of the effects of the circumstances and the measures taken are included in the next update of the river basin management plans

Prolonged droughts

The Environment Agency is responsible for safeguarding water resources in England and protecting the environment. As the regulator of the water environment, the Agency has overall responsibility for safeguarding the environment during drought and overseeing the actions water companies take to secure public water supplies. Water companies are ultimately responsible for managing water supplies to meet the needs of customers.

It is the role of the Environment Agency to monitor, report and act to reduce the impact of drought on the natural environment. The Environment Agency takes specific actions to manage environmental droughts, where low river flows and lake levels have the potential to cause damage to the natural environment and ecology. Water companies are also responsible for maintaining supply while protecting the natural environment. The decision to take action is based on a range of factors, including present and forecast weather conditions and how effective the measure would be. The sequence of measures will differ as all drought events need to be managed on an individual basis.

Prolonged and severe droughts may affect water body status through reduced river flows, damage to or loss of habitat, alterations to bio-chemical composition of the river and impact on water dependent species. A drought is a natural, unpredictable phenomenon and it is not always possible, even with the implementation of appropriate mitigation measures, to avoid the effects of drought or prevent temporary deterioration in water body status throughout a prolonged drought.

Water company drought plans set out the measures that should be taken to minimise environmental impacts and maximise available supplies during a drought, without causing deterioration where possible. Effective monitoring of environmental indicators also helps to differentiate between the natural impacts of drought and the impacts caused by human activity such as the implementation of drought permits and orders. This is important to show that any temporary deterioration resulted from the natural impacts of the drought.

If the impacts of a drought temporarily cause deterioration to water body status and all the criteria in Article 4.6 can be met, this defence can be used as a justification why an objective set in a river basin management plan has not been met. This is always done on a case by case basis.

Supporting information

- You can find more information on managing drought here:
<https://www.gov.uk/government/policies/maintaining-secure-water-supplies-high-standards-of-drinking-water-and-effective-sewerage-services/supporting-pages/water-resource-management>

Extreme floods

The Environment Agency is responsible for providing flood forecasting and warnings to the public in England. This involves monitoring rainfall, river levels and sea conditions. Combined with weather data and tidal reports the Environment Agency provides local area forecasts on the possibility of flooding and its likely severity.

Severe floods may have an impact on water body status through effects such as the loss of habitat (for example, by scouring of sediments and in-stream vegetation), the physical displacement of species or increased inputs of pollutants including sediment. These impacts may be localised and of insufficient magnitude to affect the status of an entire water body.

The condition of water bodies is assessed on an annual basis and therefore any changes in status due to a severe flood may not be detected until up to a year after the event.

Accidents

The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 implement the Environmental Liability Directive in England. Under the Regulations, environmental damage includes water damage which is defined as damage to surface waters or groundwater causing a change to water body status.

This means either a deterioration of water status overall or a deterioration in status of any of the individual elements or parameters used to classify the water body.

Adverse effects that are short-term or limited in their geographical extent are unlikely to amount to environmental damage.

When environmental damage is confirmed, the regulations include a remediation objective of achieving the same level of natural resources or services that would have existed if the damage had not occurred.

iii. New modifications or new sustainable development

New modifications or new sustainable human development activities may be permitted even though they might compromise the achievement of certain WFD objectives (Article 4.7 of the WFD). Certain new developments provide valuable benefits to society that outweighs the environmental or societal benefits of achieving WFD objectives. Such benefits may include those provided by activities such as:

- public water supply
- flood defence
- navigation and transport
- urban development
- rural land management

Any modifications or activities considered likely to compromise WFD objectives must undergo a thorough assessment before they can be permitted under Article 4.7 and must also ensure other related objectives are not compromised as a result of the proposed activities. An assessment must provide evidence to satisfy the following conditions:

- all practicable steps are taken to mitigate the adverse impact on the status of the water body
- the benefits to human health or human safety or sustainable development outweigh the benefits of achieving WFD objectives or the activity is of overriding public interest
- there are no other means of providing the services offered by the activity that are technically feasible or of a proportionate cost and provides a significantly better environmental option

In addition, the reasons for the modifications or activities must be specifically explained in the river basin management plans and relevant objectives are reviewed every 6 years.

The Environment Agency works with public bodies, developers and its own operational functions to ensure WFD objectives (including the correct application of Article 4(7)) are met.

3.2. River basin management planning

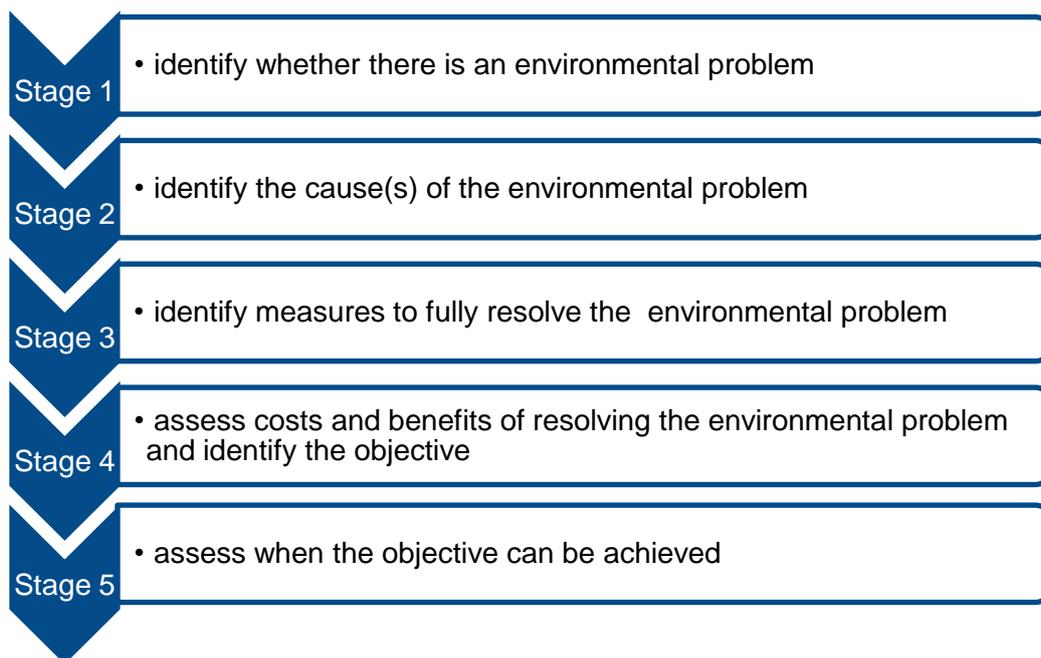
River basin management planning is a continuous, cyclical process that is punctuated at intervals by the formal consultation and reporting that is required by the WFD. This is illustrated in the diagram below. The consultation and reporting required as part of updating the plans are described in section 3.5.

Figure 3: River basin planning cycle



This ongoing river basin management planning process can be broken down into five main stages as shown below.

The different stages in this process are described in more detail in this document and additional information. Where a section of this document is relevant to a particular river basin management planning stage, this is indicated by an icon next to the section heading, for example,



Depending on the specific objectives being considered, not all stages of the overall process may be relevant. For example, for preventing deterioration stage 4 does not apply because no cost-benefit assessment of the actions needed to prevent deterioration is required.

 Stage 1 of river basin management planning is to assess whether there is an environmental problem. Possible problems might include the failure of a protected area to achieve its objective, a water body that has deteriorated in status (or is at significant risk of deteriorating), or a water body that is assessed as being at less than good status

The condition of Natura 2000 protected areas are assessed by Natural England. The condition of all other protected areas is assessed by the Environment Agency. The current status of water bodies is assessed mainly through the process of classification. Comparison of these results over time will indicate whether any deterioration in that status is occurring. Classification results are one of the pieces of information that can indicate whether there is an environmental problem in a water body but other information, including information from stakeholders, can also be used to help determine whether or not, there is a problem.

 Where a protected area is failing to achieve its objective, where deterioration in water body status occurs or where elements in water bodies are failing to achieve good status, the cause of the problem must be determined in order to identify appropriate solutions (stage 2).

In order to understand the causes of problems the Environment Agency has carried out thousands of investigations since the 2009 plans were published. These have greatly improved the understanding about why water bodies are not at good status. Additional investigations are required to understand new failures to achieve water body objectives and also where deterioration is detected and the reasons for that deterioration are not known.

 Measures may be needed to reduce the impact of current problems or prevent future problems such as deterioration in status. Where more than one technically feasible measure is available the most cost effective approach is selected (stage 3). All of the measures required to fully resolve the problem are identified.

 The cost effective and technically feasible measures needed to achieve good status across all water bodies in each catchment are grouped together and subject to economic appraisal to identify those measures where implementation is justified because the benefits to society from implementing the measures exceed the costs of putting the measures in place (stage 4).

While it is important to understand the costs and benefits of measures needed to achieve protected area objectives and those to address deterioration in water body status, the objectives for protected areas and preventing deterioration must still be achieved, even where costs outweigh benefits. The requirements for shellfish water protected areas have been subsumed into the Water Framework Directive. As a result objectives for these protected areas are subject to the same tests of disproportionate cost and technical feasibility as water body objectives.

The outcomes that will be achieved from implementing the measures are used to identify the best future condition or status that could be achieved for protected areas and water bodies. The 'best' future status, which may be less than good status (that is a less stringent objective), is the status that is expressed in the water body status objectives in the plans.

 When this future condition or status can be achieved is determined by considering how and when the measures to achieve the objectives will be funded and implemented and the time it will take for the environment to recover (Stage 5).

Information on the sectors that are responsible for the pressures on protected areas and water bodies and the costs of the measures needed to achieve the objectives are summarised in the impact assessment that accompanies the river basin management plans.

This 5-stage process identifies the objectives published in the plans. Monitoring and classification will be used to assess compliance against the objectives and the planning cycle is repeated.

3.3. Working with others

Responsibility for improving the water and wider environment cannot rest exclusively with government. As the WFD encourages, all of society has an impact upon and so needs to play a part in its protection and improvement. By working effectively with others better solutions are agreed and the things that matter most to people are protected. Working with others is therefore at the heart of a successful river basin management planning process. To support this, the Catchment Based Approach has been established to engage with local communities and jointly plan action on an on-going basis.

The WFD includes legal obligations (under Article 14) on consultation and engagement. This includes encouraging the active involvement of all interested parties in the implementation of the directive, in particular in the production, review and updating of the river basin management plans. As part of updating the 2009 plans, the Environment Agency carried out 3 formal consultations in each river basin district and ongoing engagement with stakeholders to gather input from others to help improve the plans. The results have been used to ensure that the plans set out the best ways to protect and improve the water environment. The consultations and engagement have helped build understanding about the value of integrated river basin management, and helped build support from others to drive action.

Working with others is an ongoing process. It aims to build collaborative, long-term relationships through a journey of continual conversation with those who have an interest in or responsibility for river basin management planning.

Supporting information

- For information about consultations and engagement in each river basin district and at a national level please see the 'Summary of public information and consultation taken' here: <https://www.gov.uk/government/consultations/update-to-the-draft-river-basin-management-plans>

3.3.1. National liaison panel for England

Representatives of major sectors and national organisations make up the national liaison panel for England. The panel takes an active role in the implementation of the WFD at a national level to:

- contribute to the implementation of national measures
- enable and encourage action by others
- track general progress of implementation of the river basin management plans

The national liaison panel also has an Estuaries and coasts sub group, made up of representatives from those sectors that can help deliver the measures in estuarine and coastal waters.

Supporting information

- The full terms of reference for the national liaison panel for England are available to access here: <https://ea.sharefile.com/d-sb837ac69be84a70a>

3.3.2. River basin district liaison panels

Representatives of major sectors, organisations and catchment partnerships make up the 8 river basin district liaison panels.

The role of liaison panels is to:

- contribute evidence to enable decision making and reporting on river basin management plans
- devise and track measures and projects as part of a programme of work to prevent deterioration and improve the environment
- work with members and their sectors to ensure a broad base for decision making and communication
- assist and champion the implementation of the catchment based approach

To carry out this role, liaison panel members communicate with, and through, their organisations and sector or catchment networks.

Supporting information

- The full terms of reference for river basin district liaison panels are available to access here: <https://ea.sharefile.com/d-s45f582279384593b>

3.4. Working at the catchment scale

Since March 2011, Defra, the Environment Agency and a variety of other organisations have been developing a Catchment Based Approach (CaBA). Central to CaBA is engagement of local stakeholders to establish common ownership of problems and their solutions, building partnerships to implement actions at the local level. The CaBA aim is to balance environmental, economic and social demands and align funding and actions within river catchments to bring about long term improvements.

Following a successful pilot phase Defra published their CaBA Policy Framework in June 2013. A practical guide for catchment management was developed as a handbook to translate the lessons learned from the pilot phase into useful guidance and reference material. An independent National Support Group and website were established to assist innovation and further evolution of the approach in England.

There are now over 100 Catchment partnerships actively working in all of England's catchments. More than 1,500 organisations, including water companies and environmental charities are engaged, supported by a network of dedicated Environment Agency catchment coordinators. The partnerships share evidence and agree, co-fund and deliver strategic priorities for their catchment.

Supporting information

- To access a copy of the Natural Environment White paper discussion document: record response, please see: <https://www.gov.uk/government/news/natural-environment-white-paper-discussion-document-record-response>
- To access the UK National Ecosystem Assessment website, please see: <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx>
- To access the Water for Life market reform proposals please see: <https://www.gov.uk/government/publications/water-for-life-market-reform-proposals>
- To access the Defra evaluation of the catchment based approach pilot stage please see: <http://www.catchmentchange.net/wp-content/uploads/2012/10/Baseline-Report.pdf>
- To access the 'organisational understandings and commitments for collaborative catchment management: a survey of local initiatives' final report please see: <http://ccmhub.net/wp-content/uploads/2012/10/Defra-WT0997-Final-Report-July-2013.pdf>
- To access the 'Catchment Based Approach: Improving the quality of our water environment' policy framework please see: <https://www.gov.uk/government/publications/catchment-based-approach-improving-the-quality-of-our-water-environment>
- To access the list and map of catchment partnerships in operation please see: <https://www.gov.uk/government/publications/catchment-partnerships-in-operation-list-and-map>
- You can find more information on the liaison panel and details about membership in the record of consultation and engagement here: <https://www.gov.uk/government/collections/river-basin-management-plan-update>.
- You can find examples on how the Environment Agency has used information from others in the consultation response document here: <https://www.gov.uk/government/collections/river-basin-management-plan-update>.
- You can find more information on the catchment based approach on the catchment based approach web pages here: <http://www.catchmentbasedapproach.org/>
- You can find a copy of the handbook for catchment management here: <http://ccmhub.net/wp-content/uploads/2012/10/The-Guide.pdf>

3.5. River basin management planning timetable

Most of the river basin management planning activities are continual and iterative. There are defined points for consultation and reporting as part of developing and updating the river basin management plans. The timetable for the steps required is shown in the diagram below.

Figure 4: River basin planning consultation and reporting process

Stage	Date and duration	What's the purpose?
Working together - consultation	June 2012 6 months	<p>“How should we all work together to update the river basin management plans?”</p> <p>Asking how you want to be involved</p> <p>Explaining the key steps in the river basin management planning process for Cycle 2</p> <p>Establishing a network of contacts for cycle 2 planning</p>
Challenges and choices - engagement	June 2012 to May 2013 Approx 12 months	<p>“What are the most significant water environment issues, what are the options for tackling them and which do you prefer?”</p> <p>Improving the evidence base that will be used to inform the review of the river basin management plans</p> <p>Seeking broad agreement about the principles behind taking action</p>
Challenges and choices - consultation	June 2013 6 months	<p>“Have the significant issues been fairly summarised and what can be done about them?”</p> <p>Sharing the latest evidence including results of investigations and assessment of the risk of water bodies deteriorating or not achieving their objectives</p> <p>Seeking views on how to prioritise action</p> <p>Explaining catchment plans and how they relate to the river basin management plans</p>
Follow up engagement	October 2013 to May 2014 Approx 8 months	Following the consultation, the Environment Agency will consider the responses and where necessary facilitate further engagement for groups of stakeholders where there are areas which need further discussion.
Draft river basin management plans - consultation	October 2014 6 months	<p>“Does this draft plan set the right level of ambition for the water environment and a strong commitment to deliver?”</p> <p>Estimating the likely state of the water environment in 2021 and 2027.</p> <p>Proposing water body objectives</p> <p>Outlining who would be involved to achieve these outcomes in 2021 and 2027, how much it will cost and the benefits</p>
Follow up engagement	April 2014 to August 2015 Approx 5 months	Following the consultation, the Environment Agency will consider the responses and where necessary further develop the content of the plans with delivery partners to ensure the updated plans are the best possible and fully supported
Published river basin management plans	October – December 2015	<p>“This is the plan to address the issues”</p> <p>Publishing proposed river basin management plans in October and submitting to Government for approval. The approved RBMP will be published in December. These plans will be used as a framework to direct planning and action and to track progress in each river basin district</p>
Implementation and ongoing engagement	January 2016 onwards	Following publication of the updated RBMP the Environment Agency will continue to work with delivery partners to achieve the objectives set out in the plans

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3.6. Recovery of costs for water services

Article 9.2 of the WFD requires that river basin management plans report on the contribution made by various water uses to the recovery of costs for water services. This section describes the steps taken by the water industry and its regulators.

3.6.1. Economic regulation

Public water supply and sewerage services in England were privatised in 1989. Since privatisation the water industry has been regulated to protect consumers and the environment. Ofwat is the independent economic regulator for the water industry in England and Wales. Every five years Ofwat sets price limits based on water company business plans, produced in dialogue with the Environment Agency, the Drinking Water Inspectorate, NGOs, customers and others. These plans set out in detail how much each company needs to charge its customers to provide water and sewerage services where relevant and to comply with its statutory obligations.

The water company business plans and charges therefore reflect the cost of:

- collecting or abstracting water
- building and maintaining pipes and ensuring a secure supply of drinking water to businesses and households
- treating water and sewerage to meet environmental standards.

Thus the costs of providing resilient water and sewerage services are recovered through customer bills.

Ofwat's approach under PR14 also introduced changes that will help improve ecosystem resilience, such as a focus on outcomes and the use of a total expenditure (totex) approach to cost assessment. The totex approach seeks to address a potential incentive towards capital solutions, which may have a less favourable impact on the environment than operating cost solutions.

Actions associated with water company business plans for the period 2015 to 2019 will result in:

- 6000km of rivers and 50 bathing waters across England and Wales being improved or protected
- £70 million for better protection of migrating eels and other fish
- a reduction in diffuse pollution across more than 180 river catchments

For other abstractors, as well as covering the costs of managing water resources, current charges for water abstraction include an element to fund licence changes to address unsustainable abstraction. This is done using the abstraction charges scheme which is made up of a Standard Unit Charge and the Environmental Improvement Unit Charge.

3.6.2. Water metering

One way water companies can help to reduce the environmental costs of public water supply and provide appropriate incentives is to make cost of supplying water more visible to consumers by encouraging households and businesses to install water meters. The current situation on uptake of water meters across England is as follows:

- Current meter penetration in England is over 50% and this is expected to rise to 66% by 2020 and 82% by 2040 (as reported in the water companies' water resources management plans).

- Water companies in areas of ‘serious water stress’ (where current or likely future household demand is a high proportion of the water available to meet that demand) may choose to introduce universal metering programmes through their water resources management plans, if the evidence shows that this is the most cost-beneficial way to address the issue.
- Seven water companies: Affinity, Anglian, Essex and Suffolk, South East, Southern, Sutton and East Surrey, and Thames are in areas designated as being in serious water stress.
- Of these, four have universal metering programmes in place: Affinity (currently at 47% meter penetration), South East (65%), Southern (77%) and Thames (34%).
- Universal metering programmes are not the only way that water companies can encourage uptake of meters. Anglian and South West currently have 74% and 76% metering penetration respectively, as a result of customers opting to switch to a metered charge.

3.7. Assessments of the river basin management plans

3.7.1. Strategic Environmental Assessment

A strategic environmental assessment (SEA) has been undertaken to fulfil the requirements of the Environmental Assessment of Plans and Programmes Regulations 2004 (known as the ‘Strategic Environmental Assessment Regulations’). This requires plans within certain sectors (including the water sector) that provide a framework for future development to be subject to a SEA to ensure that the environment is considered from the outset.

The objective of a river basin management plan is to improve the water environment. As a result it is anticipated that most environmental effects are likely to be positive. Nevertheless, the plans have the potential to have intended or unintended consequences for people and the wider environment. The Environment Agency used SEA to assess the potential effects of the plans and reported the results in an Environmental Report that accompanied the consultation on the updated plans. The approach to SEA is summarised below.

i. Scope of SEA

The scope of the SEA was to include all measures being proposed for catchments but to consider the significance of their effects at a river basin district scale. This was set out in scoping reports as part of the ‘Challenges and choices’ consultation in 2013. As part of the agreed scope and approach to SEA, the assessment was integrated with the RBMP preparation and appraisal process to record where benefits or disbenefits to ecosystem services were likely to occur. This enabled the SEA to influence the results of the appraisal locally.

ii. SEA Consultation and links to the Environmental Reports

The SEA Environmental Reports were published alongside the consultation on the draft updated river basin management plans. Consultees were asked to comment on the scope and conclusions of the SEA for each plan. The RBMP consultation response document includes a summary of the main comments received on the Environmental Report and how these have been addressed.

Supporting information

- The Environmental Report can be found here: <http://www.gov.uk/government/consultations/update-to-the-draft-river-basin-management-plans>

iii. SEA Statement of Particulars

A SEA Statement of Particulars (SoP) has been produced for each plan. The SoP sets out how the RBMP has taken into account the findings of the SEA Report (for the draft RBMP) and of the views expressed from the consultation. It also sets out how the implementation of the plans will be monitored for its effects on the wider environment.

Supporting information

- The SEA Statement of Particulars can be found here: <https://www.gov.uk/government/collections/river-basin-management-plans-2015>

3.7.2. Habitats Regulations Assessment

A Habitats Regulations Assessment of each river basin management plan has been carried out by the Environment Agency, in consultation with Natural England and Natural Resource Wales. This is to fulfil the requirements of the Conservation of Habitats and Species Regulations 2010, the Habitats Regulations. The assessment considers whether each plan is likely to have a significant effect on any designated European sites (Natura 2000 sites) or Ramsar sites based on the level of detail in the plan.

The assessment demonstrates that sufficient controls are in place to identify any potential risks to European sites when the actions required to implement the measures are developed. The controls and the range of potential mitigation measures available allow a conclusion to be made, at this strategic plan level, that there is no likely significant effect from the river basin management plans on European sites. Before any measures in the plans are implemented they must be subject to the requirements of the Habitats Regulations 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.

Supporting information

- The Habitat Regulations Assessment Report can be found here: <https://www.gov.uk/government/collections/river-basin-management-plans-2015>

3.7.3. Impact Assessment

The plans are supported by an impact assessment that reports an analysis of the costs and benefits of two options: continuing with the objectives in the 2009 plans ('baseline option') or implementing the objectives of the plans ('proposed option'). Information on the costs and benefits is summarised for 4 sector groupings for England and for each river basin district. Further information on the updated economic analysis of the programme of measures is in section 5.3 of this document.

Supporting information

- A copy of the impact assessment is available to access here: <https://www.gov.uk/government/collections/river-basin-management-plans-2015>

3.8. Competent authorities for river basin management planning

In England the appropriate authority for the implementation of the WFD is the Secretary of State for Environment, Food and Rural Affairs. The appropriate authority:

- has general responsibility for ensuring the WFD is given effect
- has specific responsibilities for ensuring that appropriate economic analysis is carried out, approving proposals for environmental objectives and programmes of measures and approving the river basin management plans
- may give guidance or directions to the Environment Agency, and any other public body, on the practical implementation of the WFD
- has the duty to ensure that the requirements of the WFD are given effect in relation to each river basin district as a whole

The Environment Agency is the competent authority for producing and updating the river basin management plans in England. The Environment Agency:

- is responsible for identifying, characterising and in certain circumstances monitoring Drinking Water Protected Areas, and identifying measures where water quality is deteriorating and establishing a register of those waters and other protected areas
- has to prepare proposals for environmental objectives and programmes of measures for each river basin district and prepare draft river basin management plans
- must also ensure public participation in preparation of the river basin management plans and make certain information required under the WFD accessible to the public

Secretary of State

The Secretary of State is legally part of the Crown and is not established in legislation.

Secretary of State for Environment, Food and Rural Affairs, Nobel House, 17 Smith Square, London, UK SW1P 3JR

Environment Agency

The Environment Agency is a non-departmental public body established by the Environment Act 1995.

Environment Agency, Horizon House, Deanery Road, Bristol BS1 5AH

4. Defining and describing the water environment

Summary of this section

This section describes how the water environment is divided up and characterised to support implementation and reporting for WFD. It explains how the water environment is monitored and its condition assessed and reported. The section then describes the main challenges affecting management of the water environment in England, how future risks have been assessed and causes of current problems identified.

Topics covered:

River basin districts and water bodies, typology, designation of artificial and heavily modified water bodies, protected areas, monitoring networks, classification methodologies, recent changes to how classification is carried out, significant water management issues, risk assessments and reasons for not achieving good status.

4.1. River basin districts and water bodies

The WFD covers all waters, including inland surface waters, groundwater, estuaries and coastal waters, independent of size and characteristics.

For the purpose of implementing the WFD, waters were assigned to geographical or administrative units: the river basin, river basin district and water body.

The river basin is the area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth or estuary.

The river basin district is the main unit for management of river basins under the WFD. River basin districts in England were identified by the Secretary of State in 2003. A river basin district includes the area of land and sea made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters. The river basin districts in England and those that are cross border with Wales and Scotland are shown on the map below.

Water bodies are the units used for reporting and assessing compliance with the principal environmental objectives of the WFD. The environmental objectives of the WFD apply to water bodies and so the main purpose of identifying water bodies is to enable status to be accurately described and compared to the environmental objectives set out in the directive.

The WFD defines a surface water body as a 'discrete and significant element' of surface water such as a lake or reservoir or entire (or part) stream, river or canal, estuary or stretch of coastal water (out to 1 nautical mile, and for chemical status only, this extends to the limit of territorial waters which may extend up to 12 nautical miles).

A groundwater body is a distinct volume of groundwater within one or more aquifers.

Figure 5: River basin districts in England and cross border with Wales and Scotland



Water bodies in England were identified as part of a 'characterisation' process in 2003.

Water body categories, such as groundwater or coastal waters, are delineated as a discrete area and are shown as this total area for reporting purposes.

Whilst all lengths of river, stream or drainage channel in the defined catchment areas of a water body are protected and managed, reporting uses a river line within that catchment.

For the 2009 plans this river line (often referred to as the 'blue line') was derived from the 1:50,000 scale river network. This has been updated using the 'detailed river network'. This river line is purely a reporting network and it is this river line which appears on maps in the river basin management plans.

The original water body 'building blocks' used in the 2009 river basin management plans have been revised for the updated plans. This has resolved a number of errors and removed a large number of very small streams that are less than 1km in length or with a catchment of less than 10 km². These non-reportable water bodies are not reported to Europe.

The WFD covers all bodies of surface water not just those represented as a blue-line on WFD maps. Where a stretch of water is too small to be formally a water body, or is too small to show up on a map of the water body it is still protected by law from pollution, modification and abstraction and can still be improved where local actions and assessments deem it to be a priority.

Using catchments for river basin management planning in England

Taking a catchment based approach helps to bridge the gap between management planning at river basin district level and activity at the local water body scale. The catchment scale is large enough to add value at a strategic level but small enough to encourage local scale engagement and action.

In England each RBD is divided into a number of management catchments to facilitate presentation of data and information. These are large catchments with many, often interconnected, water bodies. They are based on the catchments used for managing the availability of water for abstraction and flood risk management. Seventy five catchment partnership groups work at this management catchment scale.

These management catchments have been further divided into operational catchments covering a small number of water bodies (typically 1 to 10) based around the same local geography or sharing specific pressures. Economic appraisals (see section 5.3) have been based on operational catchments. Twenty four catchment groups work at a level similar to the 'operational catchment' scale.

Information elsewhere in the river basin management plans

- You can view the number of water bodies in England for the second cycle of river basin management planning here: <https://ea.sharefile.com/d-s9a6aac8d0f444e38>

4.1.1. Surface water body types and reference conditions

The sorts of animals and plants found in upland, rocky, fast-flowing streams are naturally very different to those found in lowland, slow flowing, meandering rivers. Therefore, to predict the animals that would be found in high status surface water bodies they are grouped into different types according to their physical and chemical characteristics.

Descriptions covering the sorts of plants and animals expected to be found in the different types of water bodies in undisturbed conditions have been produced for each type or group of types. These types are the ones that have been used in the characterisation of each river basin district. In some cases there are no sites in reference condition in the UK and descriptions are based on similar types in other member states, extrapolation from modelling studies, or historic data and/or expert opinion. For some methods more detailed site specific reference conditions have been used.

Reference conditions and the conditions found in high status waters are the same. The ministerial directions on environmental standards give the values for high status for biological and physico-chemical elements and include screening approaches for high status hydrology and morphology. To be in overall reference condition or high status, a water body needs to comply with all the criteria monitored: biology, physico-chemical, hydrological regime, morphological and chemical criteria.

Information elsewhere in the river basin management plans

- To access maps of the water body typology for each river basin district please refer to Section 2.5 in the relevant river basin district Part 1 document and use the river basin district data download link.

Supporting information

- For more detail on how reference values have been determined for each of the biological elements see the UK Technical Advisory Group (UKTAG) Assessment Methodologies here: <http://www.wfduk.org/>
- The reference conditions descriptions for rivers, lakes, groundwater, estuarine and coastal waters are given in detail on the UKTAG website here: <http://www.wfduk.org/resources/category/characterisation-water-environment-3>
- The ministerial directions on environmental standards are available here: <http://www.legislation.gov.uk/uksi/2015/1623/resources>

4.1.2. Designation of artificial water bodies and heavily modified water bodies

In the 2009 plans water bodies were designated according to their specified use and the current extent of that use. This followed a series of consultations, cross-references and quality checks, including river basin district liaison panel involvement.

The Environment Agency has reviewed the designations of water bodies. Changes to designations are being proposed in response to a changing environment, stakeholder comments or where errors have been identified in the current designations.

As a result of the review of designations 43% of water bodies are now considered to be 'artificial' or 'heavily modified'.

Information elsewhere in the river basin management plans

- You can view the number of water bodies in England considered to be 'artificial' or 'heavily modified' and the specified uses that have led to this designation here: <https://ea.sharefile.com/d-s9a6aac8d0f444e38>
- For more information on the designation review that has taken place you can access the document 'Revised HMWB designations and proposed designations of new water bodies' here: <https://ea.sharefile.com/d-s68d152d0d2e4bb09>

4.2. Assessing the current state of the water environment

4.2.1. Protected areas

Protected areas are parts of the environment requiring special protection under EU legislation for the protection of their surface water and groundwater or for the protection of habitats and species directly dependent on water. The Environment Agency has routine monitoring programmes in place for assessing compliance for Bathing Waters, Habitats Directive Sites and Drinking Water Protected Areas, and under WFD for Shellfish Protected Areas. Other information is also used to assess compliance in protected areas including conceptual models and modelling data, some of which are from third parties such as water companies.

Information elsewhere in the river basin management plans

- You can find the detailed current status of bathing waters, shellfish waters, drinking water and water-dependent Natura 2000 protected areas here: <https://ea.sharefile.com/d-s487ae61bf2a4b4fb> and summary tables here: <https://ea.sharefile.com/d-s9a6aac8d0f444e38>

Supporting information

- The condition of the SSSI units underpinning Natura 2000 protected areas can be viewed at <http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm>
- Definitions of the condition categories can be found here: <http://www.sssi.naturalengland.org.uk/Special/sssi/glossary.cfm>
- Detailed information on the measures being used to maintain or restore condition of these sites can be obtained from your local Natural England area team http://www.naturalengland.org.uk/about_us/contact_us/

4.2.2. Water body status monitoring networks

A network of monitoring sites is used to establish the status of all water bodies within each river basin district in terms of their ecology, chemistry, hydromorphology and groundwater level.

In surface waters, a small network of surveillance monitoring sites is used to provide information on long-term natural and anthropogenic trends. In rivers and lakes an additional, larger network is used to classify water bodies according to the pressures acting on the environment. In coastal and estuarine waters the operational monitoring programme has traditionally focussed on two priority pressures, nutrients and chemicals from point source discharges.

A groundwater quality monitoring network meets the surveillance and operational monitoring requirements for chemical status and trend assessment and a groundwater level monitoring network is used to meet the requirements of quantitative status assessment.

Information elsewhere in the river basin management plans

- To access a map of the monitoring network for each river basin district please refer to Section 2.5 in the relevant river basin district Part 1 document and use the river basin district data download link.

4.2.3. Assessment of water body status



Water bodies are assessed by classifying data collected from a monitoring network. For a particular point in time a classification will show whether the quality of the environment is good, or where it may need improvement.

Classification is just one part of the evidence base that helps to focus efforts on those water bodies where improvement measures might be needed. Additional information is sometimes required to assess whether a classification result is really indicative of an environmental problem; this is known as a weight of evidence approach. Additional evidence may also indicate where problems exist which are not apparent through classification results alone. The Environment Agency's weight of evidence approach to assessing environmental problems is described in more detail in section 4.2.4.

For surface water bodies there are two separate classifications; ecological and chemical. For a water body to be in overall good status both ecological and chemical status must be at least good.

For groundwater bodies there are two separate classifications; chemical status and quantitative status. Each must be reported in addition to the overall groundwater body status. For a groundwater body to be at good status overall both chemical status and quantitative status must be good. In addition to assessing status there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution which may lead to a future deterioration in status.

i. Ecological status

Ecological status classification consists of:

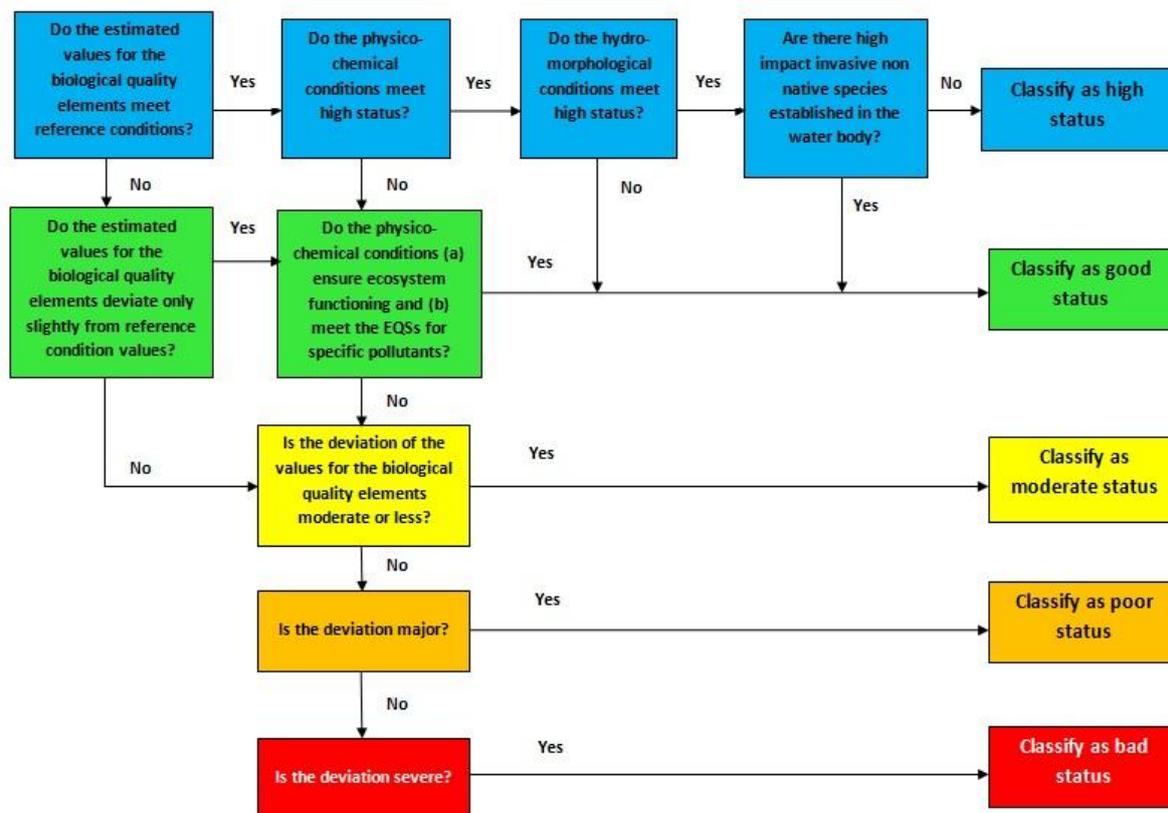
- the condition of biological elements such as fish and invertebrates, including the presence of any invasive non-native species at high status water bodies
- concentrations of supporting physico-chemical elements, for example, phosphate and ammonia levels
- concentrations of specific pollutants, for example, copper
- and for high status, largely undisturbed hydromorphology

The decision tree below illustrates the criteria used to determine the different ecological status classes.

Ecological status is reported on the scale of high, good, moderate, poor or bad. High denotes largely undisturbed conditions and the other classes represent increasing deviation from this reference condition. The classification of ecological status for the water body and the confidence in this assessment is determined by the worst scoring quality element.

Hydromorphological elements (hydrology and morphology) are supporting elements of ecological status and are used to define high ecological status.

Figure 6: Criteria to determine ecological status classes



ii. Surface water chemical status

Chemical status is determined by assessing compliance with environmental standards for chemicals that are listed in the Environmental Quality Standards (EQS) Directive (2008/105/EC) as amended by the Priority Substances Directive 2013/39/EU. Good chemical status is achieved if every EQS is met: a single EQS failure means good status for the water body cannot be achieved.

Supporting information

- You can find the amended Environmental Quality Standards Directive here: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013L0039>

iii. Groundwater status - chemical and quantitative

The achievement of good status in groundwater involves meeting a series of conditions which are defined in the WFD (2000/60/EC) and the Groundwater Directive (2006/118/EC). In order to assess whether these conditions are being met, a series of tests has been designed for each of the quality elements defining good (chemical and quantitative) groundwater status.

There are 5 chemical and 4 quantitative tests. Each test is applied independently and the results combined to give an overall assessment of groundwater body chemical and quantitative status. The worst case classification from the relevant chemical status tests is reported as the overall chemical status for the groundwater body. The worst case classification of the quantitative tests reported as the overall quantitative status for the groundwater body. Groundwaters are classified as either at good or poor status.

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Groundwater threshold values have been set for all groundwater bodies as triggers to aid risk, status and trend assessment. These are not the boundary between good and poor status, rather exceeding these values prompts further investigation to determine whether the conditions for good status have been met. These values are set at a national level except for those used for wetlands and for surface water where they are water body specific. The threshold value for nitrate has decreased and the method for calculating the threshold value for surface water has changed. In addition threshold values for wetlands based on nitrate concentrations in groundwater have been used. These replace previous thresholds which were based on phosphorus concentrations.

Further information in this document

- You can find out more detail about risk assessments for the river basin management plans in section 4.4.3 of this document.

Information elsewhere in the river basin management plans

- You can find more detail on threshold values and the process undertaken for defining risk assessment for chemical groundwater bodies here: <https://ea.sharefile.com/d-s907bd03e9e74b74a>

iv. Groundwater trend assessment

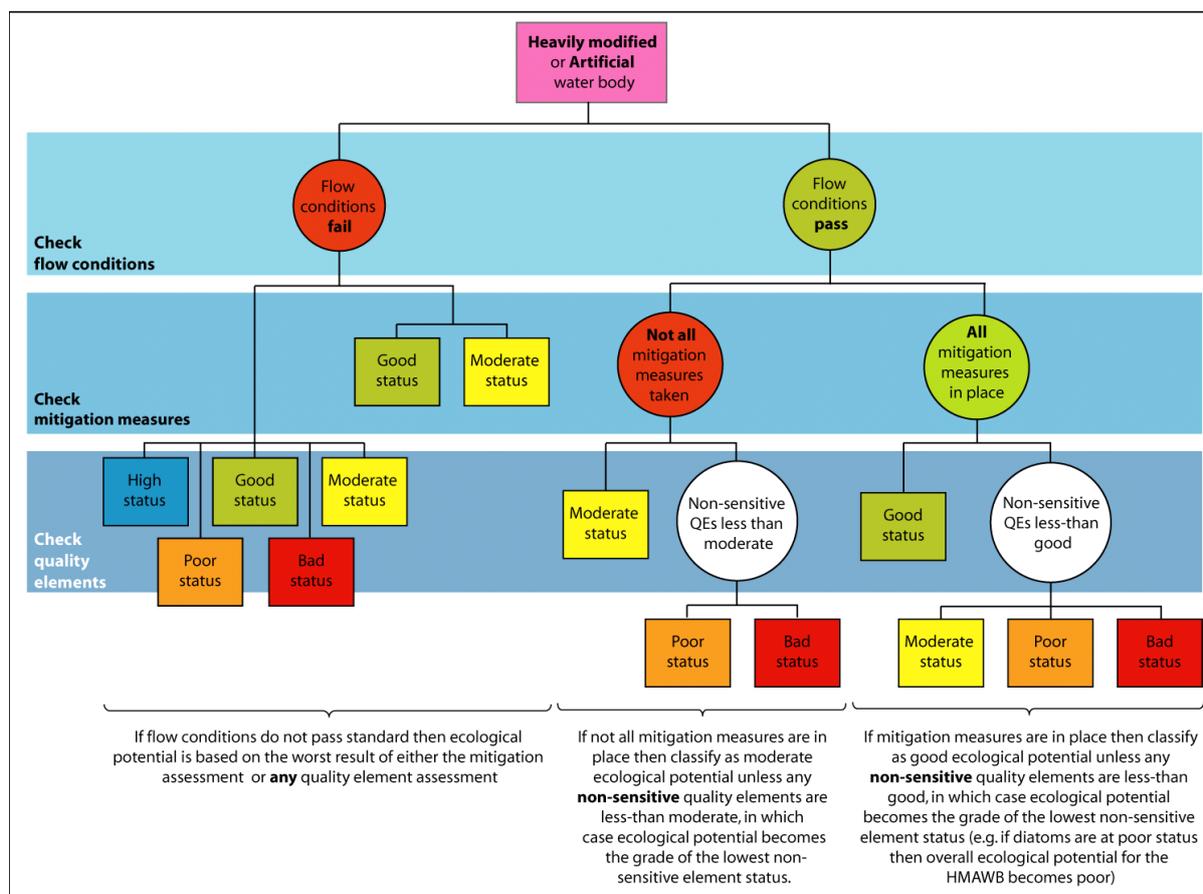
For groundwater bodies that have been identified as being at risk of failing to meet their environmental objectives for groundwater chemical status there is a requirement to identify any significant and sustained upward trends in pollutant concentrations. A significant trend is one that could lead to a groundwater body failing to meet its environmental objectives before 2021 (the end of two river basin management planning cycles) if measures are not put in place to reverse the trend.

v. Ecological potential

For water bodies that have been designated as heavily modified or artificial, the Environment Agency must classify according to their ecological potential rather than status. The UK has adopted the mitigation measures approach for classifying heavily modified and artificial water bodies.

A number of different factors are considered when making an assessment of the ecological potential of heavily modified or artificial water bodies. These factors are an assessment of river flow, the presence or absence of mitigation measures, and the status of other quality elements. These come together to provide an overall assessment of ecological potential as shown in the diagram below.

Figure 7: Factors considered in overall assessment of ecological potential



The Environment Agency may sometimes find that a water body has been designated as heavily modified, yet the biological elements sensitive to hydromorphological pressures are at good status. Where this is the case the biological evidence will be reviewed and where there is high confidence in the longevity of the ecological status the heavily modified water body designation will be recommended for removal.

Information elsewhere in the river basin management plans

- A method statement for the classification of surface waters can be accessed here: <https://ea.sharefile.com/d-s7966eb23d114a32b>
- A method statement for the classification and trend assessment of groundwater can be accessed here: <https://ea.sharefile.com/d-s4547016291542349>
- You can download the latest assessments of status for water bodies and elements in England in spreadsheet format here: <https://ea.sharefile.com/d/s7e378d3187741f2b>

4.2.4. Considering wider evidence of an environmental problem



Stage 1

As noted earlier, classification is just one part of the evidence available on the state of the water environment and additional information is sometimes required to assess whether a classification result is really indicative of an environmental problem in a water body.

For surface waters the certainty that an element or water body is at less than good status is expressed using the 3 categories of very certain, quite certain and uncertain. These definitions are based on statistical certainty from analysis of the monitoring data used to

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derive the classification results: very certain $\geq 95\%$, quite certain $\geq 75\% < 95\%$, uncertain $> 50\% < 75\%$.

The level of certainty needed to make sure an element is at less than good status is influenced by the measures required to resolve the environmental problem. In general, justifying costly or targeted regulatory measures requires a higher degree of certainty than is needed to justify low cost, voluntary type measures. This reflects the relative risk of wasting resources and investment in taking unnecessary action.

Classification and statistical certainty derived from operational monitoring may be unable, on their own, to provide the certainty needed to justify the measures required, particularly if the failure is caused by pollution from diffuse or intermittent sources. In these cases additional evidence is used to make a pragmatic, qualitative judgement of the certainty that there is a problem to solve, based on a weight of evidence approach. This additional evidence could come from pollution incident or investigative monitoring data or from a catchment-scale assessment of available evidence and information.

The classification results provide part of that weight of evidence but it is important to note that the additional weight of evidence approach to improve certainty that there is, or is not, a problem to solve does not over-ride the formal classification result.

i. Weight of evidence assessments for nutrients and eutrophication

Eutrophication is when there is too much nutrient in waters, causing algae and plants to grow excessively. This affects the quality of the water and how it can be used, as well as damaging the local wildlife.

For the impacts of nutrients on biological status, relevant classification results have been combined with wider weight of evidence within eutrophication assessments. These assessments do not affect classification, which is done element by element, but are used to target measures to reduce nutrients.

The nutrient standards used for WFD classifications are based on an understanding of the links between nutrients and the biological impacts associated with eutrophication. There is uncertainty in the ability to use this knowledge to predict the impacts in particular water bodies; exceeding WFD nutrient standard alone is considered insufficient to judge the risk of impacts on the biology. As a result, the Environment Agency uses a weight of evidence approach in assessing eutrophication and targeting control measures.

The one-out-all-out principle for WFD status classification means that if nutrients are at less than good status then a water body is classed as moderate status, regardless of whether the biology is less than good status. Using the weight of evidence approach the Environment Agency assesses the evidence of the nutrients and also their impacts, using the plant and algal quality elements sensitive to nutrients and the certainty that these are, or are not, less than good status.

Wider evidence of eutrophication, for example, from investigations, is also taken into account, including gathering information from stakeholders, to increase certainty. This assessment of certainty of eutrophication does not affect the classification result but informs decisions on subsequent measures as described above, with high certainty being required if costly targeted regulatory measures would be needed to address the problem. This approach provides a link between standards, classification, investigations and measures.

The Environment Agency has developed eutrophication assessments for water bodies at risk from nutrients for rivers, lakes, estuaries and coastal waters. These combine the latest classification results with wider evidence in a structured way to make best use of all relevant evidence in identifying whether there is a problem to solve in a given water body.

Initial assessments developed and made available for the consultation on the draft update to the river basin management plans have been updated to account for more recent

classification data and other evidence. These water body level assessments of eutrophication have been used in targeting the measures to tackle nutrients in the river basin management plans. The assessments are particularly important to the targeting of expensive regulatory measures such as phosphorus reduction at sewage treatment works.

Information elsewhere in the river basin management plans

- You can access the Weight of Evidence for Eutrophication method statements and results here: <https://ea.sharefile.com/d-s507566230314e438>

4.3. Changes since first cycle (new building blocks)

Water body status classifications are based on a set of building blocks. These building blocks are:

- the water body and monitoring networks
- the designation of artificial and heavily modified water bodies
- the standards and boundaries used in assessment
- the tools used to derive classification results for individual elements from monitoring data

A number of significant changes to these building blocks have been introduced for the second cycle of river basin management planning. These are:

- Updated standards are being used to determine good status for nutrients and some chemical substances. These new standards were developed as part of a UK-wide collaboration and were widely consulted upon.
- New chemical standards have been introduced as a result of the 2013 Environment Quality Standards Directive (EQSD) amendments.
- A second generation of biological classification tools to ensure biological classifications are better at reflecting local conditions.
- The size and shape of some water bodies have changed so that they become more logical management units.
- The process to designate heavily modified water bodies has been improved.

All of these changes have been introduced now so that the plans can be based on the best possible evidence.

Across England an extra £4.7 million has been invested in a new ecological monitoring programme for rivers. This means more biological surveys in more places and an emphasis on fixed sampling locations, making it easier to identify and report environmental improvement. An additional £1.5 million has been invested in new chemical monitoring.

For 2013, 2014 and 2015 the Environment Agency has produced two sets of WFD classification results:

- Old Building Blocks:** these results are based on the same methodologies that produced the classification results reported in the 2009 plans. They are used to assess progress against the objectives set in the 2009 plans, including improvements in the quality of water bodies, as well as check for any potential deterioration against the 2009 baseline.
- New Building Blocks:** these results contain the changes outlined above and set the baseline for the updated river basin management plans. They will help to inform future investigations and help determine appropriate measures and objectives.

These changes will make a difference to the number of water bodies reported as being in high, good, moderate, poor and bad ecological status.

Supporting information

- The full description of changes to environmental standards can be found here: <http://www.wfduk.org/sites/default/files/Media/Environmental%20standards/UKTAG%20Environmental%20Standards%20Phase%203%20Final%20Report%2004112013.pdf>
- The full description of changes to biological methods can be found here: <http://www.wfduk.org/resources/category/biological-standards-200>
- You can view maps showing the changes to water bodies for the second cycle here: <https://ea.sharefile.com/d-s2d26ecc6c334298a>

4.4. Challenges

4.4.1. Significant water management issues



In 2013, the Environment Agency consulted on what were considered to be the most important issues that challenge the current and potential future uses and benefits of the water environment in each river basin district. These significant water management issues are described in Part 1 of the river basin management plans as follows:

- **Changes to the natural flow and level of water:** taking too much water from rivers, canals, lakes and groundwater, means less water flowing and altering water levels can affect habitats.
- **Negative effects of invasive non-native species:** the effect on the health of the natural environment of plants and animals from outside the UK introduced to UK waters and associated habitats.
- **Physical modifications:** changes made by people to rivers, lakes and estuaries, such as flood defences and weirs, and changes to the natural river channels for land drainage and navigation. These modifications alter natural flow levels, may cause excessive build up of sediment, and the loss of habitats.
- **Pollution from mines:** contaminated water draining from mines, most of which are now abandoned.
- **Pollution from rural areas:** the effects of poor agricultural practice and rural land management on the water environment (also known as 'diffuse rural pollution').
- **Pollution from towns, cities and transport:** rainwater running over hard surfaces and carrying pollutants into waters, chemicals from contaminated land, and sewage from houses 'misconnected' to surface water drains rather than sewers (also known as 'diffuse urban pollution').
- **Pollution from waste water:** waste water can contain a variety of pollutants including nutrients (such as phosphorus and nitrates), ammonia, faecal bacteria and harmful chemicals.

Some of the issues described above relate to a single pressure and others are more complex and involve a range of different pressures. Pressures can come from one or more sources (activities). These include:

- Phosphorus, nitrates and faecal bacteria largely originate from agriculture and human sewage.
- Surface run-off can be contaminated by fine sediment that has both direct and indirect impacts on the condition of the receiving environment. Direct impacts include alteration of the physical characteristics of river channels leading to impacts on the habitat and to muddy floods. Indirect impacts occur because the sediment acts as a vehicle for the transfer of other pollutants, such as phosphorus, nitrate, pesticides and faecal bacteria to water.
- A wide range of chemicals used in everyday life, some of which can adversely affect the environment, enter watercourses from point sources (i.e. industrial and sewage treatment effluents) as well as diffuse sources such as road run-off.
- Sewage treatment works and storm overflows are also important point sources of phosphorus, nitrate, faecal bacteria and sanitary pollution.

The sources of the main pressures acting on the water environment are summarised in the table below.

Table 3: Main sources of pressure on the water environment

		Significant water management issues – activity/source based						
		Changes to the natural flow and level of water	Negative effects of invasive non-native species	Physical modification	Pollution from mines	Pollution from rural areas	Pollution from towns, cities and transport	Pollution from waste water
Significant water management issues – pressure based	Abstraction and flow	✓						
	Chemicals				✓	✓	✓	✓
	Faecal contamination and sanitary pollutants					✓	✓	✓
	Fine sediment			✓	✓	✓	✓	✓
	Invasive non-native species		✓					
	Nitrates					✓	✓	✓
	Phosphorus and freshwater eutrophication					✓	✓	✓
	Physical modifications			✓				

The sections below provide more information on the individual pressures that have significant impacts on the water environment.

Information elsewhere in the river basin management plans

- More information on significant water management issues, the ongoing measures that help prevent deterioration and protect the environment and the sectors that are involved in implementing the measures is available in Part 1 section 1.4 and 3.2.

i. Abstraction and flow

Abstraction is the removal of water, permanently or temporarily, from rivers, lakes, wetlands, canals, reservoirs or from groundwater. Water is abstracted to meet a wide range of uses. The effect abstraction has on the environment depends on the amount and timing of the abstraction and the location and amount of water that may be returned after it has been used. Some current abstraction is unsustainable and causes environmental damage. Some abstractions also have associated impoundments, which can alter the water level or flow of rivers. The Environment Agency manages most abstraction and impoundment through a system of licensing. Abstraction licences specify how much water can be taken, over what period, where and when. Licences often contain other conditions to help protect the environment or other water users; breaching these conditions, abstracting without a licence when one is required, or taking too much water from rivers and groundwater may result in lower groundwater and flows and reduced river levels. This can affect wildlife and the look of a river as well as impacting on other water users.

In the short term, the current measures being taken to help restore sustainable abstraction are reducing the impact on some rivers and groundwaters. There are still significant challenges in addressing existing unsustainable abstraction. In future, population growth and development are likely to require or increase pressure for more water to be abstracted. A changing climate may affect both the demand for water and the amount present in rivers and groundwater. If abstraction continues at current rates, or increases, and natural water resources become depleted due to climate change, the existing impacts of abstraction on the water environment will be magnified. Large parts of England do not have any reliable new supplies of water available from rivers and groundwater to meet potential increased future demand.

The ecological condition of some rivers is forecast to deteriorate by 2030 unless further measures are taken to reduce or limit increases in abstraction. Taking a proportionate approach to managing abstraction and flow pressures can ensure sustainable supplies of water for the public, businesses and agriculture, while making sure rivers and other wetlands support a good ecology.

Information elsewhere in the river basin management plans

- More detailed information about abstraction and flow as a significant water management issue then a technical summary ('pressure narrative') is available here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

ii. Chemicals

Sources of chemicals

A vast range of chemicals are used every day, both at home and at work, some of which can adversely affect the environment. Many of these chemicals get into the water environment via sewers and sewage treatment works. Use of chemicals in everyday products is controlled through specific European legislation and although sewage treatment is generally very good at reducing the concentrations of many of these substances entering the environment, this is sometimes not enough to achieve the required Environmental Quality Standards (EQS) in rivers and lakes. This can be particularly challenging in some parts of

England that are urbanised and where sewage treatment plants discharge into small rivers. The challenge here is to strike the right balance between source controls and affordable ways to improve sewage treatment to help meet current and future EQS.

The Environment Agency is working with the water industry in England and Wales on a Chemicals Investigation Programme (CIP). This is a £multi-million programme that will analyse chemicals in discharges from 600 prioritised sewage treatment works and the rivers and coastal waters they discharge into. This will provide better understanding of emissions of chemicals from these sewage works and their effects on river quality. This programme also includes testing of new treatment technologies to see if innovative solutions might be cost effective, along with trials of ways to reduce chemicals from other sources such as urban run-off. The results will be used to inform measures to reduce the impacts of chemicals discharged from sewage treatment works in future planning cycles.

Other sources of chemicals include industrial activity and runoff from roads or farms. Some substances are already widespread in the environment as a result of historic use and so are difficult to tackle. Such historic use has resulted in contaminated land and sediment. Evidence suggests mining has led to significant emissions of metals into the water environment.

Understanding chemical risks and their effects on status

Some substances can cause localised environmental impacts in the water body they are discharged into, but others can accumulate in the food chain with potential impacts far away from their sources. Environmental Quality Standards (EQS) are concentrations of harmful chemicals in the water, or in animals that may be eaten, that should be safe for people or animals. These are used to assess the environmental risks and determine if the status of water bodies is good or whether it needs improvement. Some chemicals can also threaten the long-term sustainability of drinking water sources and lead to increased costs of drinking water treatment. Pollution of water sources with these chemicals may also hinder the transfer of water from areas with abundant supplies to those where supplies are scarce.

The Environment Agency has developed national risk assessments for the harmful substances with the widest potential environmental exposure in England. These have been used to target monitoring to confirm risks in the aquatic environment.

Based on water column EQSs about 97% of water bodies in England achieve good chemical status in 2015.

Until recently, assessing chemical status was based entirely on monitoring of water samples. Whilst this remains the case for most substances, for certain substances that can accumulate in food chains the European Commission (EC) has, since 2008, been introducing EQSs based on chemical concentration standards in the flesh of aquatic biota such as fish or mussels. This is a new approach and the EC developed guidance in 2014 which Member States are starting to implement. Applying biota standards may significantly affect good chemical status in the future. Exploratory work is however, first needed to find a robust approach to implement biota standards. This will ensure that decisions about classification and the action required can be made with confidence. In addition to utilising long-term data sets from the marine environment, the Environment Agency has undertaken a pilot monitoring programme for these substances at selected freshwater sites. A preliminary assessment of data from freshwater sites over 2014-15 and transitional and coastal water datasets indicate that two substances (Hexachlorobenzene and Hexachlorobutadiene) will have no impact on good status. The situation for polycyclic aromatic hydrocarbons (PAHs) is less clear although the indications at this stage are that failures of the biota EQSs for benzo-a-pyrene and fluoranthene may be more localised. Significant and widespread failures are predicted for some chemicals which are banned or highly regulated, notably mercury and brominated flame retardants (BFRs). Biota levels are

yet to be assessed against standards for five new priority substances (and groups of substances) that are due to be introduced in 2018.

The Environment Agency has developed 'chemical narratives' for mercury, PAHs and BFRs because of the complexity in assessing their environmental risks. These collate information on emissions, risk assessments, trends and monitoring (in the water column and where available in biota). These provide a more in depth assessment of the current state of knowledge of these chemicals.

Emissions Inventory

The Environment Agency has been developing an Emissions Inventory, which is available for the first time in these river basin management plans, to provide a better understanding of the sources of priority substances. The inventory will be updated in each successive river basin planning cycle. In time this will allow observation and reporting to the European Commission on trends in emissions, discharges and losses for these substances.

Information elsewhere in the river basin management plans

- You can access the emissions inventory and chemicals narratives for some of the key pollutants as well as information on the performance of analytical methods used when monitoring chemicals here: <https://ea.sharefile.com/d-sab675d1e4d74e5e8>

Supporting information

- Estimates of emissions, discharges and losses for each priority substance have been determined according to the guidance set out in Technical Guidance document number 28 here: http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm

iii. Faecal contamination and sanitary pollutants

Faecal bacteria affect public health and so it is important to control the amount in the environment. Sewage effluent and runoff from animal manure are the largest sources of faecal organisms in surface waters. Climate projections suggest that there is likely to be increased contamination from farmland and urban runoff due to compacted soils and less frequent but more intense summer rainfall events. These events may also cause an increased frequency of combined sewer overflow operation and sewage treatment plant flooding.

Faecal bacteria in the water at coastal and freshwater beaches can affect people using these waters, particularly while swimming. Faecal bacteria can accumulate in shellfish, which means that shellfish harvested for consumption have to be treated to make sure that they do not pose a risk to human health. If too many faecal bacteria reach rivers and groundwater used for drinking water, the supplies must be treated to make sure they are fit for consumption. Compliance with bacterial standards has improved significantly since the 1990s in designated bathing waters, but less so in shellfish flesh because shellfish filter feed and accumulate bacteria.

Ammonia, dissolved oxygen and biochemical oxygen demand (BOD) are indicators of the organic pollution of the water environment. Ammonia is toxic and can kill, or be otherwise harmful to, aquatic wildlife like fish. The higher the BOD, the greater the potential from organic pollution to cause a drop in dissolved oxygen which can cause stress or, in extreme cases, kill aquatic life.

Sewage effluent is the largest source of sanitary pollutants. Although a small number of estuaries and coastal waters have problems from reduced amounts of dissolved oxygen, sanitary pollutants are generally an issue for rivers. Compliance with ammonia and dissolved oxygen standards has improved during the last 20 years, primarily due to investment by

water companies. Regulation and improved farming practices have also contributed to improving compliance with ammonia, BOD and dissolved oxygen standards.

Small, private drinking water supplies from groundwater can be at particular risk of bacterial pollution. The Environment Agency is working with the Drinking Water Inspectorate and local councils to see how the need for purification treatment at private supplies can be managed.

Information elsewhere in the river basin management plans

- If you would like more detailed information about faecal contamination and sanitary pollutants as a significant water management issue then technical summaries ('pressure narratives') are available here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

iv. Fine sediment

Too much fine sediment causes a range of problems such as damaging wildlife, increasing the costs of treating drinking water and increasing risk of flooding from silted up drains. Sediment has direct impacts (smothering plants, fish eggs and freshwater invertebrates) and indirect impacts such as carrying other pollutants like nutrients, chemicals and faecal contamination into the water environment. Reducing the amount of fine sediment, particularly through improved soil management measures, not only reduces the direct impacts of sediment but also brings wider benefits, including reducing the risk of flooding. Fine sediment results from soil erosion, soil compaction (which increases surface water runoff) and the erosion of riverbanks and road verges.

Climate projections indicate that there is likely to be increased contamination from sediments from farmland and farm premises and from urban environments. This will be due to washout from compacted soils and from urban environments after first-flush releases during intense rainfall events. Changing crop types and seasonal patterns of agriculture, such as increased winter cropping, will also affect sediment runoff. Research suggests there will be higher sediment loads to lakes and upland stream systems which may affect fish spawning grounds.

Information elsewhere in the river basin management plans

- If you would like more detailed information about fine sediment as a significant water management issue then a technical summary ('pressure narrative') is available here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

v. Invasive non-native species

Invasive non-native species (INNS) of plants and animals are one of the biggest threats worldwide to biodiversity after habitat loss and destruction. The annual cost of INNS to the English economy is estimated at £1.3 billion. These costs include control and eradication, structural damage to infrastructure or loss of production due to the presence of INNS. The pressure from INNS is increasing due to more species being introduced, through increasing international trade and travel, and due to the spread of established species. Climate change may increase the survival, proliferation and spread of these species further. Managing invasive non native species by preventing their introduction, spread and establishment reduces the risk of deterioration, and allows measures for other pressures to achieve their objective of good.

Information elsewhere in the river basin management plans

- If you would like more detailed information about INNS as a significant water management issue then a technical summary ('pressure narrative') is available here <https://ea.sharefile.com/d-s13685d2d8754fe29>

Supporting information

- The non-native species secretariat website provides tools and information about non-native species: <http://www.nonnativespecies.org/home/index.cfm>

vi. Nitrates

The main sources of nitrates in surface and ground waters are agriculture (the largest source) sewage and, to a lesser extent, industrial effluents.

In 2009, 46% (124 out of 268) of groundwater bodies in England were classified as being at poor status, with nitrate implicated in 57 of these. In 2015, 45% (123 of 271) of groundwater bodies are now at poor status, with nitrate being responsible for 100 (81%) of those failures. Nitrate is the biggest single water quality issue in groundwater drinking water protected areas (DrWPAs). Of the groundwater safeguard zones that have been set up to reduce risks to particular drinking water abstractions, 84% are affected by high nitrate concentrations.

Around 58% of the land area of England is designated as nitrate vulnerable zones (NVZs) under the Nitrates Directive because fresh surface waters or groundwater have elevated nitrate concentrations or waters are affected by eutrophication. The Nitrates Directive aims to prevent and reduce nitrate pollution from agricultural sources.

Nitrate is a concern in the context of drinking water resource protection, with a 50 mg/l standard to be met in tap water. It is also the main nutrient involved in eutrophication of estuaries and coastal waters, one of the main issues for these waters. Recent scientific evidence indicates that nitrogen may also play a role in eutrophication of freshwaters, particularly lakes. Increased temperatures and lower water levels under a changing climate are likely to exacerbate this.

Concentrations of nitrate in surface waters have been gradually declining since peaking in the early 2000s. In groundwater there are indications that concentrations in many locations are declining, but in some places, due to the very slow movement of water through the ground, peak levels of nitrate have not yet occurred.

Information elsewhere in the river basin management plans

- If you would like more detailed information about nitrates as a significant water management issue then a technical summary ('pressure narrative') is available here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

vii. Phosphorus and freshwater eutrophication

The main sources of phosphorus in freshwaters are sewage effluent and agricultural drainage. Sewage effluent remains the largest source entering rivers, contributing about 70% of the loading nationally. There are several sources of phosphorus within sewage, notably human metabolic wastes, food additives, detergents and the dosing of drinking water with phosphorus to control lead levels.

Estimates vary but agriculture is likely to be responsible for about 25% of phosphate in water, where good status standards are not achieved, with significant variation between and within catchments. For lakes, drainage from agricultural land is generally the largest source of phosphate. Preliminary findings indicate that a reduction in agricultural load of 45% would

be needed to meet current river phosphate standards and 56% to achieve revised phosphate standards.

Concentrations of phosphorus in English rivers have been falling since 1990, supported by major reductions in phosphorus inputs from sewage treatment works through investment by the water industry to meet EC directives. Despite this progress, phosphorus remains the most common cause of water quality failures in England, with 44% of monitored river water bodies exceeding the original phosphorus standard for good status and 58% exceeding the new (2015) river phosphorus standards based on the 2014 WFD classifications. In addition, 74% of monitored lake water bodies currently exceed the phosphorus standard for good status. Population growth will increase the amount of phosphorus entering sewage treatment works in some areas which, without intervention, may slow or reverse improvements. Climate change may exacerbate the future extent and severity of eutrophication problems.

Information elsewhere in the river basin management plans

- If you would like more detailed information about phosphorus as a significant water management issue then a technical summary ('pressure narrative') is available here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

viii. Physical modification

Plants, invertebrates and fish are affected by the flows and physical characteristics of the water environment. These hydrological and morphological features are collectively known as the water body's hydromorphology. Aquatic wildlife can be affected if the quantity and quality of water flows is altered and if habitat quality is reduced. Modifications such as straightening river channels, building weirs and reinforcing banks with concrete can constrain and stabilise the physical nature of water bodies, reducing the development and diversity of physical habitats. This can reduce the number and diversity of animals and plants present. The way land is managed can also adversely affect habitats, for example, by changing the amount of sediment that washes off both agricultural land and urban areas.

Most rivers, lakes and a large part of England's coasts have been modified to provide benefits to people such as land drainage, reduced flood risk to communities, water storage for public water supply, recreation or improved channels for navigation. In many cases these benefits and uses are still vitally important and need to be retained, while also reducing their potentially damaging impacts on flows and habitats, and subsequently on aquatic wildlife.

There is significant uncertainty about future trends for physical modifications but recent assessments indicate that some pressures will increase in response to climate and population changes. Deterioration in the ecological condition of some rivers by 2030 is forecast unless further action is taken to mitigate the impacts of, and control the development of, modifications.

Information elsewhere in the river basin management plans

- If you would like more detailed information about physical modification as a significant water management issue then a technical summary ('pressure narrative') is available here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

4.4.2. Issues affecting protected areas

Protected areas are a priority for action. The same pressures that lead to water bodies not being in good status frequently also lead to protected areas not meeting their objectives.

i. Drinking water protected areas

There are 486 surface water DrWPAs in England. All groundwater bodies have been identified DrWPAs. The main substances affecting surface water DrWPAs are pesticides, colour and nutrients. The main issue for groundwater DrWPAs is excessive nitrate.

Information elsewhere in the river basin management plans

- You can access a DrWPA technical evidence summary ('pressure narrative') here: <https://ea.sharefile.com/d-s13685d2d8754fe29>

ii. Economically significant species

Faecal contamination of shellfish waters originates from multiple points and diffuse sources including:

- sewage treatment works
- combined sewer overflows (CSOs)
- emergency sewer overflows
- urban surface water runoff
- rural diffuse pollution from wildlife, farm livestock and human sources.

Data on reasons for not achieving good status indicate that CSOs contribute to 27%, sewage treatment works 29% and agriculture 22% of failures in shellfish protected areas. Shellfish protected areas that do not robustly meet the relevant shellfish flesh standard each have an action plan which specifies the cost-beneficial measures required to improve water quality.

Information elsewhere in the river basin management plans

- You can access the shellfish action plans here: <https://ea.sharefile.com/d-s84c5554e50947dbb>

iii. Recreational Waters (Bathing Waters)

The most significant sources of pollution affecting bathing water compliance are:

- sewage treatment works
- combined sewer overflows (CSOs)
- faeces from grazing animals
- urban drainage including misconnections and urban surface water run-off which contains dog and bird faeces
- birds and animals on the beach

The proportions of these multiple sources of microbial pollution vary from site to site and in response to weather patterns. Identifying the source of microbial pollution can be very difficult. There have been many improvements to sewage treatment works near bathing waters. Current source apportionment suggests agriculture could contribute anything from 30-80% of the risk depending on the site, while sewage treatment works and CSOs contribute to the remainder.

The Environment Agency is focusing on bathing waters that are likely to be poor at the end of 2015 to ensure that the bathing waters with the most severe problems are addressed but any waters at risk of deteriorating in quality are also being prioritised. Plans are in place that include water company improvements, working with the agricultural sector, tackling urban runoff and misconnections and making investigations in those areas where causes and effects of pollution are uncertain. Measures including water company actions are also being developed to increase the number of bathing waters that are classified as good or excellent.

iv. Nutrient sensitive areas (sensitive areas under the UWWTD)

There are two types of sensitive areas involving nutrients. Firstly freshwaters, estuaries or coastal waters adversely affected by eutrophication due wholly or in part to urban waste water discharges. Secondly surface freshwaters used for drinking water abstraction that have high nitrate concentrations and which are downstream of large waste water discharges. The number of designated areas is summarised in section 4.2.1.iv.

v. Nutrient sensitive areas (nitrate vulnerable zones under the Nitrates Directive)

58% of England is designated as nitrate vulnerable zones due to elevated nitrate concentrations in freshwaters or eutrophication. Agriculture is estimated to account for some 60% of nitrate entering surface water and 45% in groundwater in England, with significant variation between and within catchments. There have been widespread but modest improvements in river nitrate levels, but for groundwater the picture is more mixed. In some water bodies there are improvements but in others there is continued deterioration as nitrate continues its journey to deeper aquifers.

vi. Natura 2000 protected areas

Natura 2000 protected area sites are affected by a wide range of issues including diffuse water pollution, modified habitats, invasive non-native species and abstraction and changes to flow and water levels.

4.4.3. Assessing risk

i. General approach to assessing risk



Article 5 of the WFD requires member states to identify pressures acting on each water body. This can mean any pressure that on its own, or in combination with other pressures, may promote current or future risk of failing to achieve the environmental objectives of the directive.

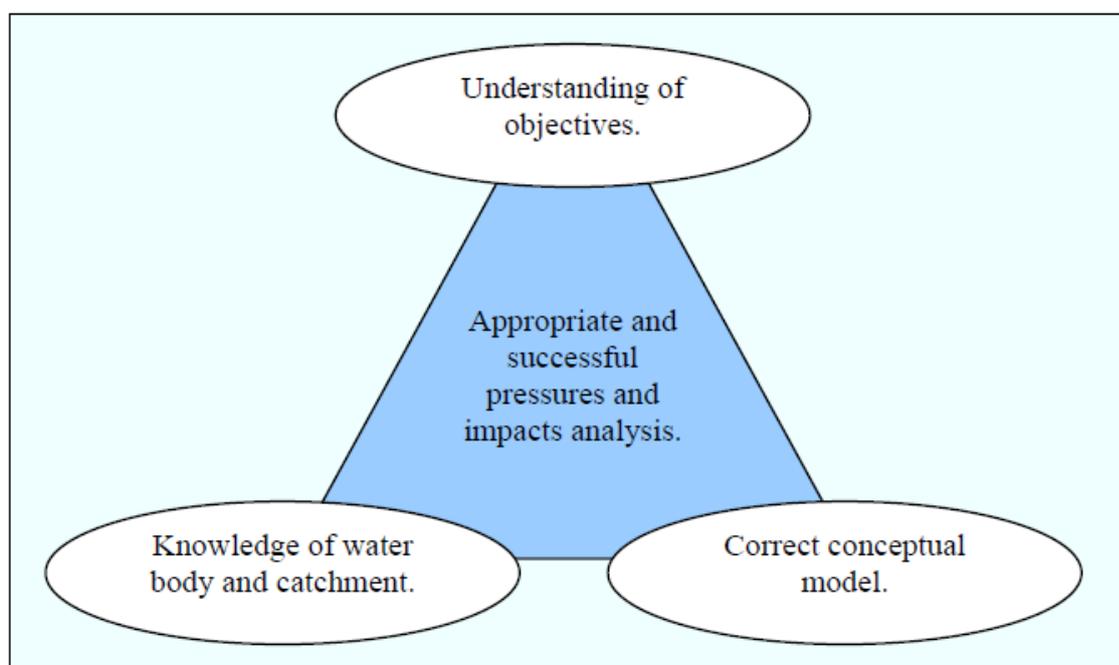
Risk assessments produced for the 2009 plans have been reviewed. Where new data and information was available the risk assessments have been updated. The table below shows the updated risk assessments that are available for the plans and the environmental objectives to which they relate.

Table 4: Updated risk assessments

Risk Assessment	Environmental Objective						
	Aim to achieve good ecological status			Prevent deterioration			
	2015	2021	2027	2015	2021	2027	2050
Chemicals & metals	✓						
Eutrophication	✓						
Phosphorus				✓	✓		
Faecal indicator organisms						✓	✓
Sanitary pollutants				✓	✓		
Sediment	✓						
Abstraction & Flow			✓			✓	
Physical modification	✓						
Groundwater Chemical			✓			✓	
Groundwater Quantitative			✓			✓	
Invasive non-Native Species				✓	✓	✓	✓
Acidification (Wales)				✓	✓	✓	

A successful risk assessment is one in which there is a proper understanding of the objectives, a good description of the water body and catchment area (including monitoring data), and knowledge of how catchments function, as illustrated in the diagram below.

Figure 8: Elements of a risk assessment



The current risk of failing to achieve good status or the risk of deterioration in status by 2015 can be informed by classification results and by an understanding of pressures acting upon a water body and the sensitivity of that water body to those pressures. Projections of risk beyond 2015 are more reliant on forecasts of future changes in activities and associated pressures such as changes in population size, land use and climate.

Each updated risk assessment followed a 4 step process:

1. Describing the driving forces such as land use, urban development, industry, agriculture and other activities which lead to pressures, without regard to their actual impacts.
2. Identifying activities or changes in activities that may result in a significant pressure or changing magnitude of the pressure acting on a water body (presenting a risk of failing to meet WFD objectives).
3. Considering the susceptibility of a water body to an impact that might result from the pressure.
4. Evaluating the likelihood of failing to meet a WFD objective.

Where information such as data, modelling outputs or expert judgement was available an estimation of the magnitude of the pressure could be made. The confidence associated with each risk assessment varies relative to the level of understanding, availability of information and the geographical scale at which information was available. For example, robust local data provides greater confidence for a water body assessment than regional or national data.

ii. Using risk assessments

WFD requires risk information to be used to optimise the design of the monitoring programmes (Article 8) and the programmes of measures (Article 11). Many other aspects of catchment scale planning will also be partly informed by the water body risk assessments:

- to report projected future risk of deterioration and risk to status objectives with associated reasons for risk and apportionment of sources of risk
- to help inform whether failure to achieve an objective is due to an environmental problem
- to inform classification as part of a consideration of the weight of evidence
- to inform design of the monitoring programme, input into designing future investigations and programmes of measures
- to inform strategic environmental planning to future proof actions and measures and maximise cost effectiveness and benefits into the future

Information elsewhere in the river basin management plans

- Risk assessment method statements are available here: <https://ea.sharefile.com/d-s907bd03e9e74b74a>
- Maps showing risk assessment results are available here: <https://ea.sharefile.com/d-sd0f63dc4a3b4f008>

4.4.4. Reasons for not achieving good status and reasons for deterioration



Where an element is classified as being at less than good status an assessment is needed of the measures that could be taken to improve the status to good. In order to identify appropriate measures it is first necessary to

understand the cause of the failure. The cause is recorded using a defined set of reasons. Where a biological element is at less than good status the pressure, for example, ammonia or sediments, causing the failure is also identified.

In addition to identifying the pressure, the type and source of the problem are also identified. This consists of 3 pieces, or tiers, of information:

- tier 1: significant water management issue, for example, diffuse source, point source or physical modification
- tier 2: more detailed activity or source, such as arable field, sewage discharge (continuous) or flood protection structures
- tier 3: sector, for example, agriculture and rural land management, water industry or Environment Agency

If more than one reason for not achieving good status is identified for a failing element (or for a pressure affecting a biological element) then the source apportionment of each reason is also recorded. So if there are two sources of ammonia, a diffuse source and a point source, then the relative contribution of each source to the overall ammonia problem is recorded.

A level of certainty (suspected, probable or confirmed) is also assigned to each reason for not achieving good status, based on a weight of evidence approach:

- Suspected
 - There is some information that points to a possible reason for not achieving good status.
 - Further investigations are required before site specific measures can be identified.
 - Part of the source-pathway-receptor linkage is missing, for example, a probable source and receptor has been identified but the pathway is not established.
- Probable
 - There is reasonable evidence that points to the reason for not achieving good status.
 - Further investigations are required before site specific regulatory or expensive measures can be considered.
 - The source-pathway-receptor linkage has been established with reasonable certainty. There is reasonable evidence which generally give a consistent (that is, not contradictory) picture.
- Confirmed
 - There is compelling evidence for the reason for not achieving good status. The available evidence should demonstrate cause and effect in a way that would be compelling to all stakeholders.
 - No further investigations into the reasons for not achieving good status are required before site specific regulatory or expensive measures can be justified.
 - The source-pathway-receptor linkage has been established. There is good evidence which gives a consistent (that is, not contradictory) picture.

Defining the problem in this way supports the appraisal of appropriate measures to address the problem. The source apportionment information informs the targeting of effort and where appropriate, the analysis of the costs and benefits of any measures. The same approach is used for recording reasons for deterioration.

Information elsewhere in the river basin management plans

- You can view a summary of the reasons for not achieving good status for water bodies in England here: <https://ea.sharefile.com/d-s9a6aac8d0f444e38>
- You can find a summary of the reasons for not achieving good status for water bodies in the river basin district in Part 1 Section 5 Summary Statistics

5. Identifying measures and updating objectives

Summary of this section

This section sets out the overall process for reviewing and updating objectives for Natura 2000 protected areas and water body status objectives. It describes the role of economic appraisal in the process and describes the objectives.

Topics covered:

Process for reviewing and updating objectives; economic appraisals; water body status objectives; alternative objectives and justifications

5.1. Reviewing and updating objectives for Natura 2000 protected areas



Under WFD the objectives for Natura 2000 protected areas are to protect or improve the status of the water environment to the extent necessary to contribute to the maintenance of, or restoration to, favourable conservation status of the water dependent interest features.

Where a Natura 2000 protected area coincides with one or more water body, WFD ecological status objectives apply in addition to the requirement to achieve favourable conservation status of the water dependent interest features.

Where objectives can be aligned, the most stringent objective applies. For example, if a certain concentration of phosphorus is needed to achieve good ecological status and a more stringent value is needed to achieve a site's conservation objectives, then the latter applies. Where Natura 2000 protected areas and water bodies coincide, the objectives will be complementary, so that good ecological status will support achievement of conservation objectives and vice versa.

It is possible for a water body to meet the objectives for good status but fail the Natura 2000 protected area objective where that objective may be more stringent. It is also possible to meet the Natura 2000 protected area conservation objectives (for example, for a Special Protection Area (SPA) for wetland birds) but fail to achieve good status in a coincident water body because the WFD may require action to protect and restore a wider range of ecological elements.

5.1.1. Aligning objectives for Natura 2000 rivers, lakes, estuaries and coastal waters

Following a review by the UK Government's statutory nature conservation advisor the Joint Nature Conservation Committee (JNCC) of 'common standards monitoring guidance' (CSMG) for rivers, targets for flow and some water quality parameters, including phosphorus, have changed for some Natura 2000 protected areas. The application of revised CSMG on relevant sites has been reviewed and where possible agreed through local discussions between Natural England and Environment Agency.

For a limited number of lake sites the only parameter where alignment of standards was reviewed was phosphorus and so this work was undertaken jointly at a national level.

The relevant targets, determined by reference to CSMG, WFD or local agreement for these river and lake sites are identified in documents linked from the Site Improvement Plans that are hosted on Natural England's 'Access to Evidence' pages.

These are target values for restoration of water quality and flow in order to meet the conservation objectives for the Natura 2000 protected areas. Achieving the conservation objective targets may take longer than the next six years therefore, where possible, interim progress goals have also been agreed locally. The aim is to achieve the interim progress goals by 2021. Where there is confidence that the interim goals can be achieved the corresponding water body element objectives reflect this. Unlike CSMG based objectives, water body element objectives are expressed as a status class, each of which represents a range of values, for example, phosphorus concentrations. This means that the water body element objective can only give an indication of the numerical standard that has been determined as necessary for Natura 2000 protected areas. Therefore the agreed numerical values for the interim goals and CSMG targets for Natura 2000 protected areas are also being made available (see box below). These numerical values will inform planning and permitting decisions during the second cycle of river basin management planning and reflect the advice of Natural England about the quality of the environment needed to achieve the objectives of Natura 2000 sites.

Where feasible, the same approach to locally agreeing objectives on SAC rivers has been taken for some non-Natura 2000 protected area SSSIs rivers, with the aim of ensuring that targets agreed to achieve WFD objectives also support achievement of CSMG targets for these nationally designated SSSIs.

In estuaries and coastal waters one of the main concerns is the impact or risk of eutrophication. The objectives for relevant elements in these water bodies will be broadly similar across WFD and Natura 2000 protected areas and a comparable weight-of-evidence based approach to identifying affected waters is being applied. The objective of good ecological status for key biological elements will generally meet the needs of Natura 2000 sites (except where the objective is to maintain high status). Local discussion will be needed to refine and determine the objectives for each particular estuary and coastal water body.

Supporting information

- High level Natura 2000 site conservation objectives can be found at: <http://www.naturalengland.org.uk/ourwork/conservation/designations/sac/conservationobjectives.aspx>
- For more information on the review of Common Standards Monitoring for freshwaters see: <http://jncc.defra.gov.uk/page-2232>
- For information on the evidence for assessing flow, nutrients and organic pollution targets for protected river habitat see: <http://publications.naturalengland.org.uk/category/432368>
- To access the numeric targets for specific Natura 2000 river and lake sites (and some non-Natura 2000 rivers) see the document linked from within the SIP: <http://publications.naturalengland.org.uk/category/4878851540779008>
or directly here for rivers: <http://publications.naturalengland.org.uk/category/432368>
or here for lakes: <http://publications.naturalengland.org.uk/publication/4841829396643840?category=430388>
- For details of Natural England local offices see: <https://www.gov.uk/government/organisations/natural-england#org-contacts>
- For details of Environment Agency local offices see: <https://www.gov.uk/government/organisations/environment-agency>

5.2. Reviewing and updating water body status objectives



Water body status objectives describe the long term aim for specific parts of the water environment. Identifying appropriate water body status objectives and the measures that are needed to achieve them is at the heart of the river basin management planning process.

The water body status objectives in the plans are legally binding; that is, the Secretary of State and Environment Agency must exercise their functions to comply with the WFD and this includes the environmental objectives. All public bodies must have regard to the river basin management plans which sets out water body status objectives when exercising their functions that could affect the quality of the water environment

Water body objectives consist of two pieces of information: the status (such as 'good') and the date by which that status is planned to be achieved (for example, 'by 2021').

The status part of an objective is based on a prediction of the future status that would be achieved if technically feasible measures are implemented and, when implemented, would give rise to more benefits than they cost. The objective also takes into account the requirement to prevent deterioration and, as far as practicable, the requirements of protected areas. For example, some elements in water bodies that are part of a Natura 2000 protected area site are also important in supporting the conditions on which the protected area depends. In these cases appropriate objectives for the relevant elements have been set. In most cases this will be to achieve at least good status, but could mean aiming to achieve high status.

The date part of an objective is the year by which the future status is predicted to be achieved. The date is determined by considering whether the measures needed to achieve the planned status are currently affordable and, once implemented, the time taken for ecology or the groundwater to recover.

The default status objectives for the second cycle river basin management plans are:

- where good status has already been achieved, to maintain this status to comply with the requirement to prevent deterioration
- in other cases to aim to achieve good or better by 2021
- in addition, where first cycle objectives for 2015 have not been met these must be met as soon as practicable.

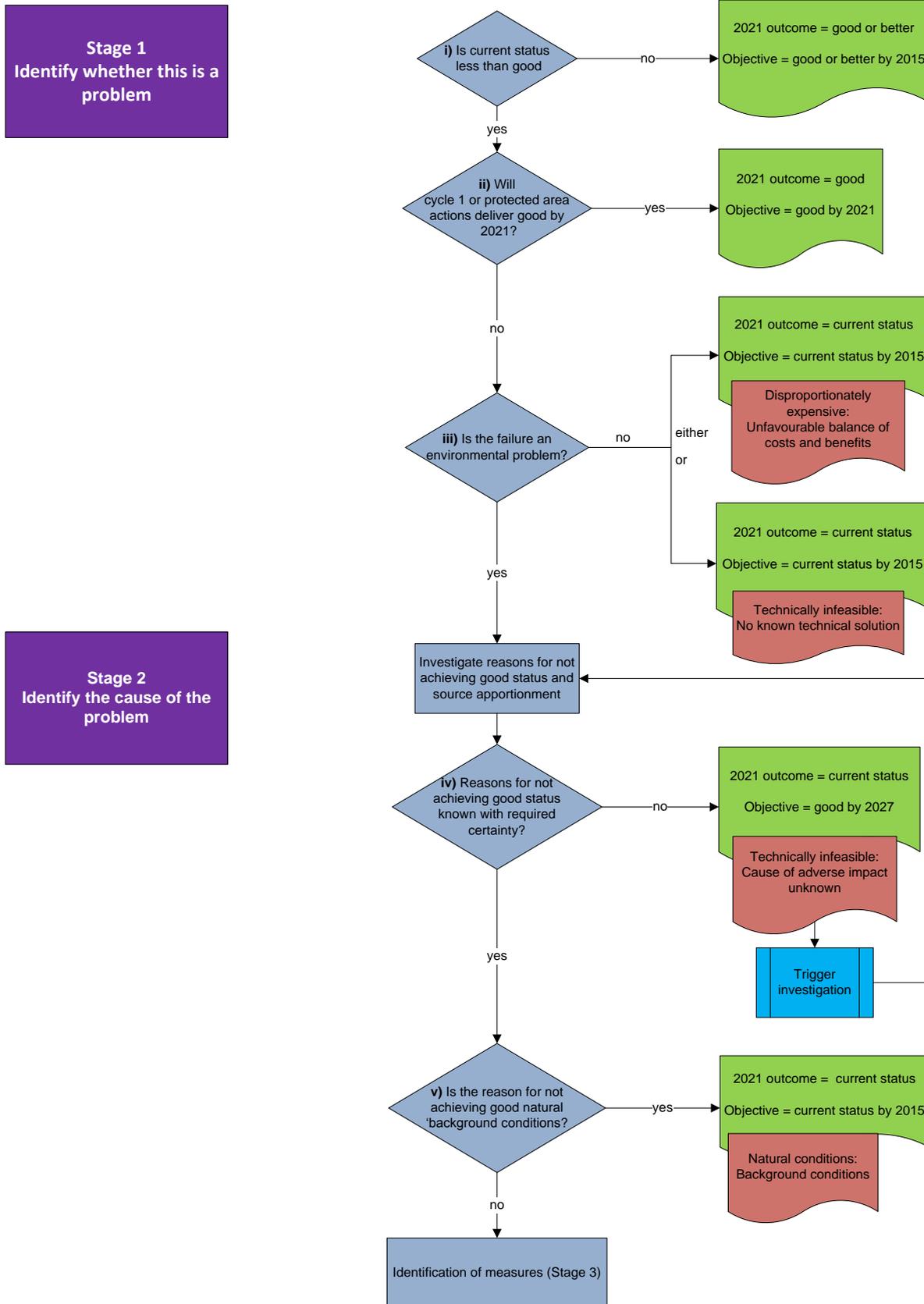
For surface waters objectives were reviewed and updated for ecological and chemical status. For artificial or heavily modified water bodies objectives were reviewed and updated for ecological potential and chemical status. For groundwater objectives were reviewed and updated for quantitative and chemical status.

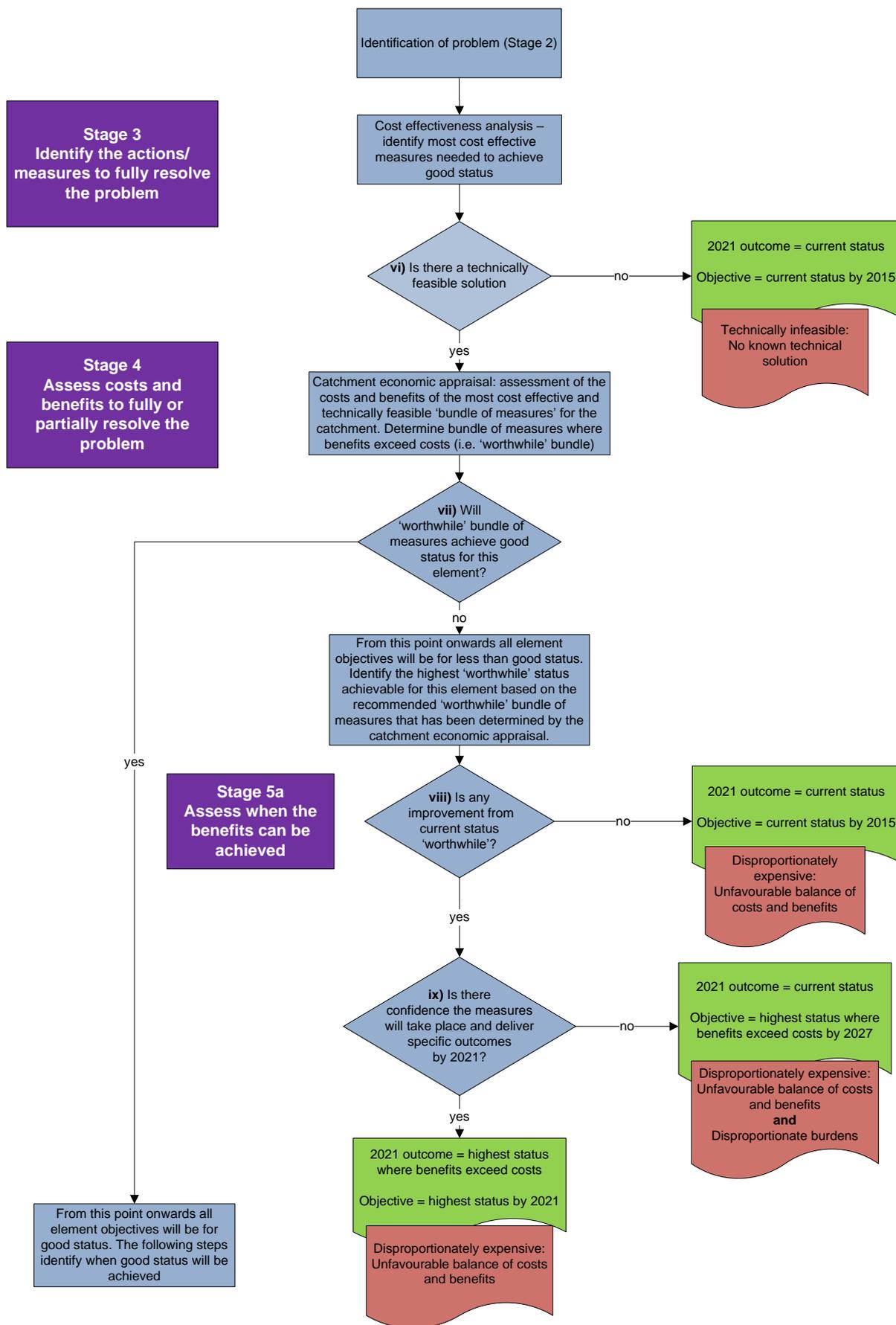
The overall process for reviewing and updating water body status objectives is set out in the flow chart below.

Information elsewhere in the river basin management plans

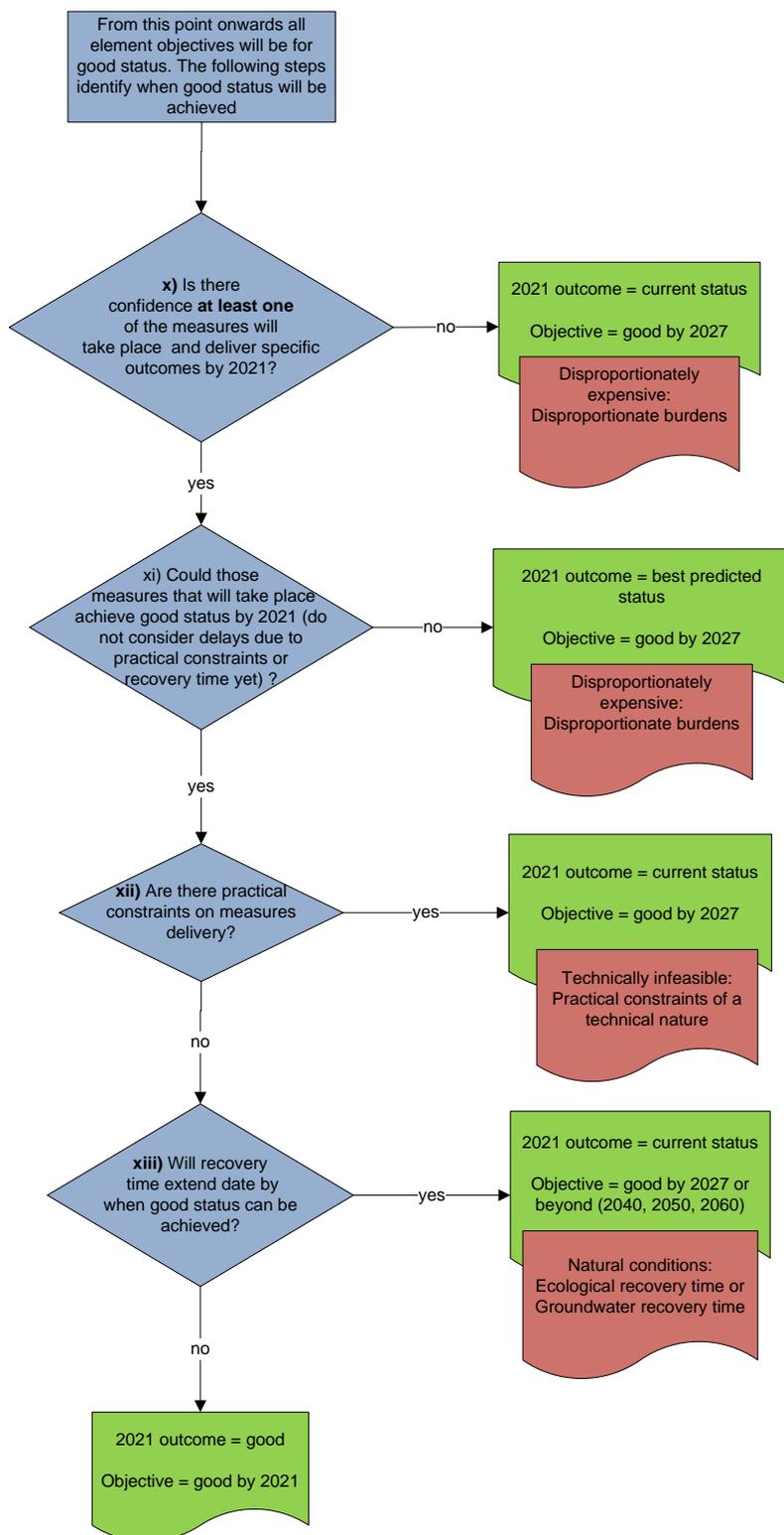
- You can view the status objectives for all water bodies in England here: <https://ea.sharefile.com/d-s0faa355450243538> and summary tables of the information here: <https://ea.sharefile.com/d-s9a6aac8d0f444e38>
- The Environment Agency's internal guidance on objective setting is available here: <https://ea.sharefile.com/d-sd34a710e1734b368>

Figure 9: Process for reviewing and updating water body status objectives





Stage 5b
Assess when the benefits can be achieved



5.3. Economic appraisals

In 2005, in preparation for the 2009 plans, a wide-ranging economic analysis was carried out and reported through a collaborative research programme overseen by UK authorities (in England this was undertaken by Defra) and stakeholder organisations. As a result Article 5 'Economic Analysis of Water use' reports were produced that describe the socio-economic characteristics of each river basin district and sectors' use of water. These reports have been reviewed for the river basin management plans but not updated as the socio-economic characteristics have not significantly changed.

Defra and the Environment Agency will continue to develop an economic analysis to provide evidence for water policy development. Future economic analysis will include projections of bills for water and sewerage services for household and non-household customers using a commissioned model. Where new policies or changes in water-related policy are considered, in line with government practice, appropriate economic analysis will be carried out.



The Environment Agency, as a public body seeks to identify those areas where money could be spent to achieve the best outcomes for society.

Stage 4 of the objective setting process is catchment economic appraisals to assess the benefits, cost and any negative impacts of implementing measures to improve the water environment. The Environment Agency has designed a robust approach, based on HM Treasury guidelines, that is proportionate and fit for purpose. The approach is designed to aid decision making on setting objectives.

Water Appraisal Guidance and associated cost benefit analysis tools have been developed in consultation with a range of stakeholders. The features of the economic appraisal approach are that:

- It is catchment based, covering all water body types. This is important to help achieve integrated and cross pressure management of the water environment.
- It is about identifying the greatest level of improvement that is justified where the benefits to the environment and society outweigh the cost of implementing measures.
- It builds up a broad picture of the environmental outcomes and benefits of measures in a descriptive way, using an ecosystem services framework, and includes a monetary estimation of the major benefits.
- It is a systematic and transparent framework that helps engagement with others in managing the water environment.

The results of the economic appraisals help ensure that wider benefits and the value of the water environment are taken into account in decision making.

Information elsewhere in the river basin management plans

- You can access Article 5 'Summary of economic analysis of water use' reports for each of the current river basin management plans here: <http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/wfd/economics/index.htm>

Supporting information

- You can access a training package on the economic appraisal approach followed by the Environment Agency here: <https://ea.sharefile.com/userinvitations-register.aspx?id=ja2938a7e56f442aa>
- You can access the economic appraisal tools and guidance here: <https://ea.sharefile.com/download.aspx?id=s6301ad0ba704e9b9>

5.3.1. Measures assessed in economic appraisals

The measures included in economic appraisals are considered to be technically feasible and the most cost effective way of improving the water environment. Measures for a catchment are grouped together into a bundle so all costs and the range of benefits can be taken account of and assessed together. This approach recognises the interdependencies within a catchment.

The catchment economic appraisals focused particularly on measures to achieve improvements in water body status, where information on costs and benefits are required to inform objective setting. Other measures (and their costs and benefits) relating to certain protected area objectives and measures that specifically prevent a water body deteriorating were considered at national level rather than in the catchment economic appraisals. Different considerations apply to different categories of protected areas.

Costs are from local and national sources and are based on previous experience of implementing similar measures. Where more specific, local cost information is available this has been used in place of national estimates.

If the bundle of measures to improve all water bodies in the catchment to good status or potential is not considered to be justified (the cost of implementing the measures outweighs the benefits to the environment and society), or would have significant adverse effects on the wider environment, an alternative bundle of measures has been appraised.

5.3.2. Consideration of disproportionate cost

In some cases it is considered disproportionately expensive to get water bodies to good status or good potential by 2021. Disproportionate cost is a political judgement informed by economic information. Among the economic information relevant to assessing disproportionate costs are: costs, benefits and “affordability” or available resources.

Evidence that the negative consequences of actions (compliance costs, impacts on non-water outcomes) outweigh the positive consequences (benefits of water environment improvements) tends to suggest disproportionate cost.

Consideration of costs and benefits of a bundle of measures is used to identify the long term objectives that are justified. Availability of resources is more relevant to the speed at which the objectives can be achieved. In some cases, even if the benefits are greater than costs for a bundle of measures, an extended deadline has been proposed because of affordability issues. Therefore consideration of costs and benefits helps to determine the status part of a proposed water body objective and information on affordability helps to propose the date by which that status can be achieved.

Where affordability is an issue, alternative financing mechanisms are considered. This might mean moving from the preferred option of the ‘polluter pays’ approach to a ‘beneficiary pays’ approach. If the beneficiary (those who directly benefit from the improved water status) is unable or unwilling to pay, other sources of funding may need to be considered.

The hierarchy for funding measures to resolve or mitigate an environmental problem is:

1. Polluter pays - the person whose activity causes (is at risk of causing or has caused) an environmental problem pays.
2. Beneficiary pays - the person who will benefit from the improvement (or reduced risk) to the environment pays (sometimes called payment for ecosystem services; PES).
3. Government pays - the UK government directly or indirectly (via EU, central and local government) pays.

Table 5: Potential funding sources

Funding Stream	Use/restrictions
Polluter pays	
Private/business finances (power generation, ports, mines and quarries)	Fund improvements to the environmental performance of a business's own activities.
Water company customer bills	Reduce the impact on the environment of water company activities.
Defra grant-in-aid for flood and coastal risk management (FCRM)	Funds maintenance and enhanced flood and coastal risk management activities, including reducing or mitigating the environmental impact of FCRM activities.
Environmental mitigation and enhancement associated with a new permitted activity	Implement environment enhancements to mitigate the potential damage caused by a new or modified permitted activity. For example requirement to install a fish pass on an existing weir associated with a hydropower application.
Voluntary industry funded initiatives (for example the Pesticide Voluntary Initiative)	Funds voluntary action to reduce the potential environmental impact of potentially damaging activities.
National and regional supporter funded organisations and charities (for example the Campaign for the Farmed Environment, CFE)	Fund advice on the environmental performance of their members and the wider industry.
Environment Agency Water Resources standard unit charge	Water Resources Capital Programme - reduce the environmental impact of Environment Agency water resources regulatory activities, for example improved fish passage around gauging stations.
Environment Agency's Environmental Improvement Unit Charge (EIUC)	Pay compensation for Environment Agency initiated abstraction licence changes (Restoring Sustainable Abstraction programme) to reduce licensed volume. Compensation is no longer applicable for water companies as a result of provisions in the Water Act 2014
Beneficiary pays (payment for ecosystem services)	
Water company customer bills	Catchment initiatives where water company is the primary beneficiary, for example providing advice or direct payments to farmers to restrict the use of pesticides in drinking water catchments.
Business plans of national and regional supporter funded organisations and charities (for example National Trust, RSBP, Canal & River Trust)	Fund improvements or advice on the environmental performance of their own assets and operations or elsewhere. Provides benefits for their supporters and the wider community.
Developer contributions (community infrastructure levy)	Payment for environmental enhancements associated with land use development.
Local voluntary funding	Funding sourced and agreed locally to undertake environmental enhancements.
Environment Agency rod licence	Fish stocking and improvements of direct benefit to anglers such as habitat improvements, fish passes, fisheries development and improvement.

Funding Stream	Use/restrictions
Government pays	
Common Agricultural Policy (CAP), New Environmental Land Management Scheme	Agri-environment funding supplementary WFD & biodiversity improvement measures. Includes small capital grants to improve efficiency of voluntary adoption in targeted areas.
CAP - Basic Farm Payment (BFP)	Funding dependent on cross compliance measures, for example soil protection review.
CAP – Greening	Funding as part (30%) of Basic Farm Payment. 5% of agricultural land in ecological focus areas. Mandatory if claiming BFP.
National Growth Programme (covering European Structural Funding including ERDF and ESF)	Local Enterprise Partnerships (LEPs) have written EU Structural and Investment Fund Strategies according to government guidance, some regeneration activities include actions to protect the environment and promote resource efficiency.
Government contribution to water company customer bills (currently South West Water)	Short term funding of water company activities to reduce the impact of water customer bills on vulnerable groups.
Defra grant-in-aid for flood and coastal risk management (FCRM)	Environmental enhancements beyond those connected directly with Environment Agency FCRM activity where FCRM provides the most cost effective way of addressing the issue.
Defra Water and Abandoned Metal Mines programme	Funds environmental improvement to reduce the environmental impact of abandoned metal mines, undertaken by Environment Agency and the Coal Authority.
DECC Coal mine water environment programme	Funds environmental improvement to reduce the environmental impact of abandoned coal mines, undertaken by the Coal Authority.
Defra grant-in-aid for Water Framework Directive	Environment Agency, Natural England and Forestry Commission implementation of WFD non-baseline improvements, either directly or via third parties.
Defra WFD Catchment Partnership Action Fund	Fund WFD non-baseline improvements by third sector groups, administered by Environment Agency with specific grant giving powers.
Defra grant-in-aid for Canal and Rivers Trust (CRT)	Reduce the impact of CRT activities.
National Lottery - HLF, BIG	Funds projects with outcomes for people, communities and heritage which include natural heritage and environment.
EU LIFE	Projects demonstrating innovative approaches at EU level to WFD implementation.
EU INTERREG	Growth driven partnership projects that improve local economies.
European Marine and Fisheries Fund (EMFF)	Administered by the Marine Management Organisation. UK priorities will include measures to promote sustainable fisheries and aquaculture.
European Social Fund (ESF)	Can fund work undertaken by voluntary and community organisations for environmental improvements etc.
Landfill Tax Credits Scheme	Where Trust supports this and local group eligible to apply.

5.4. Alternative objectives

5.4.1. Alternative objectives for water bodies



Where certain conditions apply (see section 3.1.4) and are met then alternative objectives have been set for water bodies; these involve taking an extended time period to reach the objective or meeting a lower status or a combination of both.

In some water bodies it is recognised that time constraints on putting actions in place, or the time taken for the environment to respond once actions are implemented, mean that the objective will only be achieved over more than one river basin management planning cycle.

An objective of less than good status is set where:

- there is currently no solution to the problem
- the costs of taking action exceed the benefits
- background conditions in the environment mean achieving good status is not possible

Finally, where there is genuine scientific uncertainty about the causes of problems, or where the causes are still being investigated, the objective remains one of aiming to achieve good status but with an extended deadline.

Information elsewhere in the river basin management plans

- You can view the status objectives for all water bodies in England here: <https://ea.sharefile.com/d-s0faa355450243538> and summary tables of the information here: <https://ea.sharefile.com/d-s9a6aac8d0f444e38>

5.4.2. Alternative objectives for Natura 2000 Protected Areas

For the purposes of these river basin management plans Natural England consider a Natura 2000 site to be meeting its conservation objectives when all the necessary water-related measures have been completed, that is, no further intervention is required, so that only time is needed for the biological features of the site to recover. Not all the measures necessary to achieve Natura 2000 protected areas objectives were completed in time for the December 2015 deadline required by WFD. As a result of reviewing these objectives the deadline for achieving the objectives for some Natura 2000 protected areas has been extended.

For many sites the time needed for recovery may be considerable, potentially decades. Despite this, ecological recovery time has not been used as a reason for extended deadlines because until all the measures have been implemented it is difficult to determine how long sites will take to recover.

Since the 2009 plans were published, the Improvement Programme for England's Natura 2000 Sites (IPENS) has developed site improvement plans (SIPs) for all Natura 2000 sites in England, including those that are protected areas under WFD. SIPs are a new approach to capturing the issues and identify new measures that are required to achieve favourable conservation status, manage threats and prevent deterioration. SIPs also identify the date by when new measures are likely to be implemented. The IPENS project also published 'theme plans', which are high-level plans aimed at improving the way in which the Natura 2000 network issues are managed.

The information in SIPs and theme plans, along with advice from Natural England has been used to identify which measures could not be completed before 2015. Where SIPs along with expert opinion indicate that not all of the measures necessary to achieve these

protected area objectives will be implemented before 2021 and the information in the SIPs supports an extended deadline under Article 4.4 of the WFD, the deadline has been extended to 2027.

The information on extended deadlines for Natura 2000 protected areas summarises the reasons for an extended deadline on each site.

The specific reasons for extended deadlines for each Natura 2000 protected area are provided in a linked data table (see supporting information below) and draw on the information in SIPs and national expert understanding of the actions required.

The information from objective setting for water bodies, the new information from SIPs and the IPENS theme plans and the expert advice of Natural England provide a more complete picture of the use of, and reasons for, extended deadlines for achieving Natura 2000 objectives.

Supporting information

- The Site Improvement Plans and Theme Plans for Natura 2000 protected areas are available here: <http://publications.naturalengland.org.uk/category/4878851540779008>
- For more detail on the proposed deadline extensions for specific Natura 2000 protected areas please see here: <https://ea.sharefile.com/d-s487ae61bf2a4b4fb>
- Interim goals and CSMG targets for Natura 2000 sites can be found here for rivers: <http://publications.naturalengland.org.uk/category/432368> and here for lakes <http://publications.naturalengland.org.uk/publication/4841829396643840?category=430388>

5.4.3. Justification of alternative objectives

The table below describes the circumstances in which alternative objectives have been set for water bodies and some Natura 2000 sites and Shellfish Waters under Articles 4(4) and 4(5) of the WFD. The table sets out the general circumstances in which each reason has been applied and also, where relevant, gives more specific circumstances for particular elements.

Justifications for alternative objectives are determined for individual elements and then applied to the overall water body objective. Unless an alternative objective is justified for an element in a water body it retains the default objective for the second cycle river basin management plans of aiming to achieve good or better by 2021, irrespective of the overall water body objective.

Table 6: Explanation of circumstances under which exemptions to the environmental objectives have been applied in accordance with Articles 4(4) and 4(5) of the WFD

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
Technically infeasible: No known technical solution is available	General approach	<p>This reason has been used to justify setting less stringent objectives for water bodies under Article 4(5) and in a limited number of cases it has been used to justify extending the deadline for achieving protected area objectives under Article 4(4).</p> <p>As well as being applied where there is no known practical technique for making the necessary improvement, this reason has also been used in cases where:</p> <ul style="list-style-type: none"> • techniques are under development but are not yet known to be effective in practice • there is a known technical solution but that solution cannot be applied in a specific location due to specific local conditions
	Biological elements	<p>Invasive non-native species (INNS) may impact upon biological elements resulting in them being at less than good status. For many established INNS, such as American signal crayfish, there is no known technical solution to eradicate them.</p> <p>In these circumstances a less stringent objective is set for the impacted biological element under Article 4(5), provided that the water body is not also a Natura 2000 protected area (see below). For example, American signal crayfish are present in water body GB105030062450 in the Witham Catchment in Anglian RBD and as a result a less stringent objective has been set for the biological elements affected by the signal crayfish and for the water body overall.</p>
	Biological elements Hydrological regime	<p>Flows in some rivers and streams can vary naturally on a seasonal basis (for example ephemeral streams and winterbournes) or due to features like swallow holes. These are natural phenomena but can result in a water body being classified at less than good status. In these instances there is no technical solution to the failure to reach good status and a less stringent objective is set under Article 4(5).</p>
	Fish	<p>Natural barriers to fish migration sometimes result in fish being classified at less than good status in a water body. In these situations there is no technical solution to the fish failure since natural barriers do not require removal or easement and a less stringent objective is set under Article 4(5).</p>
	Fish	<p>The natural physical characteristics of a water body may be unsuitable for certain fish species which, although expected to be present by the fish classification tools, are in fact absent, resulting in fish being reported at less than good status. There is no technical solution in these circumstances since the absence is due to the natural characteristics of the water body and therefore a less stringent objective is set under Article 4(5). As an example, in water body GB104027057500 in the Don and Rother catchment (Humber RBD), bullheads are absent due to the steep gradient and a less stringent objective has been set for fish.</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Groundwater quantity	<p>In some areas public water supply is mainly by abstraction from groundwater. Although the groundwater may be at poor quantitative status as a result of the abstraction it may not be technically possible to transfer the abstraction to another groundwater body, surface waters or an area of low environmental sensitivity. In such cases a less stringent objective has been set under Article 4(5).</p> <p>This exemption has been used when the environmental and socioeconomic needs served by the supply of public water cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs, as required by article 4(5)(a).</p>
	Groundwater chemical	<p>There is not always a technical solution to improve a groundwater body to good chemical status where:</p> <ul style="list-style-type: none"> • There are multiple small diffuse discharges from abandoned mines stretching across a groundwater body which are causing it to be at poor status. These discharges can be so numerous that it is technically infeasible to put in place measures to improve all the discharges to get to good chemical status. • A large mining discharge is in a highly constrained location, such as in the middle of a village, and land is not available for treatment schemes. This situation occurs in water body GB40302G701500 in the Northumbria RBD. <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>
	Phosphate Phytobenthos Macrophytes	<p>In England it is generally currently considered to be technically infeasible to build a sewage treatment works that will reduce phosphate in discharges to less than 0.5mg/l.</p> <p>If a water body requires discharges of less than 0.5mg/l phosphate to achieve good status then this reason has been used to justify a less stringent objective under Article 4(5), for example in the Long Eau water body (GB105029061670) in the Anglian RBD.</p> <p>Where good or high status is required to support Natura 2000 protected area objectives then this reason has been used to justify an extended deadline to achieve the objective under Article 4(4). The exemptions apply to the phosphate and the impacted biological elements such as phytobenthos and macrophytes.</p> <p>Trials are underway involving water and sewerage companies to investigate sewage treatment technologies that could be used to reduce phosphate below 0.5 mg/l. The trials will determine how effective these technologies are and are due to be complete by 2017. The results of the trials will inform the review and update of river basin management plans in 2021.</p> <p>This exemption has been used when the environmental and socioeconomic needs served by the sewage treatment works to dispose of sewage cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs, as required by article 4(5)(a).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Biological elements – Natura 2000 protected areas	<p>The control or eradication of INNS is required on many Natura 2000 protected areas. For some INNS control methods are not yet available but may become available following further research, for example the anticipated biocontrol measures for Himalayan balsam. Timescales for achieving Natura 2000 protected area objectives where INNS are involved are therefore often very long term and dependent on the success of future research.</p> <p>In these circumstances the deadlines for achieving Natura 2000 objectives have been extended under Article 4(4).</p>
	Nutrients – Natura 2000 protected areas	<p>Some Natura 2000 lake sites are impacted by eutrophication. In addition to reducing phosphate inputs from diffuse or point sources, in-lake measures may also be needed to reduce internal cycling of nutrients and reduce re-suspension of sediments.</p> <p>For some lakes the in-lake measures would require the removal of nutrient rich sediment, for example, at Oak Mere SAC. Depending on the site the removal and disposal of nutrient rich sediments is considered to be technically infeasible.</p> <p>In these circumstances when there is no known technical solution the deadline for achieving the Natura 2000 objectives have been extended under Article 4(4).</p>
Technically infeasible: Cause of adverse impact unknown	General approach	<p>This reason has been used to justify setting extended deadlines for achieving objectives for water bodies and some protected areas under Article 4(4).</p> <p>It has been applied when a water body is at less than good status and the evidence is insufficient to identify the reason or reasons for not achieving good status with the required level of certainty to support identification of the measures needed to improve status.</p> <p>This exemption has been used where:</p> <ul style="list-style-type: none"> • genuine scientific uncertainty remains despite investigation work having been carried out • there has been insufficient time to complete the necessary investigation work since the water body was classified at less than good status <p>An investigation in this context includes desk studies drawing on existing data and knowledge about the water body and wider catchment, engagement and consultation with catchment partners and bespoke field investigations.</p>
	Metals	<p>Some groundwater bodies are at poor status because of polluted mine waters entering the groundwater. Whilst it is known that abandoned mines are the general source of the metals more investigations are needed to determine exactly where the metals are coming from so that the necessary measures can be identified and appraised.</p> <p>In these circumstances an extended deadline for achieving good status has been set under Article 4(4).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Sediment and nutrients – Natura 2000 protected areas	<p>Nutrient enrichment of Natura 2000 sites can be complex to understand and address and although understanding has improved since 2009 there are still some sites that will require further investigation to identify the precise causes or sources before solutions can be identified.</p> <p>This applies to sites like the River Avon which is suffering from eutrophication and the Ouse Washes SAC/SPA where further investigation is needed to refine understanding around specific sources and impacts so actions can be targeted effectively.</p> <p>In these circumstances an extended deadline for achieving Natura 2000 protected area objectives has been set under Article 4(4).</p>
Technically infeasible: Practical constraints of a technical nature prevent implementation of the measure by an earlier deadline	General approach	<p>This reason has been used to justify setting extended deadlines for achieving objectives for water bodies and some protected areas under Article 4(4).</p> <p>In some cases, although the appropriate measures to achieve the water body or Natura 2000 site objectives have been identified, there are constraints on commissioning and undertaking the necessary works that will extend the time taken to achieve the objectives.</p> <p>This exemption has only been applied where there is confidence (a reasonable expectation) that the implementation of the measures necessary to achieve the objectives will start by 2021, that is, the appropriate measure has been identified, funding has been agreed and there is a mechanism in place to deliver it and work will start during this cycle of river basin management planning.</p>
	Hydrological regime	<p>Some water company schemes are large and complex, for example, building a new reservoir and so installation will happen over a long time frame. A water company measure may be programmed for implementation during cycle 2, but the measure will not be delivered until after 2021 because it involves the installation of a large complex scheme.</p> <p>In these circumstances an extended deadline of good by 2027 has set under Article 4(4).</p>
	Total phosphorus (lakes)	<p>Physical habitat restoration in lakes can be complex, large-scale and often involves more than one organisation. It often requires significant work to secure stakeholder consensus and cooperation. Actions may need to happen in a specific order to be effective, such as tackling diffuse sources of pollution before carrying out physical restoration works to the lake. Implementation of lake restoration action plans may therefore take place over a number of years.</p> <p>In these circumstances an extended deadline for achieving good status has been set under Article 4(4).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Hydrological regime – Natura 2000 protected areas	<p>Physical habitat restoration in rivers and lakes can be complex, large-scale, and often takes place over a number of years. It often requires significant work to secure stakeholder consensus and cooperation. In some cases, particularly river restoration, it can be detrimental to carry out all of the works required to restore hydrology over a short time period as this can result in damaging ecological disturbance to the majority of a SAC river length.</p> <p>This exemption has been used for sites that have unfavourable river and lake hydromorphology, unfavourable water levels on wetland and over abstraction. The necessary measures can be technically very complex and the planning, commissioning and delivery of the necessary actions to address these aspects of Natura 2000 site condition will require continued effort over long time scales.</p> <p>In these circumstances extended deadlines for achieving the Natura 2000 protected area objectives have been set under Article 4(4).</p>
	Physical modifications – Natura 2000 protected areas	<p>In some locations changes to coastal and estuary morphology are impacting on Natura 2000 protected area objectives. For example, coastal realignment and coastal squeeze on sites like the Humber Estuary SPA. The measures needed to address these pressures can be technically complex, involving large scale engineering works which take a long time scale to implement.</p> <p>In these circumstances extended deadlines for achieving the Natura 2000 protected area objectives have been set under Article 4(4).</p>
Disproportionately expensive: Unfavourable balance of costs and benefits	General approach	<p>This reason has been used to justify setting less stringent objectives for water bodies under Article 4(5).</p> <p>This exemption has been used in situations where:</p> <ul style="list-style-type: none"> • There is no environmental problem to solve and therefore the costs of taking any action would exceed the benefits. <p>Although WFD classification tools and the monitoring programme represent best science, due to the varied nature of the environment they sometimes flag a problem where no problem exists. Additional information including risk assessments and information from third parties can be used to establish if there is an environmental problem.</p> <ul style="list-style-type: none"> • Economic appraisal has determined that the costs of implementing the most cost effective and technically feasible measures needed to reach good status are greater than the benefits to be gained from achieving good status <p>In some cases, although a less stringent objective has been set action will still happen to improve the water body to the best possible status, as required by Article 4.5(b). Measures will be implemented up to the point where doing more would be disproportionately expensive. In these cases pressures may be partially resolved or, where there are multiple sources in a catchment, some may be addressed whilst others are not.</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Fish	<p>In some cases the fish classification tool gives a result of less than good status due to the absence of a certain species but it is known from other data, such as angling match records, that the species is both present and at expected densities in the water body. Therefore there is no environmental problem to solve and action to take.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>
	Hydrological regime	<p>In some water bodies there are multiple small abstractions or a large abstraction from either groundwater or surface water, or a combination of the two, which is affecting surface water flows. The potential compensation costs of changing abstractions, either the abstraction regime or decreasing abstraction volumes overall, can be relatively high.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p> <p>This exemption has been used when the environmental and socioeconomic needs served by the supply of public water cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs, as required by article 4(5)(a).</p>
	Fish Invertebrates Mitigation Measures Assessment	<p>The costs of implementing some mitigation measures to address pressures from physical modifications are very high. For example, in urban areas where improvement works are often technically and spatially challenging there are increased costs for ground works and securing land availability as well as spatial limitations.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5). The exemption applies to the Mitigation Measures Assessment and the impacted biological elements.</p> <p>This exemption has been used when the environmental and socioeconomic needs served by the physical modifications cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs, as required by article 4(5)(a).</p>
	Groundwater quantitative	<p>The groundwater body is at poor status but the groundwater is a confined aquifer that has no direct or indirect link to environmental features or problems.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>
	Groundwater chemical	<p>In some groundwater bodies which are failing the General Chemical Test for nitrates, farming would need to stop across a very wide area of land in order to meet the good status objective. The costs of implementing such measures have been judged to exceed the benefits.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Phosphorus Ammonia Dissolved oxygen Macrophytes Phytobenthos	<p>Engineering measures and technologies to improve water quality of discharges from sewage treatment works can have high costs relative to other measures within a catchment bundle of measures. Although these measures can be technically feasible, the cost of implementation can exceed the benefits to be gained from achieving good status. This is especially true in cases where improvements are limited to an individual water body which limits the overall relative benefit in the catchment.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p> <p>This exemption has been used when the environmental and socioeconomic needs served by the sewage treatment works to dispose of sewage cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs, as required by article 4(5)(a).</p>
	Nutrients	<p>For phosphate failures in freshwater and dissolved inorganic nitrogen in estuaries and coastal waters, targeted regulatory measures (for example, water industry nutrient removal schemes) require sufficient evidence of a eutrophication problem to justify the measure. If a water industry sewage works is a major source of relevant nutrient and nutrient removal would be required to improve status to good but there is insufficient evidence of biological eutrophication impacts within the downstream water body or catchment then there is no environmental problem to solve and the costs of taking action would exceed the benefits.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p> <p>Less certainty of eutrophication does not preclude consideration of non-regulatory or voluntary approaches to address other nutrient sources.</p>
	Hydrological regime	<p>If hydrological regime is classified as not supporting good status but investigations have not shown any evidence of impacts upon biological elements then there is no environmental problem to solve and the costs of taking action would exceed the benefits.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>
	Metals	<p>The cost of mine remediation measures are often relatively high within a catchment bundle of measures and in some cases, where the extent of the benefits are less certain and limited to specific water bodies, the cost of implementation exceeds the benefits.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>
	Physico-chemical elements Chemicals	<p>The complex nature of pressures and pollutant pathways in urban areas along with spatial challenges mean that the costs of implementing successful and worthwhile sustainable urban drainage measures can be high. These costs can exceed the benefits, especially if the benefits are limited to specific, small urban water bodies.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
	Shellfish waters protected areas	<p>For some shellfish waters the benefits to be gained from achieving compliance is less than the cost of implementing the most cost effective and technically feasible measures needed to deliver the improvements by 2021. Such measures include, for example, installation of UV disinfection at sewage treatment works and action to reduce the pollution of run-off from agricultural land.</p> <p>In these circumstances an extended deadline for achieving the objectives has been set under Article 4(4).</p>
<p>Disproportionately expensive: Disproportionate burdens</p>	General approach	<p>This reason has been used to justify setting extended deadlines for achieving objectives for water bodies and some protected areas under Article 4(4) for the purposes of phased achievement of the objectives.</p> <p>This reason has been used in two situations:</p> <ul style="list-style-type: none"> • The programme of measures to achieve improvements in water body status by 2021 consists of measures where there is confidence that there is a mechanism (for example a piece of legislation or voluntary agreement) in place to implement the measure and funding is available. Confidence in this context means at least a reasonable expectation that funding is available during the second cycle. <p>Where funding has not been confirmed and there is not a reasonable expectation that it will become available, it is assumed that the measures are therefore unaffordable to implement in the second cycle without creating a disproportionate burden on the relevant sector or fall outside government spending limits. This will be subject to consideration by Ministers in finalising the plans.</p> <p>In these circumstances an extended deadline for achieving the objectives has been set under Article 4(4).</p> <ul style="list-style-type: none"> • In some cases, although there is confidence that the measures envisaged as being necessary to achieve the objectives are funded for the second cycle there is low confidence about: <ul style="list-style-type: none"> ○ exactly which measures will take place and where they will be implemented, for example, where implementation of measures is voluntary ○ the element-level improvements in status that will be achieved by 2021 <p>It is assumed that a different approach to implementing the measures cannot be taken without placing a disproportionate burden on the relevant sector. In these circumstances an extended deadline for achieving the objectives has been set under Article 4(4).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
<p>Natural conditions: Ecological recovery time</p>	<p>General approach</p>	<p>This reason has been used to justify setting extended deadlines for achieving water body objectives under Article 4(4).</p> <p>Generally speaking the ecology of aquatic systems recovers quickly when pressures are removed. However, in some cases there may be a delay before the biological quality of the water body recovers.</p> <p>The delay may be due to the time taken for the plants and animals to re-colonise and become established after the hydromorphological, chemical or physicochemical conditions have been restored or the time taken for the habitat conditions to stabilise after improvement works.</p> <p>The natural recovery of biological populations is typically achieved through re-colonisation. Where impacted habitats are hydrologically connected to un-impacted locations, recovery can occur quickly. This is particularly true for species that show mobility through their life history (for example, fish and invertebrates). Here, recovery can happen within a limited number of generations and therefore years. Where habitats lack this connectivity, or where species are no longer present, recovery may take much longer.</p> <p>Other circumstances where ecological recovery time may be delayed are:</p> <ul style="list-style-type: none"> • measures to remove the activity giving rise to a pressure are successful, but the pressure takes time to reduce. Here the ecology cannot recover quickly as it is still impacted by a pressure, albeit reducing in magnitude. Recovery of ecosystems from prolonged exposure to increased nutrients provides a good example. In such cases it may take tens of years for the plant communities to return to those expected under near reference conditions once all improvement measures are implemented. In such cases deadlines can be extended beyond 2027. • measures to remove pressures are successful, but the ecology does not return to the community expected to be seen under near reference conditions. Instead the ecology assumes a different ecological stable state. In these cases, further management of the ecosystem may be needed to trigger a change back to good status. <p>Ecological recovery time is only used as a justification for an extended deadline if there is confidence that the measures necessary to achieve the improvement in status will be implemented by 2021.</p> <p>In these circumstances an extended deadline for achieving the objectives has been set under Article 4(4).</p>

Reason alternative objective has been set	What the alternative objective applies to	Explanation for use of exemption
Natural conditions: Groundwater status recovery time	General approach	<p>This reason has been used to justify setting extended deadlines for achieving water body objectives under Article 4(4).</p> <p>Groundwater bodies can take many decades to recover from chemical pressures once measures to reduce the pressures are in place. This is mainly because of the delay as water travels downwards through the unsaturated zone to the water table. The length of this delay will depend on many factors including the rate of recharge, properties of the pollutant and the nature of the hydrogeological setting.</p> <p>The recovery time delay can vary between several years to many decades. In the majority of cases where this exemption has been used the substance causing poor status was nitrate. Groundwater status recovery time has mainly been used for groundwater chemical pressures.</p> <p>In these circumstances an extended deadline for achieving the objectives has been set under Article 4(4).</p>
	Dissolved inorganic nitrogen	<p>In some cases nitrates from groundwater bodies are leaching into surface water bodies such as estuaries resulting in dissolved inorganic nitrogen failures. As nitrate can take a long time to move through groundwater, it will correspondingly take a long time for the surface water to recover.</p> <p>For example nitrates in groundwater in Hampshire are leaching into surface waters, resulting in dissolved inorganic nitrogen in Portsmouth Harbour (water body GB580705140000) being classified at moderate status.</p> <p>In these circumstances an extended deadline for achieving the objectives has been set under Article 4(4).</p>
Natural conditions: Background conditions	General approach	<p>This reason has been used to justify setting less stringent objectives for water bodies under Article 4(5).</p> <p>It has been applied when the natural background level of a substance in the environment is such that the level in a water body (in the absence of any man made inputs) cannot be reduced sufficiently to meet the WFD standard.</p> <p>In these circumstances a less stringent objective has been set under Article 4(5).</p>
	Phosphate	<p>The Upper Greensand aquifer in the south-west of England contains high concentrations of natural phosphate. Groundwater assessments have been adjusted for this background level but it is also one of the reasons for phosphate levels in surface waters failing to reach good status.</p> <p>In these circumstances a less stringent objective has been set for the relevant surface water bodies under Article 4(5).</p>

6. Programme of measures

Summary of this section

This section provides background to the programme of measures, and links to further information and supporting documents.

Topics covered:

Programme of measures, and mechanisms to implement measures

i. Basic and supplementary measures

The summary programme of measures is made up of both basic and supplementary measures, as defined in Article 11 of the WFD.

Basic measures are associated with the implementation of other legislation for the protection of waters such as the Urban Waste Water Treatment Directive, the Marine Strategy Framework Directive and the Habitats Directive. They also include regulatory instruments such as permit regimes and general binding rules.

When basic measures alone are not sufficient to achieve the environmental objectives, supplementary measures are required in addition. Supplementary measures can be very diverse in nature and include negotiated agreements, economic tools and habitat restoration schemes.

For ease of reading, Part 1 presents basic and supplementary measures together with measures summarised based on the outcomes they achieve, as follows:

- ongoing measures to prevent deterioration
- main programmes of measures for 2021 outcomes (including national investment programmes and local investment through catchment partnership groups)
- measures to achieve objectives to 2027 and beyond
- additional measures to achieve protected area objectives

ii. Considering climate change

Climate change has been taken into account in the design of the programme of measures:

- For most significant investment programmes, such as water company investment, climate change adaptation and mitigation is an important consideration in the design and planning of projects, taking into account the most up-to-date scenarios for a changing climate at the time of implementation
- For less significant projects, a flexible step-by-step approach to install measures that are capable of being adapted or extended as required in the future, is more appropriate. Where there is a choice of potential solutions, climate change resilience is a factor in decision making.
- Measures resulting from the long-term environmental plans, such as water resources management plans and flood risk management plans include consideration of climate change in their assessment of actions to be taken.

ii. Mechanisms

For measures to be translated into effective action on the ground there needs to be appropriate 'mechanisms' in place to facilitate this.

River basin management plans:

Part 2: River basin management planning overview

Measures are brought about through a range of policy, legal or financial mechanisms. These include:

- legislation
- economic instruments
- codes of good practice
- negotiated agreements
- promotion of good practice
- education

Information elsewhere in the river basin management plans

- More information about the mechanisms used to implement measures is available here: <https://ea.sharefile.com/d-sabbd14301a44d5e9>

Supporting information

- You can find a list of the measures used to predict improvements in status by 2021 for specific elements in specific water bodies here: <https://ea.sharefile.com/d-sabbd14301a44d5e9>
- You can find a summary of the measures that will deliver additional environmental outcomes by 2021 (not linked to predicted outcomes because of a lack of confidence in specific location or outcome) here: <https://ea.sharefile.com/d-sabbd14301a44d5e9>
- You can find a summary of water company measures here: <https://ea.sharefile.com/d-sabbd14301a44d5e9>
- You can find a summary of the measures needed to achieve water body objectives for 2027 and beyond here: <https://ea.sharefile.com/d-sabbd14301a44d5e9>
- You can find information on The Improvement Programme for England's Natura 2000 sites (IPENS) is available here: <https://www.gov.uk/government/publications/improvement-programme-for-englands-natura-2000-sites-ipens>
- You can access the Site Improvement Plans for Natura 2000 sites here: <http://publications.naturalengland.org.uk/category/6287197783195648>

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