

# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex H: Adapting to climate  
change

# Contents

<b>H.1</b>	<b>Introduction</b>	<b>3</b>
<b>H.2</b>	<b>Summary of approach in dealing with climate change</b>	<b>4</b>
<b>H.3</b>	<b>Summary of climate change impacts</b>	<b>6</b>
<b>H.4</b>	<b>The impact of climate change on the identified pressures and the ability of measures to perform under future climate conditions</b>	<b>12</b>
<b>H.5</b>	<b>Interaction of management action for pressures</b>	<b>34</b>
<b>H.6</b>	<b>Adaptation strategies</b>	<b>35</b>
<b>H.7</b>	<b>Adaptation in relation to underlying conditions and biology</b>	<b>36</b>
<b>H.8</b>	<b>Summary</b>	<b>37</b>

## H.1 Introduction

The water environment is particularly vulnerable to the effects of climate change. We are already experiencing trends in climatic factors that are having impacts on the water environment.

The Intergovernmental Panel on Climate Change (IPCC) Climate Change and Water Technical Paper<sup>1</sup> concluded that 'observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change, with wide-ranging consequences on human societies and ecosystems'.

Projections of future climate from the UK Climate Impacts Programme ('UK Climate Projections': UKCP09<sup>2,3</sup>) identify that we can all expect climate changes to intensify with the following key changes:

- All areas of the UK get warmer, and the warming is greater in summer than in winter;
- There is little change in the amount of precipitation (rain, hail, snow etc) that falls annually, but it is likely that more of it will fall in the winter, with drier summers, for much of the UK. There is likely to be an increased incidence of very intense heavy rainfall (see section H3);
- Sea levels rise, with this rise being greater in the south of the UK than the north.

Climate change will inevitably affect the conditions and pressures that the Water Framework Directive seeks to manage in the water environment. Climate change impacts may not be strongly felt during the first river basin management cycle up to 2015 and may not be easily distinguishable from normal climatic variations. However, decisions and investments made during this period may have a lifetime that extends for many decades. In particular new infrastructure or modifications to existing infrastructure will last more than one cycle. Over this extended period, towards the end of cycle two (to 2021) and through cycle three (to 2027), it is predicted that the UK's climate is likely to change significantly. Therefore, if we all fail to take account of climate change now, this could result in poor investment decisions in terms of actions and limit the extent to which we can meet Water Framework Directive objectives and/or the efficiency with which we will achieve them. Further, climate change could affect the predicted effectiveness of current or new actions in meeting Water Framework Directive objectives (unless we all take this into account). This presents real risks for implementation and success.

The European Commission has identified water management as the priority area for action in taking into account the impact of climate change. In April 2009 an EU White Paper was produced, 'Adapting to climate change: Towards a European framework for action'. This describes the kind of action that can be best delivered at EU level to deal with the impacts of climate change. The White Paper sets out a framework to reduce the EU's vulnerability to the impact of climate change and specifically highlights the need to take climate change into account in developing the River Basin Management Plans and the role the river basin management process can play in delivering sustainable water management in a changing climate.

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<sup>1</sup> Bates, B.C., Kundzewicz, Z.W. Wu, S. and Palutikof, J.P. (Eds.) 2008: *Climate Change and Water*. Technical Paper VI of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, 210 pp. Available at: <http://www.ipcc.ch/pdf/technical-papers/climate-change-water-en.pdf>

<sup>2</sup> <http://ukclimateprojections.defra.gov.uk/>

<sup>3</sup> Note that UKCP09 was launched on the 18<sup>th</sup> June 2009. In developing the draft River Basin Management Plan we used the previous UK climate change projections (UKCIP02) that were available at that time. For this plan we have now considered the outputs of UKCP09 in carrying out an initial revision of our approach to climate change and particularly the likely performance of measures.

With respect to climate change impacts on the water environment the European Commission has made it clear that member states should take climate change into account when implementing the Water Framework Directive. A policy paper on the need for, and approach to, climate change adaptation through implementation of the Water Framework Directive has been endorsed by the EU Water Directors.<sup>4</sup> A Common Implementation Strategy activity on Climate Change and Water, started in 2007, is currently focusing on making the best use of existing EU water legislation and identifying adaptation measures at different scales to progress adaptation for water, and is currently producing guidance on integration of climate change into Water Framework Directive implementation. This guidance should be published by the end of 2009. The EU white paper identifies the development of guidance and supporting tools to 'climate-proof' River Basin Management Plans as a specific action. The UK (through Defra with the support of the Environment Agency) is supporting the development of this guidance including leading on the drafting of a chapter on the 'analysis' stages of Water Framework Directive implementation.

As a minimum, the European Commission expects our response to climate change to include, in the first cycle, screening of the likely effects of climate change on the pressures identified under the characterisation (Article 5) step of the river basin management process. The European Commission also recommends that member states carry out a climate impact sensitivity analysis or 'climate check' on the programme of actions to help in 'selecting actions that are effective, sustainable and cost efficient under changing conditions'. The European Commission also states that, 'In the second planning cycle, climate change impacts should be taken fully into account'. The European Commission recommendation is primarily in relation to climate change adaptation (rather than mitigation) which is the main thrust of this annex. This annex seeks to summarise how the Environment Agency have approached these assessments of the impacts of climate change in producing this first River Basin Management Plan.

## H.2 Summary of approach in dealing with climate change

The Environment Agency's priorities for dealing with climate change in the first cycle of implementing the Water Framework Directive in England and Wales will be to:

- consider the change in risk, due to climate change, of not achieving the Water Framework Directive default objectives (for example no-deterioration, good status) as a consequence of the identified Water Framework Directive pressures (for example abstraction);
- consider the impacts of climate change when identifying and appraising actions and propose appropriate adaptation of actions where necessary;
- look for opportunities in the monitoring programme to improve our understanding of climate change trends;
- consider the likely contribution of actions to future climate change through their impact on emissions of greenhouse gases, and propose appropriate mitigation where necessary.

In the first cycle the Environment Agency will not attempt to incorporate climate change into typologies, reference condition descriptions or default objective (including standards) and final water body objective setting. This is because we require some stability in our planning assumptions for subsequent work and because further work is required to understand what impact climate change will have on underlying conditions before we can do this. Further, on the basis of current scientific results, it is not expected that, within the timeframe of initial Water Framework Directive implementation (i.e. up to 2027) and within the metrics used for pressure assessment, a climate change signal will be observable above natural variability or

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<sup>4</sup> Common implementation strategy for the Water Framework Directive, policy paper on climate change and water, June 2008  
**Environment Agency** River Basin Management Plan, Anglian River Basin District  
Annex H: Adapting to climate change  
December 2009

adequately distinguishable from other human pressures at a level to cause major changes in typology or major changes at reference sites. We are following the recommendations of the European Commission for the first cycle and are expecting a view from the commission as to common and consistent action to address issues identified above for future cycles. We will not reopen the agreed monitoring plan for similar reasons. However these aspects of the planning cycle will be addressed by future planning cycles.

We will do further research and scoping work in the first cycle of river basin management to determine if and how climate change should be factored into these considerations. There is already relevant ongoing or proposed research which will help inform our decision on these issues in the future. Examples include:

- A proposed assessment of the impact of climate change on river flows and groundwater levels across England and Wales, to improve the Environment Agency's capacity for taking this into account in management and regulatory decisions.
- Proposed development of guidance for water companies to prepare plans for future water supply that include effective adaptation to and mitigation of climate change.
- Project on 'Potential impacts of climate change on river water quality' (Environment Agency Science report: SC070043/SR).
- Project on 'climate change impacts and water temperature' (Environment Agency science report: SC060017/SR).
- Project on 'Preparing for climate change impacts on freshwater ecosystems (PRINCE)' (Environment Agency science report: SC030300).

Further work is also required to determine if and how controlling non-climate change pressures and maintaining ecosystems in good functional condition increases the resilience of ecosystems to the impacts of climate change. Robust evidence for this could influence adaptation strategies, appraisal outcomes and therefore alternative objective setting.

This annex addresses a number of the priorities identified in the bullets above:

- The impacts of climate change in England and Wales and the river basin district.
- The potential impacts of climate change on the identified Water Framework Directive pressures.
- How resilient the programme of actions are to the impacts of climate change.

Essentially this annex looks at climate change impacts on the pressures, actions and achievement of Water Framework Directive objectives in the River Basin Management Plan. It does not report in detail the impact of the programmes of actions on greenhouse gas emissions and future climate change. These aspects are considered in the strategic environmental assessment reports which accompany the draft and this River Basin Management Plan and annex E which describes how the cost of carbon was included in the economic appraisal process. As such this annex, annex E and the strategic environmental assessment are complementary. The assessments in this annex are essentially qualitative. More quantitative information may have to be used in appraising existing measures or through other processes (e.g. PR09) and should be used in updating risk assessments prior to measures implementation.

## H.3 Summary of climate change impacts

This section summarises climate change effects in England and Wales to date and scenarios for future climate change effects as reported in UKCP09<sup>5</sup>. You can find more detailed analyses and descriptions on historic trends and future projections, together with guidance on how to plan for climate change via either the UKCP09 or the UK Climate Impacts Programme<sup>6</sup> websites.

### Climate change effects to date

The 'climate of the UK and recent trends report' from UKCP09 identifies the following climate change effects to date for the UK<sup>7</sup>:

- Warming of the global climate system is unequivocal, with global average temperatures having risen by nearly 0.8 °C since the late 19th century, and rising at about 0.2 °C a decade over the past 25 years.
- It is very likely<sup>8</sup> that man-made greenhouse gas emissions caused most of the observed temperature rise since the mid 20th century.
- Global sea-level rise has accelerated between mid-19th century and mid-20th century, and is now about 3mm per year. It is likely that human activities have contributed between a quarter and a half of the rise in the last half of the 20th century.
- Central England temperature has risen by about a 1.0 °C since the 1970s, with 2006 being the warmest on record. It is likely that there has been a significant influence from human activity on the recent warming.
- Annual mean precipitation (rain, hail, snow etc) over England and Wales has not changed significantly since records began in 1766. Seasonal rainfall is highly variable, but appears to have decreased in summer and increased in winter, although with little change in the latter over the last 50 years.
- All regions of the UK have experienced an increase over the past 45 years in the contribution to winter rainfall from heavy precipitation (rain, hail, snow etc) events; in summer all regions (except North-East England and Northern Scotland) show decreases.
- Severe windstorms around the UK have become more frequent in the past few decades, though not above that seen in the 1920s.
- Sea-surface temperatures around the UK coast have risen over the past three decades by about 0.7 °C.
- Sea level around the UK rose by about 1mm a year in the 20th century, corrected for land movement. The rate for the 1990s and 2000s has been higher than this.

### Scenarios for future climate change

Much of the change in climate over the next 30 to 40 years has already been determined by historic emissions and because of the inertia in the climate system. We are all likely, therefore, to have to adapt to some degree of climate change even if future emissions are reduced. The climate of the second half of the twenty-first century, and beyond, will be increasingly influenced, however, by the volume of greenhouse gases that human society emits over the coming decades.

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<sup>5</sup> <http://ukclimateprojections.defra.gov.uk>

<sup>6</sup> <http://www.UKCIP.org.uk/>

<sup>7</sup> Jenkins G.J., Perry M.C. and Prior M.J.O., 2009. The Climate of the United Kingdom and Recent Trends, Revised Edition, Jan 2009, Met Office Hadley Centre

<sup>8</sup> The IPCC definitions of likelihood are used throughout this annex, i.e.: very likely means: more than 90 per cent probability of occurrence; likely means: more than 66 per cent probability; unlikely means: less than 33 per cent probability, very unlikely means: less than 10 per cent probability.

Consideration of future climate change is based on scenarios of future global emissions of greenhouse gases. The scenarios reported by UK Climate Impact Programme 2009 describe three alternative emissions scenarios for the UK. These are 'low emissions', 'medium emissions' and 'high emissions'. Due to space constraints we have largely presented results in this document for the medium emissions scenario. In the Environment Agency assessment of climate impacts on pressures and the performance of measures we have looked across all three emission scenarios.

As well as uncertainty surrounding future greenhouse gas emissions there are also other significant uncertainties (for example in the choice of climate model to use) that mean that it is not possible to give one correct value for future climate. UKCP09 addresses this through, for the first time, presenting climate change projections in probabilistic form. This has been made possible through advancements in the understanding and modelling of the climate system, advances in computing power, and the integration of the results of climate models from centres other than the Meteorological Office Hadley Centre. Within UKCP09 and in this annex, where probabilities are described, the Intergovernmental Panel on Climate Change definitions are used – for example very unlikely means that there is less than 10 per cent probability of occurrence of an event. Further, UKCP09 presents projections for three different emission scenarios: 'low', 'medium', and 'high'.

The following statistics, maps (Figures H1-H3) and cumulative distribution functions (Figure H4) are provided in order to give an indication of the scale, direction of change and uncertainty associated with annual average temperature, winter precipitation and summer precipitation in the 2050s. The 2050s are presented to allow consideration of the potential changes in climate over the lifespan of those measures that might be less flexible to changing conditions (i.e. fixed infrastructure such as housing, flood defences, reservoirs, wastewater treatment works and so on). UKCP09 projections are provided at seven 30-year time periods covering the period from 2010 to the end of this century – thus the '2050s' represents the average across the time period from 2040-2069. The changes are relative to a 1961-1990 baseline. Further information including other significant variables (e.g. humidity, rainfall intensity, maximum and minimum temperatures), additional timescales and alternative probability levels are available from the UKCP09 website <http://ukclimateprojections.defra.gov.uk>.

The UKCP09 projections suggest that for the Anglian River Basin District<sup>9</sup> in the 2050's:

- Under medium emissions, the central estimate of increase in **winter mean temperature** is 2.2°C; it is very unlikely to be less than 1.1°C and is very unlikely to be more than 3.4°C.
- Under medium emissions, the central estimate of increase in **summer mean temperature** is 2.5°C; it is very unlikely to be less than 1.2°C and is very unlikely to be more than 4.3°C.
- Under medium emissions, the central estimate of increase in **summer mean daily maximum temperature** is 3.4°C; it is very unlikely to be less than 1.3°C and is very unlikely to be more than 6°C.
- Under medium emissions, the central estimate of increase in **summer mean daily minimum temperature** is 2.7°C; it is very unlikely to be less than 1.2°C and is very unlikely to be more than 4.7°C.

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<sup>9</sup> Based on the UKCP09 'East of England' administrative area  
Environment Agency River Basin Management Plan, Anglian River Basin District  
Annex H: Adapting to climate change  
December 2009

- Under medium emissions, the central estimate of change in **annual mean precipitation** is 0 per cent; it is very unlikely to be less than –4 per cent and is very unlikely to be more than 5 per cent.
- Under medium emissions, the central estimate of change in **winter mean precipitation** is 14 per cent; it is very unlikely to be less than 3 per cent and is very unlikely to be more than 31 per cent.
- Under medium emissions, the central estimate of change in **summer mean precipitation** is –16 per cent; it is very unlikely to be less than –37 per cent and is very unlikely to be more than 6 per.

Figure H1 - **Change in annual mean temperature (°C) in the 2050s under the Medium emissions scenario for the Anglian River Basin District for the a.) 10 per cent; b.) 50 per cent and c.) 90 per cent probability levels. Results from UKCP09.**

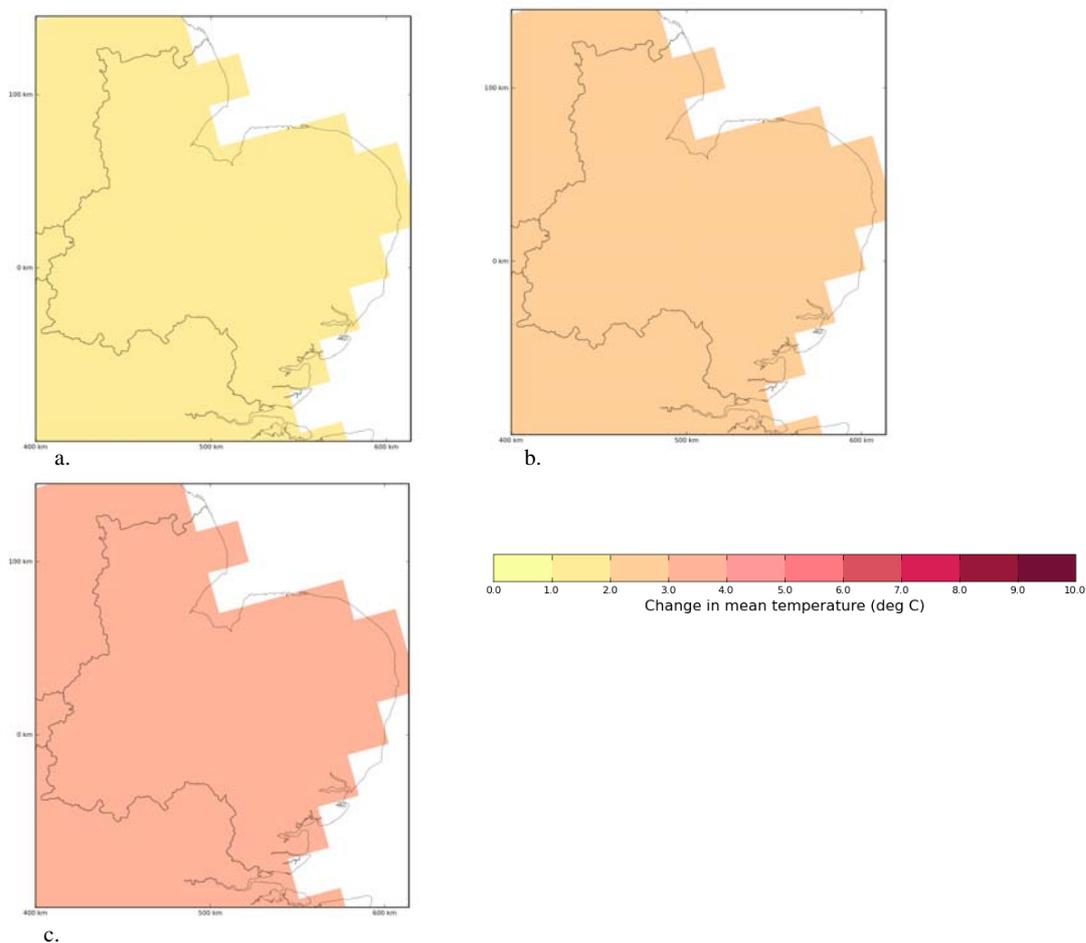
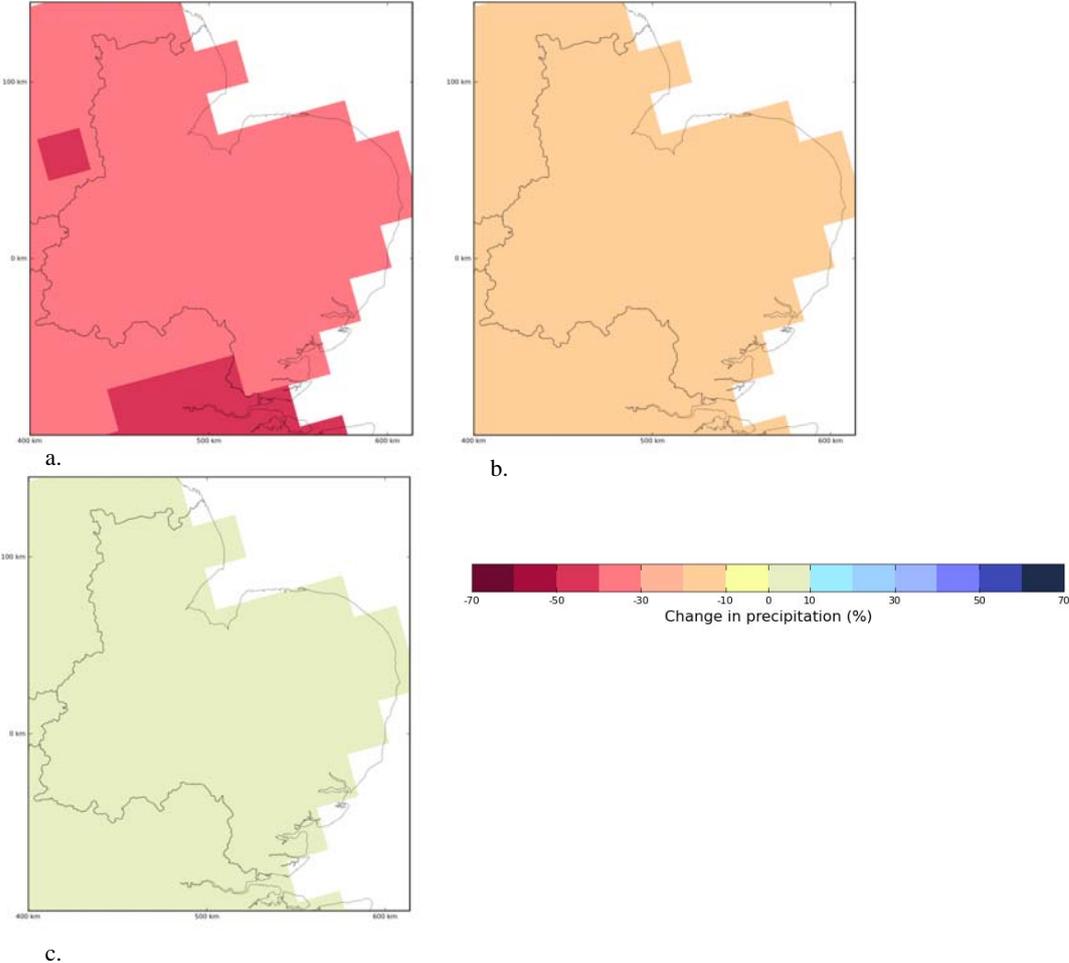
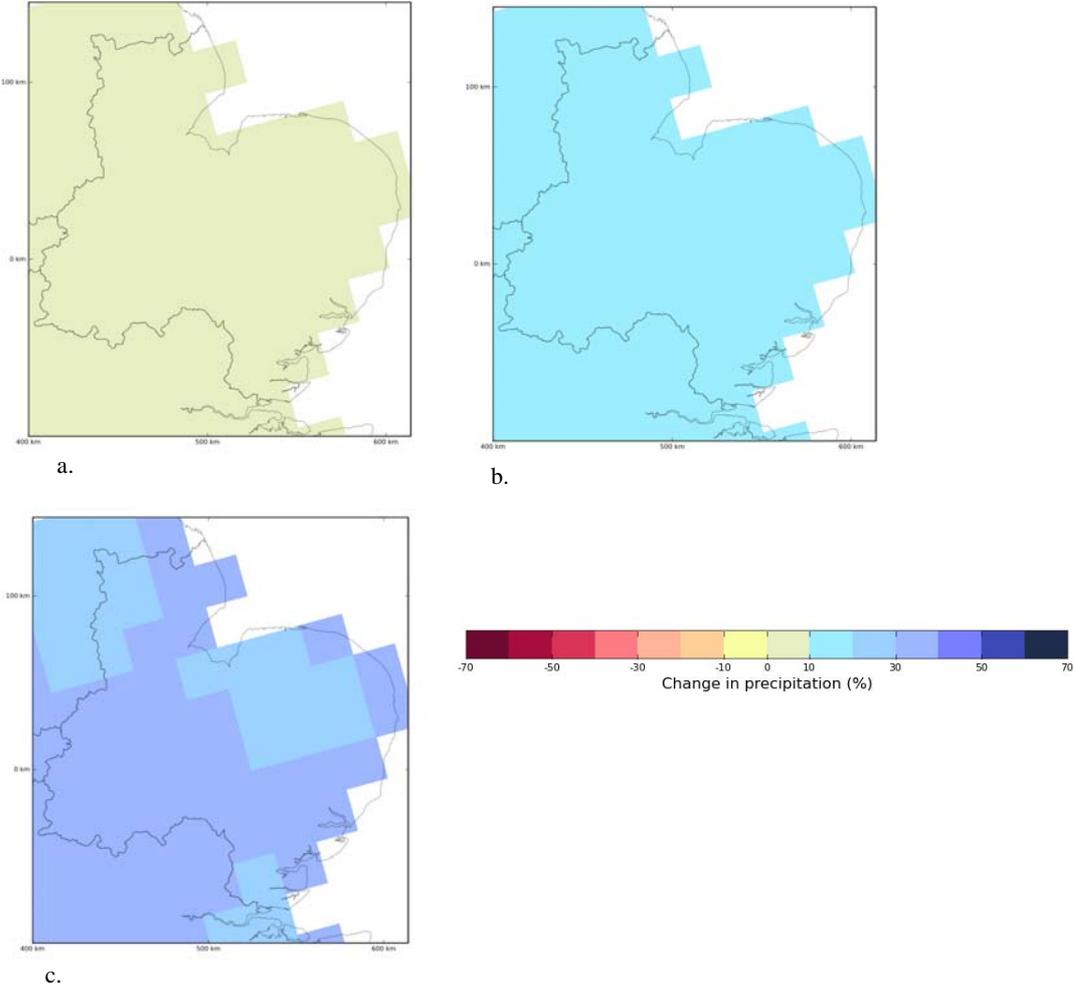


Figure H2 - Change in summer precipitation (per cent) in the 2050s under the Medium emissions scenario for the Anglian River Basin District for the a.) 10 per cent b.) 50 per cent and c.) 90 per cent probability levels. Results from UKCP09.



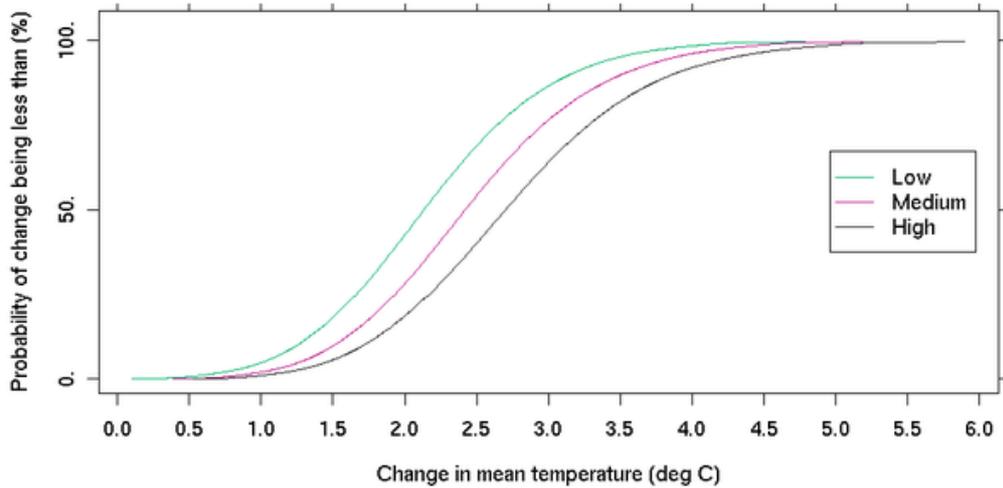
**Figure H3 - Change in winter precipitation (per cent) in the 2050s under the Medium emissions scenario for the Anglian River Basin District for the a.) 10 per cent, b.) 50 per cent and c.) 90 per cent probability levels. Results from UKCP09.**



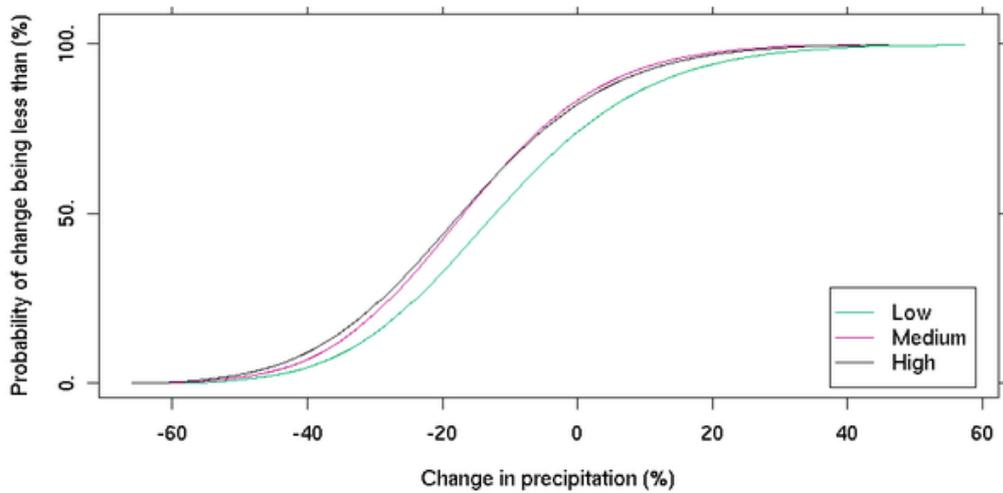
The maps above (figures H1-H3) present only a single possible future climate and do not properly represent the range of possible futures. In preparing for the impacts of climate change we need to consider the range of probabilities and take a risk based approach to our planning (in particular looking for solutions that are robust and cost effective over a wide range of conditions). Figure H4 gives an indication of the range of possibilities for future temperature, summer rainfall (June, July and August) and winter rainfall (December, January and February).

Figure H4 – Change in a.) annual mean temperature (°C), b.) summer precipitation (per cent) and c.) winter precipitation (per cent) in the 2050s for the Anglian River Basin District plotted as cumulative distribution functions for the low, medium and high emissions scenarios. Results from UKCP09.

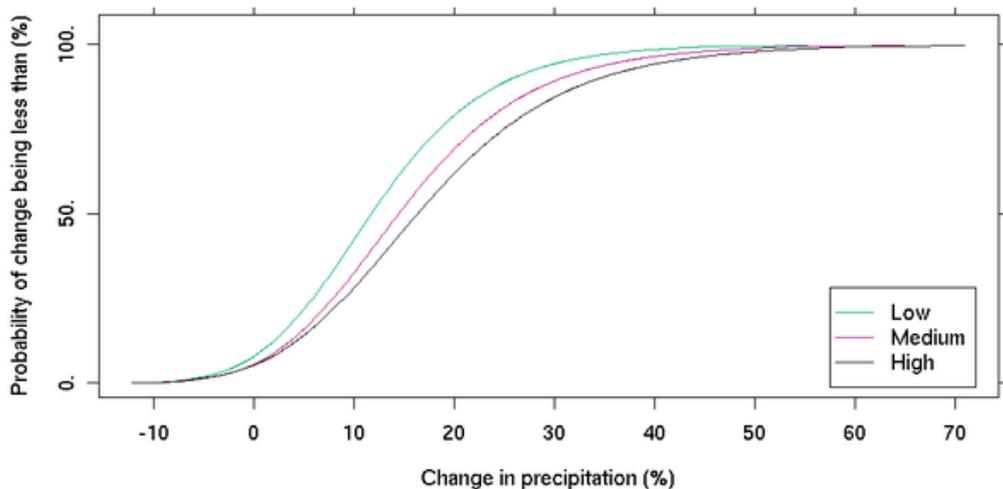
a.



b.



c.



## H.4 The impact of climate change on the identified pressures and the ability of measures to perform under future climate conditions

### Introduction

We all want to make sure that this River Basin Management Plan brings benefits now and into the future. We do not want the actions that are implemented, and the benefits they deliver in terms of Water Framework Directive objectives, to be undermined by changing climatic conditions.

This section looks at the likely consequences of climate change on the pressures that are being considered in the Anglian River Basin District under the Water Framework Directive and then considers if the proposed actions will continue to perform under future climatic conditions.

**Firstly**, we include here an assessment of the potential impacts of climate change on the individual pressures. These are:

- Abstraction and other artificial flow pressures
- Biological pressures (fisheries management and invasive non-native species)
- Microbiological pressures (including faecal indicator organisms)
- Organic pollution (sanitary determine and) pressure
- Nutrients pressure (nitrogen and phosphate)
- Priority hazardous substances, priority substances and specific pollutant pressure
- Acidification pressure
- Salinity pressure
- Temperature pressure
- Physical modification pressure
- Sediment pressure

The assessments are only qualitative at this stage and give no indication of the severity and timescale over which changes may occur. UKCP has advised the Environment Agency that the new UKCP09 climate projections will not change the generalities of previous pressure trend analyses based on UKCP02. Although only qualitative, this assessment of pressures will help us all prioritise both improving certainty in our risk assessments and our adaptation work. Whilst it is clear that human induced climate change is occurring, predicting the exact impacts on the water environment is difficult. There are a number of levels of uncertainty over, for example, what level of climate change to expect and over the combinations of processes controlling behaviour in water bodies. As we continue to understand more about these uncertainties we will all be able to improve these assessments and develop appropriate responses in future river basin management planning cycles.

**Secondly**, for each of the individual pressures, we include a summary of how the current or proposed actions are likely to be able to deal with the changes to the pressures due to climate change (that is, how well this River Basin Management Plan is adapted to climate change). The Environment Agency has carried out a systematic screening (or 'climate check') for most of the actions which make a contribution to achieving Water Framework Directive objectives to determine if and how they are likely to perform under future climate conditions – or where we need further adaptation, to seek alternatives or to develop additional actions. This screening has assessed both the 'mechanisms' in annex F and the 'actions' in annex C. This has been repeated since the draft River Basin Management Plan on the revised annex F and C with the new UKCP09 projections.

This screening is to help ensure any increased risk due to climate change does not compromise the benefit of the actions in terms of achieving Water Framework Directive objectives. In doing this we have tried to take a view on the lifespan and permanency of actions.

Because of the uncertainties concerning the impacts of climate change on the water environment we all need to, where possible, choose actions that can cope with a range of future climate conditions. There are a number of viable cost-effective adaptation approaches that we can apply. Applying these approaches will minimise risks associated with implementing actions whose cost-effectiveness at achieving Water Framework Directive objectives could be compromised by climate change even in the face of high uncertainties.

These adaptation options are normally referred to as win-win, no-regrets, low-regrets, and flexible/adaptive management. Actions may include more than one of these approaches. In addition the Environment Agency screening tried to make sure that we are not proposing any unfavourable or regrets options where the action is identified as unlikely to perform under future climate nor be able to be enhanced or modified to deal with future climate change. The way in which actions are likely to cope with climate change are described using the following descriptions:

- **Win-win options**– cost-effective adaptation actions that have the desired result in terms of minimising the climate risks or exploiting potential opportunities but also have other social, environmental or economic benefits. Within the climate change context, win-win options are often associated with those actions or activities that address climate impacts but which also contribute to climate change mitigation or meet other social and environmental objectives. For example, encouraging efficient use of water, and particularly hot water, in the home is a win-win option, reducing demand on water resources and also mitigating climate change by reducing carbon emissions from water heating.
- **No-regrets option** – cost-effective adaptation actions that are worthwhile (that is they bring net socio-economic benefits) whatever the extent of future climate change. These types of actions include those justified (cost-effective) under current climate conditions (including those addressing its variability and extremes) and are further justified when their introduction is consistent with addressing risks associated with projected climate changes. For example promoting good practice in soil management to limit the risks of diffuse pollution is a no regrets option. This is a low risk option.
- **Low-regrets (or limited regrets) option** – adaptive actions where the associated costs are relatively low and where the benefits, although mainly met under projected future climate change, may be relatively large. For example allowing for climate change in assessing headroom in water company plans for managing water resources could be a low regrets option.
- **Flexible adaptation option**– these are actions which are designed to include a capacity to be modified at a future date as climate changes. Influencing the design of a reservoir so its capacity can be increased at a future date if necessary would be an example of flexible adaptation.
- **Regrets** - these are unfavourable options where the action is identified as unlikely to perform under future climate conditions and where it is likely that the action cannot be enhanced or modified to deal with future climate change. It should be noted that this term has been adopted for the purpose of this document and, unlike the other terms, is not commonly used.

Figure H.5 Adaptation options



The majority of the actions proposed within this River Basin Management Plan are identified as no regrets approaches. These are actions that are proposed and justified in the river basin management planning process due to current pressures. They will also bring benefits under future climatic conditions, and should, therefore, rightly be a favoured option. In several cases the actions proposed are highlighted as flexible adaptation – this means that as the climate changes the action can be adapted to cope with these changes. In terms of looking at future cycles of the river basin management process it is recommended that these actions in particular are revisited to assess whether adjustment is needed to cope with new climatic conditions. Few actions were identified as regrets actions. However one area of potential regrets is in the citing and performance of infrastructure within floodplains. Under climate change the frequency and severity of flooding is likely to increase, and it is important that any infrastructure (for example waste water treatment) is located or designed to provide business continuity with this in mind.

An example of our screening of actions is displayed below in Figure H.36 for abstraction and other flow pressures. In the following section we give a summary of the results of the screening, presented for the pressures the proposed actions are acting to address. In section H.6, where applicable we also give a summary of actions we are carrying out to address climate change in relation to some of these pressures.

Figure H.6 Summary of ability of actions to perform under future climate for abstraction and other artificial flow (an example of the screening is only displayed for this pressure)

Name of action	Mechanism	How is action able to cope with climate change?
Preventing damage to the environment from new development, which helps to achieve good status for surface and groundwater and reduce the effects of flooding.	The Environmental Impact Assessment Directive (85/337/EEC) Town and Country Planning (Environmental Impact Assessment) Regulations 1999 (SI 1999 No. 293) Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999	Regrets – potentially development may add to risks of flooding and drought under climate change if not adequately adapted. Currently there is low confidence that all new developments will be properly adapted to future climate. No regrets options (for example sustainable drainage systems or high levels of water efficiency should be sought.
Prevent unauthorised abstraction.	Abstraction of water prohibited without a licence with certain exemptions <sup>1</sup> under Water Resources Act 1991 s24.	No regrets – preventing unauthorised abstraction helps us manage water resources now and under future climate.
Managing abstraction such that it is sustainable, efficient and within environmental limits.	Conditional licences for water abstraction and conditional licences for impoundment under Water Resources Act 1991, Chapter II of Part II (as amended by Water Act 2003)  Time limited abstraction licences	No regrets – managing abstraction improves our ability to manage water resources now and under future climate. Flexible adaptation – a flexible licensing system means that abstraction can be modified as necessary as the climate changes through review of licences.
Reduce unacceptable abstraction impact.	Amend or revoke abstraction licences often requiring compensation.	No regrets – reducing abstraction improves our ability to manage water resources now and under future climate. Flexible adaptation – a flexible licensing

Name of action	Mechanism	How is action able to cope with climate change?
Reduce unacceptable abstraction impact through operational arrangements for example for river support schemes.	Agreements under Water Resources Act 1991 s20, 20A and 158.	system means that abstraction can be modified as necessary as the climate changes through review of licences. No regrets – reducing abstraction improves our ability to manage water resources now and under future climate. Flexible adaptation – operational arrangements can be amended further as necessary as the climate changes.
Tighten controls in times of drought.	Drought orders and permits under Water Resources Act 1991, Chapter III of Part II.	No regrets – controls help us manage droughts now and under future climate Low regrets – action may also be needed to highlight increased risk of drought under climate change (and the higher natural probability of drought than that which responsible parties currently plan for) and prepare abstractors. Where drought conditions are reasonably foreseeable under climate change scenarios drought should not be used as a reason for temporary deterioration).
Mitigation work.	Direct action to maintain, improve/increase flows. Will depend on natural flow conditions.	Flexible adaptation – approach may not be able to withstand future climatic conditions and will therefore need to be reviewed from time to time. Issues of sustainability and carbon emissions relating to water transfers will need to be taken into account. (could be ‘Regrets’ if not adjusted to future climate).
Demand management actions.	Voluntary agreements, permits, economic incentives (water pricing) water-saving campaigns etc.	Win-win – demand management improves our ability to manage water resources now and under future climate and reduces the carbon footprint of water use. Low regrets – climate change as a driver of the need for demand management should be brought into water-saving campaigns now.
Preservation, maintenance and re-establishment of biotopes and habitats for wild birds.	The Council Directive on the conservation of wild birds (Birds Directive (79/409/EC). Direct action by Natural England or service of management notices or implementation of management agreements under Wildlife and Countryside Act 1981. In some coastal sites, this may be directed by Coastal Habitat Management Plans	No regrets – protection of habitats now likely to give greater robustness to climate change. See for example conserving biodiversity in a changing climate guidance for practitioners <sup>10</sup>
Restricted operations within the Special Protected Areas.	The Council Directive on the conservation of wild birds (Birds Directive (79/409/EC). This may be directed by Coastal Habitat Management Plans in some coastal sites.	No regrets – protection of habitats now likely to give greater robustness to climate change.
Designation of Special Protected Areas.	The Council Directive on the conservation of wild birds (Birds Directive (79/409/EC). Conservation (Natural Habitats &c.) Regulations 1994.	No regrets – protection of habitats now likely to give greater robustness to climate change.

<sup>10</sup> Conserving biodiversity in a changing climate: guidance on building capacity to adapt, Published by Defra on behalf of the UK Biodiversity Partnership, DEFRA 2007

Name of action	Mechanism	How is action able to cope with climate change?
On land designated as a Special Area of Conservation or Special Protection Areas designated under the Wild Birds Directive you must comply with requirements to take appropriate steps to avoid deterioration or disturbance of species and habitats and to assess plans and projects likely to have a significant effect on the Special Area of Conservation.	European Community Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora 'Habitats Directive'. Conservation (Natural Habitats &c.) Regulations 1994 – Regulation 3(3) & 3(4) and Regulations 48 & 50.	Variable – dependent on pressure on Special Protected Areas or Special Areas of Conservation. Where pressures from abstraction or diffuse pollution may be high. No regrets and low regrets actions should be sought.
General duties for protecting, managing the quality and sufficiency of supplies and promotion of water efficiency.	Section 6(2) Environment Act 1995	Win-Win – demand management improves our ability to manage water resources now and under future climate and reduces the carbon footprint of water supply R- Potential carbon increases from some measures (particularly water quality related infrastructure)
Provisions to encourage water conservation, through installation of water efficient appliances.	Water Industry Act 1991	Win-Win – demand management improves our ability to manage water resources now and under future climate and reduces the carbon footprint of water supply
Standards for water efficiency.	Government code for sustainable homes. Initiated through Development Plans etc	Win-Win – demand management improves our ability to manage water resources now and under future climate and reduces the carbon footprint of water supply Flexible Adaptation – standards may need to be tightened as climate change progresses (potential for R if standards insufficient in large portion of housing stock)
Review and improve environmental flow indicators (EFI).	Catchment abstraction management strategies	No regrets – Abstraction can be reduced further as necessary with climate change through review of EFIs
Improve flow estimates for surface water bodies.	Catchment abstraction management strategies	No regrets – Action should help us manage water resource pressures now and in the future
Programme of investigation of ecological impacts of managed flows in Heavily Modified Water Bodies with water supply use.	Catchment abstraction management strategies	No regrets – Action should help us manage water resource pressures now and in the future
Extension of abstraction control to include previously exempt uses.	Water Resources Act 1991	No regrets – Control helps us manage water resource pressures now and in the future
Registration for previously exempt activity: 'water meadows'.	Water Resources Act 1991	No regrets – Control helps us manage water resource pressures now and in the future

As well as the consideration of adaptation for individual pressures we all need to consider how pressures link together. We also need to factor in other changes that will change the risk from the pressures such as population change and housing development into risk assessments. For instance Governments in England and Wales are still committed to increase house building to meet demand through new growth points and ecotowns. The

greatest demand is often in areas that are already water stressed. It is projected that some of these areas, such as the South-East of England, are likely to experience significant reductions in summer rainfall increasing the risk that water stress will increase. In England the Government's water strategy for England 'Future Water'<sup>11</sup> and in Wales the Environment Strategy for Wales<sup>12</sup> identifies water demand and water supply actions and approaches to reduce potential climate effects to reduce this risk. Water companies are expected to incorporate estimations of increased demand from new development within their water resources planning, and this feeds into this River Basin Management Plan.

Partnership working and better integration of different aspects of water management will increase our chances of successfully adapting to climate change. In particular flood risk management, urban planning, and water resource management will need to integrate better with river basin management planning (see Annex J).

## **Abstraction and other artificial flow pressures**

### **Climate change impact on abstraction and other artificial flow pressures**

Water is abstracted from groundwater and surface waters for a variety of purposes such as drinking water, irrigation and industrial uses. This should be managed in a sustainable way so that other uses and the environment are not compromised.

The largest use of water in the Anglian River Basin District is for public supplies with current average domestic consumption at around 150 litres/head/day. Agriculture, in particular spray irrigation, comes in second and yet nearly three quarters of the licensed water volume is in catchments under severe water stress. In total the river basin district produces 30 per cent of potatoes and 25 per cent of fruit and vegetables grown in the UK. This represents 60 per cent of the irrigated area and 57 per cent of the volume of water used for irrigation in England. Agricultural use is significant since the period of highest demand is concentrated in the summer months when river flows are at their lowest and will continue to increase with predicted reductions in summer rainfall.

The majority of industrial demand is met through the public supply system but a significant proportion is met from direct abstractions, especially for cooling or washing purposes. Despite the generally dry climate, the river basin district supports a high number of water dependant habitats (wetlands, rivers, estuaries etc.). Many of these are of special conservation value with the Norfolk and Suffolk Broads being one such example. It is Britain's largest protected wetland and third largest inland waterway, with the status of a national park.

Many catchments within eastern area are classed as 'Over licensed' or 'Over abstracted' under Catchment Abstraction Management Strategies (CAMS). The Environment Agency is tackling this by targeting our enforcement activities, promoting water efficiency and carrying out the Strategy Actions stated in CAMS.

Sea level rise/saline incursion is an issue along the east coast and in the Broads. This could result in licence holders not being able to abstract, for example, for irrigation, forcing them to re-locate. This could have consequences for other areas that already have no further water available for abstraction. There may be further impacts from the estuaries' strategies.

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<sup>11</sup> Future Water- The Governments Water Strategy for England. DEFRA. HM Government Feb 2008

<sup>12</sup> Environment Strategy for Wales. Welsh Assembly Government. 2006

The demand for development growth is and will have significant impacts on abstraction and water availability. The demand for development growth in the South East and in the East of England will impact highly on the Anglian River Basin District. This will provide challenges to ensure that a high level of sustainable construction and resource use is incorporated in these developments as well as an active recognition of the future challenges posed by climate change. The Environment Agency is an influential advisor. We aim to raise the environmental awareness and resource efficiency of businesses so that they achieve high productivity while taking environmental considerations, including the changing climate, into account.

Demand for water is likely to increase for domestic, leisure industry, agricultural and industrial uses as a result of rising temperatures. Studies such as *Climate Change and the Demand for Water*<sup>13</sup> suggest that agricultural irrigation use, for example, will increase by around 20 per cent by the 2020s and around 30 per cent by the 2050s. Demand in tourist areas may increase as tourism increases due to more predictable warmer and longer summers. There is also likely to be a need for increased abstraction for cooling waters as industrial processes operate at higher ambient air temperatures and as the temperature of abstracted cooling water itself increases at certain times of the year. The proposed house-building programme will also put further pressures on current water resources, particularly in areas which are already water stressed. Water resources are likely to decrease at the same time due to higher temperatures, reduced and changing rainfall and, increased saltwater intrusion into drinking water supplies. Studies have assessed flow change across a wide range of catchments, under different climate model projections<sup>14</sup>. By the 2020s flows in winter could increase by between four and nine per cent and summer flows will decrease on average by 11 per cent but this could range from one to 32 per cent depending on the catchment location, land use, soils, geology and model uncertainty. A number of organisations, including the Environment Agency, plan to carry out further research to understand, and integrate in water resource planning, the likely impacts of climate change on river flows following the publication of UK Climate Projections (previously named UK Climate Impact Programme 2008).

Reduced available water resources to maintain compensation flows and overall reduction in flows at certain times of the year may reduce the opportunities for fish migration within systems and particularly around or across barriers such as weirs.

In an area where water resources are already stressed, any increase in overall demand or reduction in availability is likely to increase the risk of failure to meet the Water Framework Directive objectives. Three of the largest Growth Areas identified in the 2003 Sustainable Communities Plan are in the Anglian River Basin District including Milton Keynes-South Midlands, London-Stansfeld-Cambridge-Peterborough and the Thames Gateway which affects South Essex. Furthermore four potential Ecotowns (only one has been included in the Planning Policy Statement of July 2009) are in the river basin district and eight urban areas have been identified as New Growth Points. The current Regional Spatial Strategies (RSS8 and RSS14) outline a need for 600 000 new homes to be built by 2021. This growth in demand will be parallel to reducing water availability due to climatic changes and will often occur when water supplies are at their lowest i.e. watering gardens in the summer.

Good planning, based on accurate information and backed by a strong regulatory framework will be the key to managing this risk. Many of the measures we have identified aim to reduce water demand but these may be being played out against a background of climate change driven rising demands.

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<sup>13</sup> Downing, T.E., Butterfield, R.E., Edmonds, B., Knox, J.W., Moss, S., Piper, B.S. and Weatherhead, E.K. (and the CCDeW project team) (2003). *Climate Change and the Demand for Water*, Research Report, Stockholm Environment Institute Oxford Office, Oxford.

<sup>14</sup> Romanowicz *et al.*, 2007

This will be in relation to protected area objectives, status, no deterioration and groundwater level objectives.

**Relative severity of impact of climate change on abstraction and other artificial flow pressures**

**Very high**

### **Ability of actions for abstraction and other flow pressures to perform under climate change**

The Environment Agency and other bodies already do a lot to plan for climate change in managing water resources. For example, water companies are considering the impact of climate change on supply-demand balance, make estimates of their carbon footprint and use the shadow cost of carbon in their comparison of options. The Environment Agency has a role to ensure that all water companies make these assessments. The system for licensing water resources is now flexible and includes time limited licences, meaning that as climate changes adjustments can be made to ensure continued protection of the environment. A further example is the Environment Agency's developing water resources strategy which looks to 2050. Several modules of this strategy are considering how climate change will impact on available water resources and how our management of them might adjust to cope with future pressures.

Within the screening of actions identified in this River Basin Management Plan it is clear that existing and proposed actions are likely to need to change to make sure they deliver Water Framework Directive objectives with changing climatic conditions for this pressure. It is considered that all the actions, related to managing abstraction and flow pressures, help us tackle these pressures now and in a future climate (see Figure H.6). The Environment Agency cannot identify any current or proposed actions in the programme of actions where it would be a significant mistake in terms of managing the pressure now or under a future climate to continue to apply or introduce these actions (this assessment does not consider in detail the impact on carbon emissions. This should be considered in economic assessments of the actions. Also the effects of actions to reduce abstraction pressures on climate change (that is impact on carbon emissions) are presented in the strategic environmental assessment reports which accompany the draft and this River Basin Management Plan).

Furthermore most of these actions can be adapted in the future so that they will be capable of managing any increased risk from climate change. For example, abstraction licences can be modified in relation to volume and abstraction period to adjust to seasonal water availability. Flows in rivers can be augmented by changing management procedures. This depends on individual rivers as their natural flow patterns vary. Flexible adaptation will require a good understanding of how changing conditions increase or decrease the risk that the pressures will prevent us achieving Water Framework Directive objectives. The possibility of the option to adapt the action is purely a technical possibility. Future socio-economic considerations may change this view. For example land take costs could increase such that adaptation of a particular action that involves land take is no longer the cost-effective approach.

Some of the actions have risks in terms of successful application unless we change policies and operational relationships/ requirements. For instance, abstractors will need to be prepared for a higher probability for the application of drought orders or permits under the Water Resources Act 1991.

Certain actions represent a win-win. For instance, demand management actions will improve our ability to manage water resources now and in the future as well as reduce the carbon footprint from water supply and treatment (see strategic environmental assessment reports which accompany the draft and this River Basin Management Plan).

It is clear, however, that further actions will be required in areas of proposed housing development, particularly in areas which are already water-stressed and where climate change is projected to have greatest impact on water resources (e.g. in the South-East).

## **Biological pressures (Fisheries management and invasive non-native species)**

### **Climate change impact on biological pressures**

Fisheries management can represent a risk in terms of direct fish/shellfish removal, impact of competition/predation from managed fisheries on native biology, impact of supplied feeds on nutrient conditions and impacts of removing migratory fish.

The Anglian River Basin District has a thriving fishing industry with a number of pleasure, match and specimen silverfish fisheries. There are also a number of non migratory trout farms and managed trout waters, predominantly in Lincolnshire and Norfolk. These range from large reservoirs such as Grafham Water to small reservoirs on private farms.

Climate change could result in increased disease levels in managed fisheries which could spread to native plant and animal life. There could be an increased consequence of nutrient impacts from supplied food. Changing water temperatures may bring about changes to stocked species. Reduced flows may increase stocking pressures on native fish. Longer term temperature increases may mean that certain water courses may not be able to support the species for which they are required to achieve a designated water quality standard. In these cases the Environment Agency will take the view, in line with the requirements of the Water Framework Directive, that the lack of particular indicator species is no reason to let the quality of the watercourse deteriorate.

- Ecto parasites may be of particular concern. The species *Argulus* is already a significant problem for trout farmers, with three mortality incidents in the river basin district this year in tench and bream. *Ergasilus* and *Lernaea* are similar parasites.
- Warmer and brighter conditions may increase fish deaths caused by algal toxins as the relevant species of algae - already in the river basin district - will thrive.
- Koi Herpes Virus infections have been recorded in the river basin district in the last two to three years, and increasing temperatures are likely to result in further mortalities. However this may be offset by a concomitant increase in the carp immune response also due to the higher temperatures.
- On the horizon, Epizootic Ulcerative Syndrome caused by *Aphanomyces invadens* is not yet in this country, but is spreading across mainland Europe. This temperature dependent infection is high on the risk list.

### **Relative severity of impact of climate change on fisheries management pressure**

**Low/Medium**

Invasive non-native species can be introduced intentionally or non-intentionally as a result of their use as ornamentals, 'hitch-hiking' on ornamentals, washout from ship ballast water and from farming and fishing practices. Species can spread rapidly as a result of these activities, water transfers and transfer between catchments caused by animals and people moving.

Table H.7: **Priority non-native Species in the Anglian River Basin District**<sup>15</sup>

Priority Species	Impact	Location in Region		
		Northern	Central	Eastern
<b>HIGH PRIORITY – ALREADY PRESENT</b>				
Floating Pennywort <i>Hydrocotyle ranunculoides</i>	Flood defence & ecology	✓	✓	✓
Signal Crayfish <i>Pacifastacus leniusculus</i>	Ecology	✓	✓	✓
Topmouth Gudgeon <i>Pseudorasbora parva</i>	Ecology	✓?		✓
Mink <i>Mustela</i>	Ecology	✓	✓	✓
Japanese Knotweed <i>Fallopia japonica</i>	Flood defence & ecology	✓	✓	✓
Zebra Mussel <i>Dreissena polymorpha</i>	Flood defence & ecology	✓	✓	✓
Giant Hogweed <i>Heracleum mantegazzianum</i>	Flood defence & ecology	✓	✓	✓
Himalayan Balsam <i>Impatiens glandulifera</i>	Flood defence & ecology	✓	✓	✓

More research is needed into how these species and others will be impacted by climate change in the Anglian River Basin District and therefore impact the local fauna and flora in the future.

Climate change will alter the geographical location of the climatic conditions that define many UK habitats, with knock-on effects for the species they support. It is already having a significant impact upon the timing of the developmental cycles of species such as early emergence of certain plant and animal species in spring and early breeding of birds. This includes the survival, variety and extent of non-native species, increasing the risk of their becoming invasive. The range of invasive non-native species may have to be constantly updated as new species are introduced and become established as the climate changes.

Further, concepts about what constitutes a ‘non-natural’ species may have to change as our climate and underlying conditions change. Research such as the ‘Modeling Natural Resource Responses to Climate Change’ (MONARCH) programme, the Marine Biological Association led project ‘Marine Biodiversity and Climate Change’ and the Environment Agency led project ‘Preparing for climate change impacts on freshwater ecosystems’ (PRINCE) are helping to predict how the composition of plant and animal communities in the UK will change. Increasing air temperatures in a future climate may increase the survival and transport of invasive non-native species. Increasing water temperatures and lower flows may increase their survival, proliferation and spread. The variety and use of invasive non-native ornamental species could increase as more species survive in a future UK climate and as people use their gardens more in warmer summers particularly in terms of water features such as ponds.

The predicted increase in aquaculture across the UK coupled with increased storminess may increase the risk of release of invasive non-native species.

It has been suggested that invasive non-native aquatic macrophytes (for example *Crassula helmsii*) may spread more rapidly if winters become warmer and frost events are less frequent. Invasive non-native animals, such as bullfrogs, may also benefit from warmer weather, with possible serious implications for native amphibians. A large number of marine

<sup>15</sup> This list was compiled during the Anglian river basin planning invasive non-native species workshop on 28/04/2008  
**Environment Agency** River Basin Management Plan, Anglian River Basin District  
 Annex H: Adapting to climate change  
 December 2009

and estuarine species are already well established. Examples include cord grass, slipper limpet, wire weed and the Chinese mitten crab. New and established marine non native invasives are likely to increase rapidly in number and range as sea temperature increases. These invasives are already having significant impacts on coastal and estuarine native species and/or morphology.

**Relative severity of impact of climate change on invasive non-native species pressure**

**Medium**

### **Ability of actions for invasive non-native species pressure to perform under climate change**

It is likely that existing and proposed actions for invasive non-native species will need to be adapted to make sure they meet Water Framework Directive objectives as climatic conditions change. It is possible that new actions may be needed due to the increasing risk resulting from climate change. It is considered that all the actions, related to managing invasive non-native species help us tackle this pressure now and in a future climate. The Environment Agency cannot identify any current or proposed actions in the programme of actions where it would be a significant mistake in terms of managing invasive non-native species, now or under a future climate, to continue to apply or introduce these actions. This assessment does not consider the impact on carbon emissions which is considered elsewhere in the strategic environmental assessment reports which accompany the draft and this River Basin Management Plan). In this respect they are 'no regrets' actions. For instance controls on importation and releases will continue to be an essential way to manage invasive non-native species.

Most of these actions can be adapted in the future so that they will be able (in a technical sense) to manage any increased risk from climate change (wider socio-economic considerations may change this view). For example, the range of species restricted for importation could be broadened. Flexible adaptation will require a good understanding of how changing conditions increase or decrease the risk of the pressures of not achieving Water Framework Directive objectives.

Some of the actions have risks in terms of successful application unless we change policies and operational relationships/ requirements. For instance in order to maintain biodiversity, which species we consider as 'invasive non-native species' will have to be updated as new species arrive and become established in the UK as the climate warms.

## **Microbiology (including faecal indicator organisms)**

### **Climate change impact on microbiology pressure**

Livestock farming, wastewater treatment and urban runoff (e.g. dog fouling) can all lead to microbial contamination of waterways.

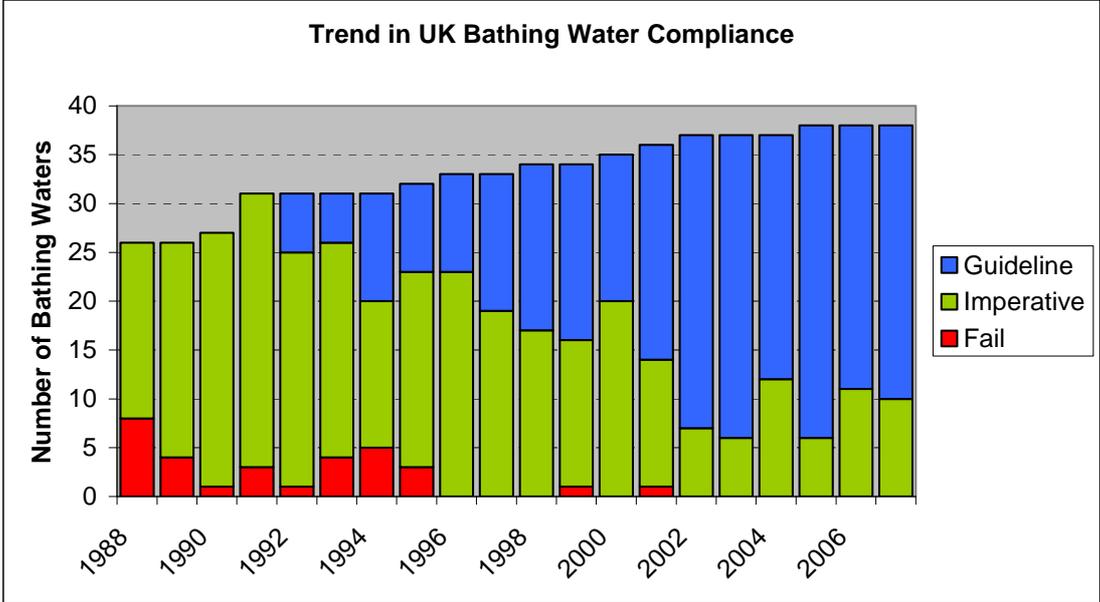
There are currently 37 designated bathing water beaches in the Anglian River Basin District. In 2007, 73.7 per cent and 76.3 per cent of these beaches met the UK and EU bathing water guideline standard, respectively. No beaches failed the mandatory standard in 2007. In fact, no beach in the Anglian River Basin District has failed the mandatory standard since 2001.

It is important to note that beach failures are not always attributable to human sewage point sources e.g. waste water treatment works. Non point sources of microbial contamination can occur. Recent scientific work, has highlighted that stores of faecal indicator organism trapped in soils can be released into coastal waters via rivers during high flow events. Furthermore, it

has been shown that in rivers draining rural areas, faecal indicator organism levels can rise by three orders of magnitude during storm events. It is worth noting that many beaches in our river basin district can be regarded as rural and have river inputs that drain via intensively farmed land. In fact, our river basin district has one of the greatest concentrations of large scale pig and poultry production units in the country. Such microbial sources can also impact on shellfish waters e.g. North East Wash.

Climate change predictions suggest that there is likely to be increased contamination from farmland and urban runoff due to compacted soils and/or less frequent but intense summer rainfall events. These events may also cause an increased frequency of combined sewer overflows overflow and sewage treatment plant flooding. These events can kill fish and other water life, and threaten human health. Although there may be an increase in the number of events that lead to high levels of microbial pathogens in water bodies increased water temperature and ultra-violet light exposure may reduce the survivorship of bacterial pathogens.

Figure H.8: **Bathing water compliance trend in the Anglian River Basin District**



In 2007, the river basin district had 14 blue flag beach awards. It is clear from figure H.8 that they have been a progressive improvement in bathing water compliance since the mid 1990's. This is due to a combination of good regulation and significant investments made by the water companies since privatisation.

**Relative severity of impact of climate change on microbiology pressure**

**Medium**

**Ability of actions for microbiological pressure to perform under climate change**

It is likely that existing and proposed actions for this pressure will need to be adapted to make sure they meet Water Framework Directive objectives with changing climatic. It is possible that new actions may be needed due to the increasing risk resulting from climate change, particularly from the increased risk from diffuse sources. Most of the actions, related to managing microbiological pressures, help us tackle these pressures now and in a future climate. For instance effluent treatment at sewage works will continue to be an essential way to manage this pressure. However, the Pitt review and Environment Agency reviews of the summer 2007 floods identified that a lot of water sector critical infrastructure is in the

floodplain. Investing considerable funds in 'climate vulnerable' sewerage treatment and water treatment plants could represent a significant risk to not achieving Water Framework Directive objectives. Therefore although most actions are 'no regrets' actions there are some possible 'regrets' actions.

Most of these actions can be adapted in the future so that they will be capable (in a technical sense) to manage any increased risk from climate change (wider socio-economic considerations may change this view). For example there is the possibility of improving effluent treatment at sewage treatment works, changing standards and fitting improved storm tank capacity. However this will only be possible where there is capacity or space to do this. Therefore any investment in new works or managing current sites should allow for the opportunity for flexible adaptation. Unless this is done this is a case of possible 'regret'. This will have to be brought to any operator's attention. It is recommended that water companies use the guidance provided by Water UK 'A Climate Change Adaptation Approach for Asset Management Planning'. Flexible adaptation will require a good understanding of how changing conditions increase or decrease the risk of the pressures of not achieving Water Framework Directive objectives.

### **Organic (sanitary determinand) pressure**

#### **Climate change impact on organic (sanitary determinand) pressure**

Organic pollution such as ammonia and substances resulting in high biological oxygen demand come from sources such as sewage and industrial effluent discharges, urban runoff and runoff from farmland and farm premises.

The overwhelming majority of catchments within the Anglian River Basin District have been classified as 'not at risk' from ammonia and BOD. This is in line with our monitoring of the performance of industrial, intermittent and sewage discharges which show that compliance has been consistent throughout the region.

Climate change predictions suggest that there is likely to be increased contamination from organic pollutants from farmland and farm premises. This is due to washout during intense rainfall events from compacted soils and from urban environments at first-flush during intense rainfall events. It is possible that increased disease outbreaks amongst livestock as a consequence of climate change may lead to higher levels of organic pollution from high stock densities where movement and/or slaughter is restricted and where disease control culls are undertaken. The risk of this is not known at the moment. Intense rainfall events and increased flooding may also cause an increased frequency of combined sewer overflow. On the other hand the performance of sewage treatment works could increase under higher temperature reducing the biological oxygen demand burden. Ammonia concentrations in rivers will also potentially reduce due to greater nitrification.

It is likely, therefore, that changes in this pressure, due to the affects of climate change, could increase the risk of not achieving Water Framework Directive objectives in the Anglian River Basin District. Periods of low rainfall could reduce available dilution for effluent discharges into the receiving watercourses. This could impact upon the ecological status of the watercourse.

**Relative severity of impact of climate change on organic pressure**

**Medium**

## **Ability of actions for organic (sanitary determinand) pressures to perform under climate change**

The approach to consenting of discharges to water courses, together with the Periodic Review system for the investments of water companies, allow us to adapt, to some degree, to climate change as it progresses. However it is particularly important that climate change is adequately factored into decisions for investments that will have a long lifetime to avoid regrets in the future.

For the organic pollutant pressure it is likely that existing and proposed actions will need to be adapted to make sure they meet Water Framework Directive objectives with changing climatic conditions for this pressure. It is possible that new actions may be needed due to the increasing risk resulting from climate change, in particular from the increased risk from diffuse sources. It is considered that most of the actions, related to managing organic pollution help us tackle these pressures now and in a future climate. For instance discharge licensing of point source discharges will continue to be an essential to manage this pressure. However, investing considerable funds in sewage treatment and water treatment plants built on floodplains could represent a significant risk to not achieving Water Framework Directive objectives as these will be vulnerable to flooding as a result of the consequences of climate change. Therefore although most actions are 'no regrets' actions there are some possible 'regrets' actions.

Most of the actions can be adapted in the future so that they will be capable (in a technical sense) to manage any increased risk from climate change. Wider socio-economic considerations may change this view. For example discharge consents can be modified in relation to biological oxygen demand. However, this will only be possible where there is capacity or space to do this within waste water treatment works. Carbon implications of tightening standards in this way would also need to be considered and options other than end-of-pipe (for example the phasing out of phosphate in detergents) may be preferable. The Environment Agency is currently assessing the carbon costs of wastewater management options, and will be looking to include some of the 'quick wins' from this work in the Periodic Review 2009. Therefore, any investment in new works or the management of current sites should allow for flexible adaptation. Unless this is done, this is a case of possible 'regret'. This will have to be brought to operators attention. Flexible adaptation will require a good understanding of how changing conditions increase or decrease the risk of the pressures of not achieving Water Framework Directive objectives.

Some of the actions have risks in terms of successful application unless we change policies and operational relationships/ requirements. For instance, dischargers may require improved codes of practice to account for changing climatic conditions. The same is true for farmers in terms of slurry and soil management for instance.

## **Nutrients pressure (nitrogen and phosphate)**

### **Climate change impact on nutrient pressure**

Diffuse nutrients such as nitrogen and phosphate compounds can come from sources such as unsatisfactory combined sewer overflow, leakage from sewerage systems, urban runoff (for example animal and bird faeces) and runoff of fertilisers and animal sludge from agricultural land and premises.

Both nitrates and phosphates have been identified as significant environmental issues within the Anglian River Basin District. Our water quality data indicates that there has been a general trend of consistently high level of nutrients occurring. This is confirmed where the

majority of river catchments have been classified as being at risk, or probably at risk, from nitrates and phosphates.

The Environment Agency have recently been working with Reading University using the 'Integrated catchment' suite of water quality models (Integrated Nutrient in Catchment model) to assess the potential impacts of water quality on river systems in the UK. The models have been used to simulate flow, total and soluble phosphorus, nitrate (as N), ammonia, sediments, and ecology (macrophytes and epiphytes). Results show that a number of factors controlling nutrient concentration will be affected by climate change. Under all climate change scenarios water quality will be affected by changes in flow regime with lower minimum flows giving less volume for dilution and hence higher concentrations downstream of point discharges. Increased storm events, especially in summer, could give more frequent incidences of combined sewer overflows discharging highly polluted waters into receiving water bodies. The potential impacts on urban water quality will be largely driven by these changes in short duration rainfall intensity overwhelming drainage systems, as well as rising sea levels affecting combined sewage outfalls. For diffuse inputs there is likely to be increased contamination from organic pollutants from farmland and farm premises. This is due to washout during intense rainfall events particularly in winter.

Climate change predictions suggest that there is likely to be increased contamination from nutrients from farmland due to compacted soils and less frequent but intense rainfall events. These intense rainfall events are also likely to cause high-levels of 'first-flush' pollution from urban areas. Intense rainfall events and increased flooding may also cause an increased frequency of combined sewer overflows, overflow, sewage plant flooding, flooding of industrial and commercial premises and wash-in from silage pits. The seasonality of changes in nutrient inputs is likely to vary between rivers dependent on the balance between urban and rural inputs, but overall nutrient loads are expected to increase.

Prolonged growing seasons may result in increased use of fertilisers. However this should be compensated by increased uptake by plants. The impact of nutrients from eutrophication may be worsened due to enhanced algal growth as a result of increased sunlight and water temperatures. This may be offset to some extent by improved breakdown of nutrient compounds in sewage treatment works due to higher temperatures and increased functioning of microbes and increased denitrification within rivers.

Loss of baseflow during summer months could lead to a reduction in dilution of effluent from sewage treatment works increasing in-stream concentrations. This is a particular concern where a large proportion of streams are fed by groundwater from chalk aquifers. Lower flows, reduced velocities and, therefore, higher water residence times will increase the potential for algal blooms. Some blooms cause toxicity issues and/or water deoxygenation killing other native species.

For chalk streams further work, using a version of the Integrated Nutrient in Catchment-Nitrogen models modified to account for the transport of nitrate through the unsaturated zone of the underlying chalk rock, predicts that reducing fertiliser inputs today will have a short-term impact on in-stream nitrate concentrations but a clear long-term reduction will not occur until between 2060 and 2080. This is because of nitrate that has already accumulated in the chalk aquifer (Jackson *et al*, 2007<sup>16</sup>). Thus, some in-stream intervention, such as constructing water meadows, may be the best option to reduce in-stream nitrate concentrations within the timescale of the Water Framework Directive.

It is likely, therefore, that changes in this pressure, due to the affects of climate change, will increase the risk of not achieving Water Framework Directive objectives in the Anglian River

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<sup>16</sup> Jackson B.M. et al. 2007. Ecological Modelling, vol. 209, 41-52

Basin District. This is particularly in relation to bathing water and drinking water protected areas objectives. Decreasing quality of abstracted water will increase the risk of not achieving Article 7 objectives (avoid deterioration in their quality [water bodies] in order to reduce the level of purification treatment required in producing drinking water). There is already a rise in the need for groundwater blending and treatment to achieve drinking water standards for nitrate.

**Relative severity of impact of climate change on nutrient pressure**

**High**

### **Ability of actions for nutrient pressures to perform under climate change**

Similar to organic pressures it is likely that existing and proposed actions for nutrient pressures will need to be adapted to make sure they meet Water Framework Directive objectives with changing climate. It is possible that new actions may be needed due to the increasing risk resulting from climate change, in particular from the increased risk from diffuse sources. It is considered that all the actions, related to managing nutrient pollution help us tackle these pressures now and in a future climate. The Environment Agency cannot identify any current or proposed actions in the Programme of Actions where it would be a significant mistake in terms of managing the pressure now or under a future climate to continue to apply or introduce these actions (this assessment does not consider in detail the impact on carbon emissions). This should be considered in economic assessments of the actions. In this respect they are 'no regrets' actions. For instance discharge licensing of point source discharges will continue to be an essential way of continuing to manage this pressure.

Furthermore, most of these actions can be adapted in the future so that they will be capable (in a technical sense) to manage any increased risk from climate change. Wider socio-economic considerations may change this view. For example discharge consents can be modified in relation to the loads and concentrations of nutrients. However, this will only be possible where there is capacity or space to do this. Implications for greenhouse gases of tightening standards in this way would also need to be considered and options other than end-of-pipe (for example the phasing out of phosphate in detergents) may be preferable.

Some of the actions have risks in terms of successful application unless we change policies and operational relationships/ requirements. For instance, dischargers may require improved codes of practice to account for changing climatic conditions. The same is true for farmers in terms of fertiliser use, slurry management and soil management for instance.

### **Priority hazardous substances, priority substances and specific pollutants**

#### **Climate change impact on priority hazardous substances, priority substance and specific pollutant pressure**

At the England and Wales scale the main source of priority hazardous substances, priority substance and specific pollutants is from the chemical, pharmaceutical and manufacturing sectors. They also come from sewage discharges, contaminated land runoff and urban runoff.

Hazardous substances are a significant issue in the Anglian River Basin District in relation to climate change.

Any change in risk as a result of climate change will be substance/ groups of substance specific and depend on issues such as sources and uses. It is unlikely that climate change

will significantly increase the risk from industrial point sources. It is also unlikely that the risk for substances such as Tributyl Tin will significantly change from either point or diffuse sources. However more frequent and intense rainfall events may cause significant first-flush spikes in some chemicals such as oils from urban and land runoff and inputs resulting from flooding of combined sewer overflows and industrial and commercial premises.

Available dilution may decrease as a result of reduced precipitation and reduced summer flows, again meaning chemical spikes occur which could exceed set limits. This could be the case for substances including pesticides and polycyclic aromatic hydrocarbons.

Cropping patterns may change as a result of climate change. This may influence the types of pesticides used and therefore the levels detected in water. For example, pesticides used on oil seed rape are now being found more frequently and at higher levels as the market for biofuel crops increases.

**Relative severity of impact of climate change on priority substances pressure**

**Low**

**Ability of actions for priority hazardous substances, priority substance and specific pollutant pressure to perform under climate change**

It is possible that existing and proposed actions for this pressure may need to be adapted for controls on certain substances to make sure they meet Water Framework Directive objectives with climate change. It is possible that new actions may be needed due to the increasing risk resulting from climate change, in particular to address the increased risk from diffuse sources. It is considered that all the actions, related to managing priority substances help us tackle these pressures now and in a future climate. The Environment Agency cannot identify any current or proposed actions in the programme of actions where it would be a significant mistake to continue to apply or introduce these actions (this assessment does not consider in detail the impact on carbon emissions. This should be considered in economic assessments of the actions. Also the effects of actions to reduce hazardous substances pressures on climate change (that is impact on carbon emissions) are presented in the strategic environmental assessment reports which accompany the draft and this River Basin Management Plan). In this respect they are 'no regrets' actions. For instance, discharge licensing of point source discharges will continue to be an essential way to manage this pressure.

There are potential win-win actions. For instance better storage and handling of toxic substances in industrial and commercial premises reduce the risk of wash-in during high rainfall or flooding events while also potentially improving health and safety and/or resource use issues in relation to industrial raw materials and wastes.

Furthermore, most of these actions can be adapted in the future so that they will be able (in a technical sense) to manage any increased risk from climate change. For example, standards can be modified (wider socio-economic considerations may change this view so other more cost-effective actions may be needed). Flexible adaptation will require a good understanding of how changing conditions increase or decrease the risk of the pressures of not achieving Water Framework Directive objectives.

Some of the actions have risks in terms of successful application unless we change policies and operational relationships/ requirements. For instance, we may need to change codes of practice for the using and disposing of materials containing hazardous substances.

## Acidification

### Climate change impact on acidification pressure

Possible sources of acidification are emissions of sulphur and nitrous oxides from power stations and road transport and ammonia emissions from agriculture.

Acidification is not seen to be of particular concern in the Anglian River Basin District with relation to climate change.

Reductions in sulphur emissions since the 1980s have led to a decrease in acid deposition across the country, but some studies warned of future problems associated with increased N deposition and climate change (Wilby R.L., 1993<sup>17</sup>). Climate variables that could affect acidification include higher temperatures, increased summer drought, wetter winters, reduced snow pack, simultaneous changes in hydrological pathways, and more frequent sea-salt deposition events. Intense rainfall and wetter winter conditions favour acidic episodes (Wright R.F., 2007<sup>18</sup>).

Droughts can make acidification even worse by lowering water tables, creating aerobic conditions and enhancing the oxidation of sulphur to sulphate (Dillon P.K. et al, 1997<sup>19</sup>; Wilby R.L., 1994<sup>20</sup>). Acid anions are exported during subsequent storm events along with heavy metals (Tipping E. et al, 2003<sup>21</sup>).

Seawater has been shown to be a significant sink for carbon absorbing 27-34 per cent of the CO<sub>2</sub> emitted into the atmosphere since the industrial revolution<sup>22</sup>. This has already had a significant impact on ocean chemistry, with estimates of mean surface ocean pH decrease of approximately 0.1 (equivalent to an approximately 30 per cent increase in hydrogen ion (H<sup>+</sup>) concentration), from a value of approximately 8.18 around the time of the industrial revolution. This pH drop is significantly larger than the seasonal pH variability of 0.03 to 0.04 due to changes in temperature and photosynthesis. This is making seawater more acidic threatening marine life. By 2100, atmospheric CO<sub>2</sub> concentrations could reach more than 800 parts per million without any mitigation of emissions causing an additional surface water pH decrease of ~0.4 pH units.

Monitoring will be able to identify if this situation changes, and, if necessary, update the pressure in future river basin management planning implementation cycles accordingly.

**Relative severity of impact of climate change on acidification pressure**

**Low for freshwater.  
Medium/High for marine waters**

### Ability of actions for acidification pressure to perform under climate change

Actions, related to acidification help us tackle these pressures now and in a future climate. Furthermore, most of these actions can be adapted in the future so that they will be capable (in a technical sense) of managing any increased risk from climate change.

<sup>17</sup> Wilby, R.L. 1993. The influence of variable weather patterns on river water quantity and quality regimes. *International Journal of Climatology*, **13**, 447-459.

<sup>18</sup> Wright R.F. 2007. *Hydrology and Earth System Sciences Discussions*, vol., 4, 2945-2973.

<sup>19</sup> Dillon P.K. et al. 1997. *Environmental Monitoring and Assessment*, vol 46, 105-111

<sup>20</sup> Wilby, R.L. 1994. Exceptional weather in the Midlands, UK during 1988-1990 results in the rapid acidification of an upland stream. *Environmental Pollution*, **86**, 15-19.

<sup>21</sup> Tipping E. et al. 2003. *Environ. Pollution*. Vol., 123, 239-253.

<sup>22</sup> Turley, C, Findlay, HS, Mangi, S, Ridgwell, A and Schimdt, DN. (2009) CO<sub>2</sub> and ocean acidification in Marine Climate Change Ecosystem Linkages Report Card 2009. (Eds. Baxter JM, Buckley PJ and Frost MT), Online science reviews, 25pp.

[www.mccip.org.uk/elr/acidification](http://www.mccip.org.uk/elr/acidification)

## Salinity

### Climate change impact on salinity pressure

The main sources of saline inputs to water courses included runoff of de-icing salts from roads and urban surfaces and industrial sources.

Freshwater surface water can become more saline as a result of incursion (high tide and surge impacts) and intrusion (inland migration of saline front) from marine waters. Likewise groundwater can be impacted by intrusion. Furthermore reduced rainfall in summer may reduce freshwater flows to estuaries increasing their salinity.

Freshwater surface and groundwaters can also become more saline as a result of intrusion and/or incursion of marine waters.

Saline incursions into the Norfolk and Suffolk Broads may threaten freshwater fish stocks either directly or indirectly as a result of prymnesium<sup>23</sup> blooms, such as those in the Hickling Broad. The risk to surface water is presently reduced due to the existing Environment Agency management structure and defence policy including both solid sea walls such as those at SeaPalling and Waxham and barriers such as at Potter Heigham. This mitigates against saline intrusion, protecting the fish in this area when the barrier operates.

Climate change predictions suggest that there are likely to be higher peaks of salinity as a result of first-flush high rainfall events from roads and urban areas after extended dry periods. However, the use of de-icing salts is likely to decrease due to milder winters and fewer snowfall events. Industrial sources will probably not change significantly.

Increasing sea levels and storm surges are likely to cause increased saline intrusion into surface freshwaters, but more importantly into groundwater systems. Although some freshwater habitat may be lost, the most significant impact will be on groundwater resources.

**Relative severity of impact of climate change on salinity pressure**

**Medium**

### Ability of actions for salinity pressure to perform under climate change

It is likely that existing and proposed actions will need to be adapted to make sure they meet Water Framework Directive objectives for this pressure as the climate changes. It is possible that new actions may be needed due to the increasing risk resulting from climate change. It is considered that all the actions, related to managing salinity pressure help us tackle this pressure now and in a future climate. The Environment Agency cannot identify any current or proposed actions in the programme of actions where it would be a significant mistake in terms of managing the pressure now or under a future climate to continue to apply or introduce these actions (this assessment does not consider in detail the impact on carbon emissions. This should be considered in economic assessments of the actions. Also the effects of actions to reduce abstraction pressures on climate change (that is impact on carbon emissions) are presented in the strategic environmental assessment reports which accompany the draft and this River Basin Management Plan). In this respect they are 'no regrets' actions. For instance discharge licensing will continue to be an essential way of continuing to manage this pressure.

Most of the actions can be adapted in the future so that they will be able (in a technical sense) to manage any increased risk from climate change. There may be exceptions. For

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<sup>23</sup> Prymnesium is a bloom-forming organism found in brackish waters. Some species are toxic to fish  
Environment Agency River Basin Management Plan, Anglian River Basin District  
Annex H: Adapting to climate change  
December 2009

instance environmental controls on new developments and infrastructure (for example roads) may not have adequate requirements for applying sustainable urban drainage systems and road runoff treatment and maintaining this treatment to cope with future conditions.

In the longer term, there is little we will be able to do to avoid sea level rise having an impact on coastal aquifers. In future planning cycles of river basin management planning it may be necessary, therefore, to redefine reference conditions. The implications of salinisation of coastal aquifers on increasing demands on alternative water resources will need to be considered.

## **Temperature**

### **Climate change impact on direct temperature pressures**

It should be noted that in this section 'temperature pressure' refers to the release of point source effluents which are of a higher temperature than the receiving water as opposed to the direct effects of climate change on water temperature. 'Heated' point source effluents can originate from power station and industrial cooling waters and sewage discharges. However it is believed that nature of higher temperature discharges will not change to a large extent as the result of climate change

Climate change will cause a rise in water temperatures regardless of these direct sources of higher temperature waters. The potential impact in areas that receive heated discharges may be increased due to the increased temperature of the receiving water resulting directly from climate change

**Relative severity of impact of climate change on direct temperature pressures** **Low**

### **Ability of actions to perform under climate change for temperature pressure**

Most, if not all, actions for this pressure can be adapted in the future so that they will be capable (in a technical sense) to manage any increased risk from climate change. This is mainly controlled through discharge licensing.

The most immediate reaction to climate change is expected to be in river and lake water temperatures. There is little we can do now to avoid at least some increase in temperatures. In future cycles of river basin management planning it may therefore be necessary to redefine reference conditions.

## **Physical modification**

### **Climate change impact on physical modification pressure**

The Anglian River Basin District has a long history of the construction of both fluvial and tidal flood defences to very extensive low lying areas i.e. The Fens, The Broads et al. These defences vary from relatively small earth embankments to major hard defences and barriers.

Climate change could change patterns of development and the physical pressures this imposes on water bodies. For instance coastal areas may develop because of increased tourism due to warmer drier summers.

The increased chance of extreme events leading to flooding, rising sea levels and storm surges is likely to mean flood defences and surface water drainage will need upgrading. This could threaten achieving not only good status but also good potential in water bodies

designated as heavily modified water bodies. However, all new flood defences would be required to satisfy Article 4.7 of the Water Framework Directive, which will ensure that the best environmental option is considered for the flood risks posed.

Alternative strategies to deal with high flows, described in documents such as Defra's 'Making space for water' and the Welsh Assembly Governments Environment Strategy may reduce the need for hard engineered modifications whilst having additional benefits in terms of water management in catchments.

Reduced availability of water to maintain compensation flows and overall reduction in flows may result in fewer opportunities for fish migration within systems particularly around or across barriers such as weirs. This increases the significance of this pressure.

There is a possible increased risk from dredging as more marine aggregate material is required for flood defences to protect against increased flood risk as a result of climate change. However, currently most marine aggregate regions are well offshore from the closest coastal water body such that any changes in marine aggregate production may not affect Water Framework Directive compliance.

A rising sea level and more frequent storm surges will increase the risk of wide spread saline flooding. Whilst a rising sea level alone will reduce the effectiveness of fluvial outfalls so increasing the probability and severity of fluvial flooding.

**Relative severity of impact of climate change on physical modification pressure**

**Medium**

#### **Ability of actions to perform under climate change for physical modification pressure**

It is likely that existing and proposed actions will need to be adapted to make sure they meet Water Framework Directive objectives with changing climatic conditions for this pressure. It is possible that new actions may be needed due to the increasing risk resulting from climate change. It is considered that all the actions, related to managing physical modifications help us tackle these pressures now and in a future climate. For instance codes of practice and impact assessment will continue to be an essential way to manage this pressure. However these actions may have negative impacts for other pressures (see section 5.5.) which are increased as a consequence of climate change. Therefore careful consideration is needed to assess if there are any potential negative consequences in relation to achieving Water Framework Directive objectives of implementing these actions.

Most of these actions can be adapted in the future so that they will be able (in a technical sense) to manage any increased risk from climate change (wider socio-economic considerations may change this view).

There are a number of possible situations where climate change represents a significant risk to any investment in actions (that is a 'regrets' situation). For instance investment in fish passes or lifts could be wasted and bring no benefits in relation to meeting Water Framework Directive objectives if reduced flows in a future climate prevent them from operating properly. Climate change effects would have to be factored into their effectiveness, design and operation.

Certain actions represent a win-win situation. For instance, 'Green infrastructure' (the managed interconnected network of open spaces and natural areas, such as greenways, wetlands, parks, woodland and native plant vegetation, that naturally manages stormwater, reduces flooding risk and improves water quality), river restoration and regeneration could reduce the impact of physical modification pressures whilst bringing about other significant

benefits such as reducing the carbon footprint from 'old infrastructure' and improved quality of life in urban environments (see strategic environmental assessment reports which accompany the draft and this River Basin Management Plan). Similarly these actions could improve habitat conditions such that the biology is better able to cope and migrate with changing climatic conditions.

## **Sediments**

### **Climate change impact on sediment pressure**

Excessive levels of sediments in water bodies can result from runoff from agricultural and urban areas, sewage discharges and combined sewer outputs, industrial waste management procedures, construction and forestry activity.

The Anglian River Basin District has a large number of outdoor pigs, which can increase soil erosion and sediment loss, for example around Ipswich and Cambridge. Other than pigs the primary agricultural activities in the river basin district are arable crops and vegetable production, which can present a risk with issues such as:

- late cultivation can cause soil capping;
- heavy traffic can cause compaction and reduce infiltration on field;
- break down of soil structure;
- reduced organic matter content e.g. the Fens, Brecklands.

The Catchment Sensitive Farming initiative has identified sediment as the main problem in some priority catchments. One example is sediment on river bed reduces fish spawning opportunities for example in the River Wensum, and rivers in North Norfolk.

With 500,000 new homes to be built in the river basin district by 2021, construction will have a major impact on sediment in the region. The Environment Agency is promoting Sitewise, a pilot project in the river basin district encouraging the minimisation of construction waste including silt, and the need for properly resourced/monitored on-site construction waste management plans to reduce contamination.

Climate change predictions suggest 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 during intense rainfall events from compacted soils and from urban environments after first-flush releases during intense rainfall events. Changing crop types and seasonal patterns of agriculture and forestry may also change sediment runoff. Increased winter cropping is already having an effect on sediment runoff. Promotion of tree planting (for shading of rivers from UV and for carbon storage for instance) may have positive effects in reducing sediment runoff. Localised runoff from construction sites could also increase in intense rainfall events. There will also be changes in stream power during storm events and hence enhanced sediment loads due to channel erosion and enhanced resuspension. The Integrated Nutrient in Catchment model framework mentioned in the nutrients section above has been used to predict phosphorus and sediment movements and loads. In this model sediment release was described as a function of previous climate conditions and the rate of change of flow conditions. Climate change is likely to increase the rate of change of flow conditions and therefore sediment movement and loads. This will lead to higher sediment loads to lakes. Stream power between events may be reduced, causing higher rates of sediment deposition higher up the stream systems. Intense rainfall events and increased flooding may also increase the frequency of combined sewer overflow. The Defra soil strategy and soil action plan and the Welsh Assembly Governments draft soil action plan are acting to help reduce this risk.

**Relative severity of impact of climate change on sediment pressure**

**High**

### **Ability of actions for sediment pressure to perform under climate change**

Existing and proposed actions will need to be adapted for controls to make sure they meet Water Framework Directive objectives with changing climatic conditions for this pressure. It is possible that new actions may be needed due to the increasing risk resulting from climate change, in particular from the increased risk from diffuse sources. It is considered that all the actions, related to managing sediments help us tackle these pressures now and in a future climate. However the effectiveness of some actions may be compromised if climate change is not considered in their design and implementation. For instance any proposed sediment traps or sustainable urban development systems may need to be designed and operated to cope with increased sediment loads to prevent blocking and to maintain their effectiveness at achieving Water Framework Directive objectives. If this is not done this would represent a 'regrets' situation.

Furthermore, most of these actions can be adapted in the future so that they will be capable (in a technical sense) of managing any increased risk from climate change.

Sediment and soils store carbon. Managing soils and sediments better will ensure soil carbon is not released to the atmosphere increasing climate change. Also soil and the minerals and nutrients it contains are retained for agriculture. This represents a win-win situation (see Defra soil strategy).

## **H.5 Interaction of management action for pressures**

Management action to address one pressure may increase the risk of not achieving Water Framework Directive objectives for another pressure. Climate change may increase this risk further. For example, removing weirs to remove obstacles to the movement of native flora and fauna may increase the risk of allowing the spread of invasive species where the suitable habitat of these invasives is broadened because of climate change.

Further, climate change adaptation action for one issue and/or in one location may in itself cause problems elsewhere. For instance managed retreat may reduce the risk from morphological pressures but increase the risk of saline intrusion, particularly where lower groundwater and surface water levels and flows are reduced as a consequence of climate change.

Because many of these risks are higher because of climate change the interaction of climate change and management action for different pressures need to be considered. There is unlikely to be an ideal set of actions. 'Trade-offs' between different management actions for different pressures and drivers need to be considered. This highlights the need for integrated catchment thinking when managing different pressures under the Water Framework Directive. This point was made by several consultees in the various Water Framework Directive consultations.

There will also have to be significant trade-offs in relation to particular outcomes in catchments such as those for conservation, agriculture and water supply. Trade-offs will also need to be considered in relation to adaptation actions and the outcomes these deliver. This is nothing new. These trade-offs have to be considered in sustainability appraisals. Political priorities, however, may affect the methodology that is used and decisions made. Transparency, in relation to appraisal methodologies and decision-making, are therefore

important to ensure the consensus on the balance that is struck between competing outcomes and priorities.

## H.6 Adaptation strategies

A number of organisations will play a part in delivering the objectives of the Water Framework Directive. This annex considers the implications of climate impacts on the effectiveness of the actions to deliver these objectives. It is important that everyone is involved in developing and implementing effective adaptation action for actions in order that we are all able to meet Water Framework Directive objectives.

Several organisations involved in the river basin management process are developing and acting on strategies for adapting their activities to address climate change. Generally these are targeted at a wide range of responsibilities including those under the 'umbrella' of the Water Framework Directive. Much of the activity will be to better understand risks and appropriate responses in the first instance. This work should rapidly develop into effective adaptation action to ensure we all meet Water Framework Directive objectives as planned. The Environment Agency would expect that organisations that have not taken on board planning for adaptation for areas of the Water Framework Directive for which they are responsible, should start to do this as part of river basin management planning and implementation of plans. The Environment Agency as competent authority for Water Framework Directive implementation will review if this is happening.

The Environment Agency, for example, has developed an organisational climate change adaptation and mitigation strategy. The different parts of the Environment Agency are now developing action plans to enact this strategy and to embed adaptation into the environmental management of sectoral activities. These will be published at a later date but include the following:

- Identifying good practice in terms of adaptation and making sure this is communicated.
- Updating our risk information using new 2009 UK Climate Projections (previously named UK Climate Impact Programme 2008).
- Ensuring water companies consider the impact of climate change on the supply-demand balance.
- Developing a map of the impact of climate change on river flows across England and Wales and examining the impact of climate change on demand for water in the 2020s, 2030s and 2050s.
- Looking at the carbon cost of different water supply actions, including the carbon footprint of operating the water supply system.
- Looking at how people value water, and alternative ways of allocating resources that will help us respond to increasing water scarcity as a result of climate change.
- Progressing research to look at, for example, the use of probabilistic climate scenarios on water supply and ecology, changes in water quality and failures of water quality standards, discharges, effluent treatment and chemical processes; the spatial coherence of European droughts in the past and in the future and the impact of future droughts on water supply management.
- Considering how to take on board climate change in our 'Time limiting of abstraction licence' policy and improving water efficiency requirements in our abstraction licences.
- Improving the resilience of water supplies to climate change through involvement in the Water Saving Group.
- Ensure climate change adaptation is embedded into fisheries practices and invasive species strategies.
- Looking for opportunities in joint working to manage and adapt for a range of pressures.

- Reflecting the long term costs of climate change in the way decisions are made to maintain or improve water quality. Make sure options are assessed by Net Present Cost, taking account of operating costs to perpetuity and, in this, the estimates that have been advised for the social costs of carbon.

As part of river basin management planning it will be important to co-ordinate activity on adaptation as part of the Water Framework Directive. Therefore the Environment Agency would like to hear of any developed or developing strategies, plans or activities which are occurring for adaptation across the Anglian River Basin District, particularly where these have relevance to planning and implementing actions under the Water Framework Directive and/or achieving Water Framework Directive objectives. As identified in section H1 the Environment Agency and other UK representatives are working within the EC common implementation strategy to help deliver guidance and tools for how climate change should be considered in the steps of the river basin management process. This will help ensure we all take a consistent approach in the way we address climate change risks and adaptation across water management activities.

## **H.7 Adaptation in relation to underlying conditions and biology**

Work is needed to understand how changes in underlying 'natural' environmental conditions and the impacts of man-made pressures as a consequence of climate change will impact on the biology in the water environment. This is needed to ensure we all implement the most cost-effective actions to meet Water Framework Directive objectives, particularly those for biology. Those organisations involved in the river basin management process that have direct responsibilities for managing the natural environment need to consider the consequences of climate change and the need for adaptation in the context of delivering biological outcomes. The Environment Agency, for instance, is starting to set out its adaptation action plan for ecology and conservation. This includes the following actions:

- Develop the 'landscape ecology approach' to identify and protect key habitats, open up new habitats and develop and maintain wildlife corridors. Reduce habitat fragmentation and protect and restore areas of floodplains and wetlands.
- Work with Natural England and Countryside Council for Wales on their review of protected area designation criteria and on managing changing conservation objectives for designated sites.
- Work with others to develop better understanding of climate space. Map current and future climate spaces and the vulnerability and impacts for priority species and environments. Develop robust case on the future ranges of key species and how reducing current risks and adaptation actions may affect their viability.
- Target action to build environmental resilience in relation to both existing and climate change pressures.
- Work with partners to identify those species and environments at greatest risk, prioritise policies and strategies for action and identify and make changes in management practices and policies that may help freshwater ecosystems and habitats to adapt to climate change.
- Ensure we all build environmental resilience and restore damaged habitats to ensure salmon and trout species are to remain in existing localities. We will also seek to protect the habitat conditions for glacial relict fish species such as Char and White Fish which have little opportunity to adjust or move from their rare and isolated lake habitats and are therefore at significant risk of local extinction.

Further the Environment Agency intend to commission research to understand if, and over what timescales, the variables on which the characteristics of waterbodies are determined will change, how this could change such things as waterbody type or category and whether or how best to modify tools, analyses, and management as a consequence.

## H.8 Summary

It is likely that the risk to not achieving Water Framework Directive objectives from a number of man-made pressures will increase as a result of climate change.

Figure H.9: **Summary of severity of climate change impacts on pressures in the Anglian River Basin District**

Relative severity of impact of climate change on:	Level of Severity
Abstraction and other artificial flow pressures	Very High
Nutrient pressure (nitrate and phosphate)	High
Sediment pressure	High
Microbiology pressure	Medium
Organic pressure	Medium
Physical modification pressure	Medium
Salinity pressure	Medium
Invasive non-native species pressure	Medium
Fisheries management pressure	Low/Medium
Acidification pressure	Freshwater: Low Marine: Medium/High
Priority hazardous substances, priority substance and specific pollutants such as pesticides	Low
Temperature pressure	Low

Therefore we all will be at more risk of failing Water Framework Directive objectives in the future unless we use adapted actions that continue to bring benefits (in terms of Water Framework Directive objectives) in a future climate. In our screening analysis of actions the Environment Agency consider that the vast majority of actions will help us tackle pressures now and in a future climate (there are few current or proposed actions in the programme of actions where it would be a significant mistake to continue to apply or introduce them). Most actions can be adapted as the climate changes. Therefore most represent a 'no regrets' and/or 'flexible adaptation' option. Any investment in new works or managing current sites should include adaptation or allow for the opportunity for flexible adaptation. Unless this is done this is a case of significant possible 'regret'. Of particular significance here is infrastructure where the effectiveness could be compromised by flooding.

We should all be looking for win-win type actions. It is clear that a number of these exist. It is also clear that actions for different pressures can be counterproductive particularly in a context of a changing climate. This highlights the need to think and plan in a more integrated and catchment based way.

The issues raised in this annex need to be progressed in terms of improving understanding and certainty through to management action. Organisations involved in the river basin management are starting to identify positive action to do this. However this work must be accelerated if we are all to ensure delivery of Water Framework Directive objectives to the Water Framework Directive timescale.



# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex I: Designating artificial and  
heavily modified water bodies

# Contents

<b>I.1 Introduction</b>	<b>2</b>
<b>I.2 Freshwater water bodies</b>	<b>4</b>
<b>I.3 Estuarine and coastal waters water bodies</b>	<b>11</b>
<b>I.4 Liaison Panel Review and Further Quality Check of Results</b>	<b>15</b>
<b>I.5 Designation of Additional Water Bodies</b>	<b>15</b>
<b>I.6 Results</b>	<b>16</b>

## I.1 Introduction

This annex explains the criteria used to designate water bodies in the Anglian River Basin District as artificial or heavily modified. The criteria used for designation of freshwater water bodies can be found in section I.2 and the criteria for estuarine and coastal water bodies can be found in section I.3. Section I.4 discusses how results of a liaison panel consultation on designation were incorporated and further quality checks made to results. Section I.5 outlines how designation of new and split water bodies was made and I.6 maps the artificial and heavily modified water bodies in the Anglian River Basin District.

### **The need to designate water bodies as heavily modified or artificial**

Article 4(3) of the Water Framework Directive (WFD) states that water bodies may be designated as artificial or heavily modified in the river basin management plans. The WFD recognises that some water bodies have been significantly physically modified to support various uses which provide valuable social and economic benefits. In many cases these modifications cannot be removed without having a major negative effect on the social and economic benefits that these uses bring. If achieving 'good status' would require changes to a water body's hydromorphology that would have significant adverse effects on the social or economic activity, then it can be designated as a artificial or heavily modified water body. Before designation it also needs to be established that due to technical or disproportionate cost reasons there is no significantly better environmental option for delivering the social and economic benefits (European Union CIS guidance document no. 4, 2003). The WFD also recognises that many artificial bodies of water need to be managed in terms of their environmental quality and hydrology.

Artificial and Heavily Modified Water Bodies (AWB/HMWBs) have to achieve an alternative objective of "good ecological potential" (GEP). The objective of GEP is similar to good status but takes into account the constraints imposed by the social and/or economic uses.

### **Definitions**

Article 2 (8) of the WFD defines an artificial water body as a 'body of surface water created by human activity'. Article 2 (9) defines a heavily modified water body as a 'body of surface water which as a result of physical alterations by human activity is substantially changed in character, as designated by the Member State in accordance with the provisions of Annex II (of the WFD).'

The definitions presented in the WFD are expanded on further in Common Implementation Strategy guidance documentation. In order to address the challenges of WFD in a co-operative and coordinated way, the Member States, agreed on a Common Implementation Strategy (CIS). CIS Guidance documents and technical reports have been produced to assist member states in implementing the WFD. CIS guidance document no. 4 focuses on the 'Identification and Designation of Heavily Modified and Artificial Water Bodies' and can be found at:

[http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework\\_directive/guidance\\_documents/guidancesnos4sheavilysmo/ EN 1.0 &a=d](http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents/guidancesnos4sheavilysmo/ EN 1.0 &a=d)

Paragraph 3.1.1 of CIS guidance No. 4 ('the CIS guidance') states that:

'In order to be a heavily modified water body, a water body must be:

- Physically altered by human activity;
- Substantially changed in character;
- Designated under Article 4(3)'.

In general, the changes to the hydromorphology need to be long-term and alter the morphological and hydrological characteristics in order to represent a substantial change in the character of a water body.

Paragraph 3.1.2 of the CIS guidance interprets an Artificial Water Body as:

'A surface water body which has been created in a location where no water body existed before and which has not been created by the direct physical alteration or movement or realignment of an existing water body'.

The guidance clarifies that this does not mean that there was only dry land present before. Minor ponds, tributaries or ditches may have been present, which were not regarded as discrete and significant elements of surface water. Significant water bodies that have changed water category due to modifications are considered to be heavily modified water bodies. For instance a river dammed to form a reservoir is a heavily modified river not an artificial lake.

# I.2 Freshwater water bodies

## Introduction

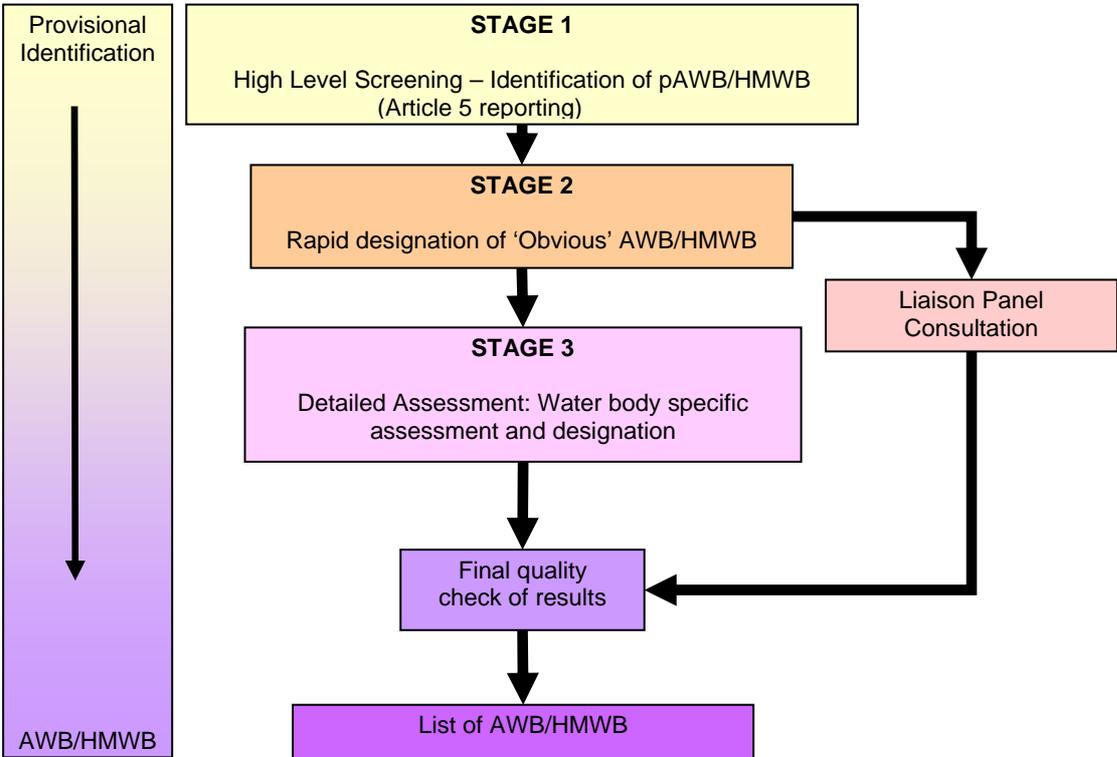
A two-stage approach was developed to apply the Article 4(3) designation tests to those water bodies provisionally identified as AWB/HMWB for Article 5 reporting (Figure I.1). This list of provisional AWB/HMWB (pAWB/pHMWB) was formed of water bodies that were at risk of failing good ecological status due to morphological pressures. The risk assessment was completed as part of the river basin characterisation process. Further detail on the risk assessment approach is discussed in Annex G. The two-stage designation process comprised of a rapid designation stage to identify ‘obvious’ AWB/HMWB followed by a second more detailed assessment stage.

The rapid designation stage applied the 4(3) tests to a small number of priority water body uses. The rapid designation stage was developed following the principles outlined in the UK TAG paper, ‘Criteria and Guidance for the Designation of heavily modified water bodies’:

[www.wfduk.org/tag\\_guidance/article\\_4/heavily\\_modified\\_wb/view](http://www.wfduk.org/tag_guidance/article_4/heavily_modified_wb/view)

For water bodies where it was not possible to designate using the rapid process a further detailed process was applied. The detailed designation process also applied the Article 4(3) tests but to a wider set of water body uses and gathered more supporting information and justifications for designation. The process is described in Figure I.1.

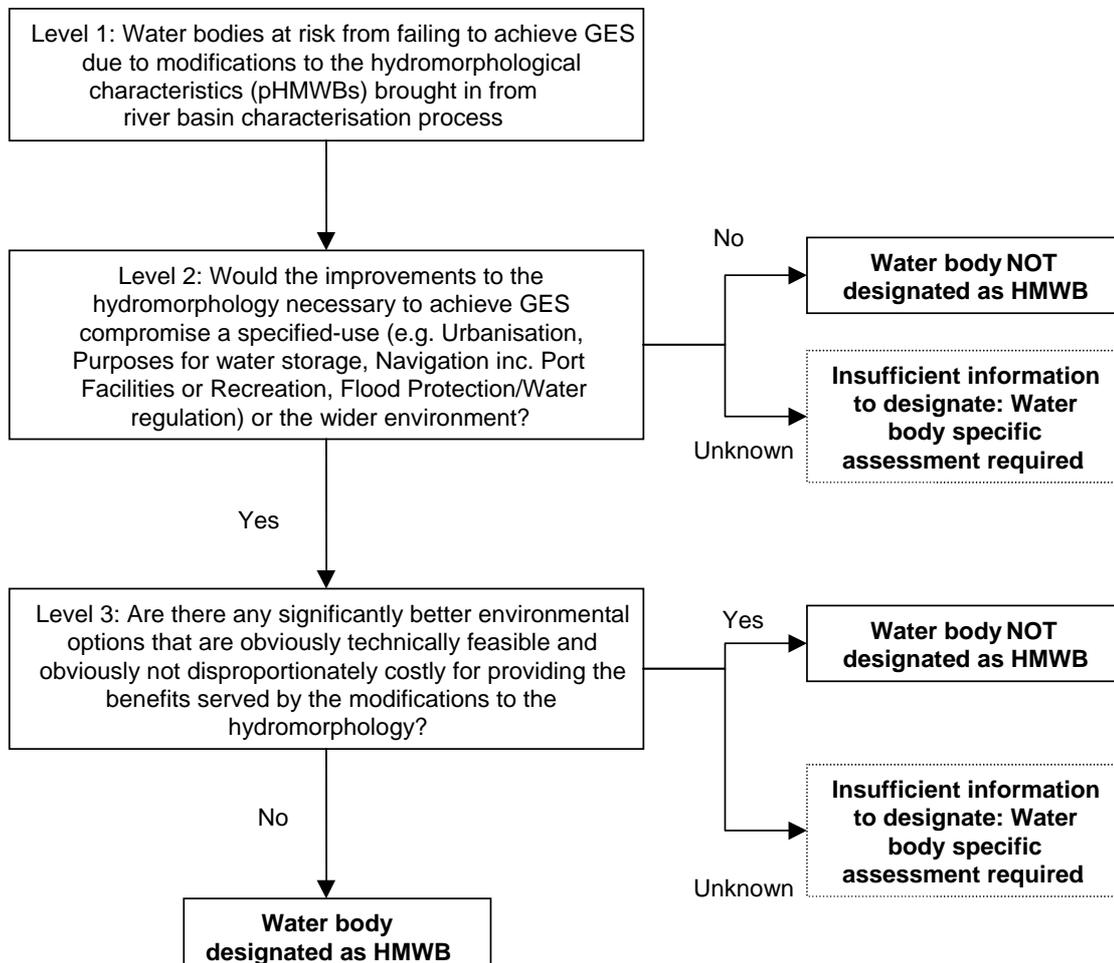
Figure I.1 Summary of steps in the designation of artificial water bodies and heavily modified water bodies for freshwater water bodies



## Overview of the rapid designation process for heavily modified water bodies

The process is described in Figure I.2:

Figure I.2 **Outline of the rapid designation process for freshwater heavily modified water bodies**



Boxes that have a dashed outline will be covered outside of the rapid designation process.

Further specified uses were addressed in the detailed designation process.

## Overview of the rapid designation process for artificial water bodies

A water body should be designated as artificial if the ability to achieve 'good ecological status' is limited through the designated use or through changes necessary for this use.

However, not all man-made water bodies have to be designated. Paragraph 6.8.1 of the CIS guidance explains:

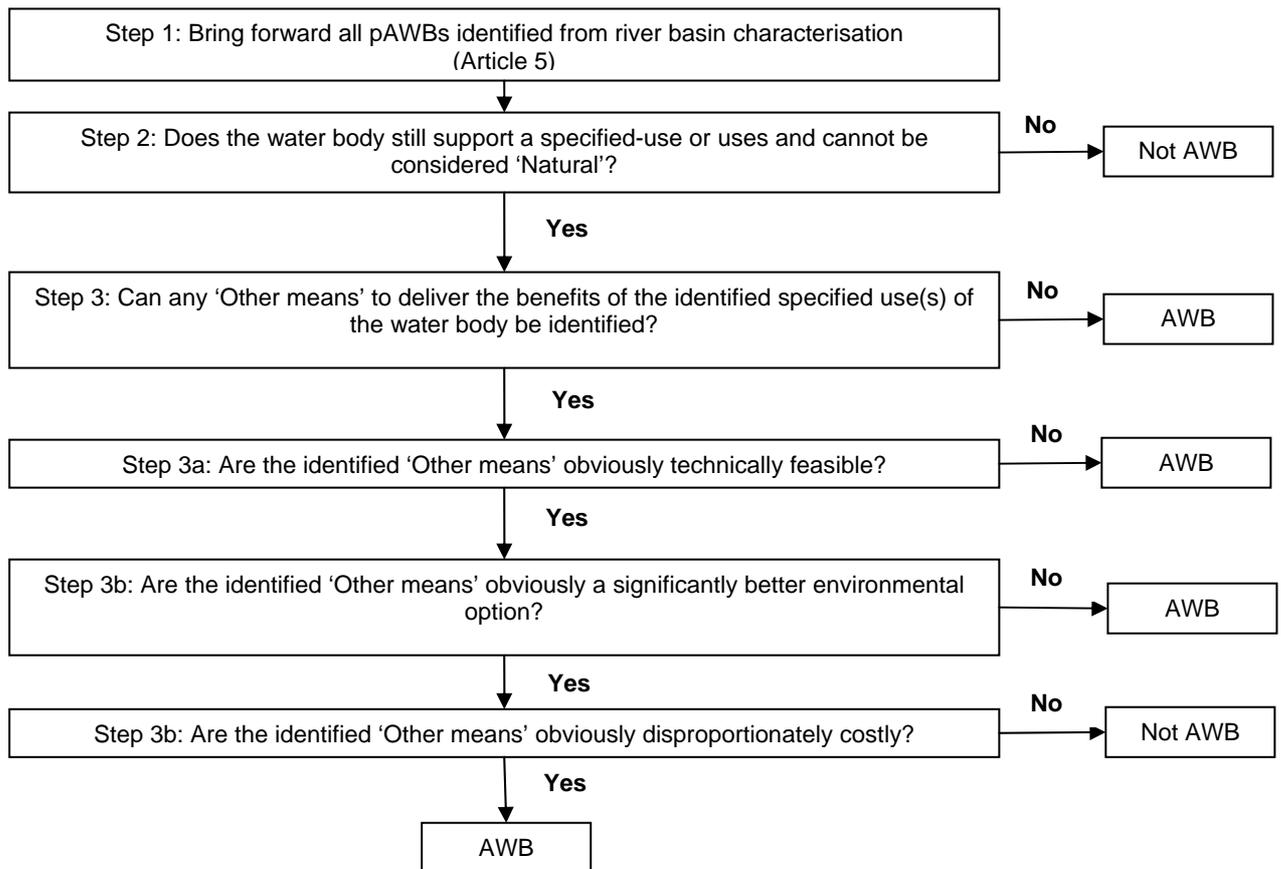
'There may be some circumstances where long established water bodies, which are subject to little or no pressures, are indistinguishable from natural waters. Under such circumstances it may be appropriate to consider their current biological condition as high ecological status (HES) or good ecological status (GES)'.

Water bodies that are considered as provisional artificial water bodies are shown in Figure I.3. The process for designating 'obvious' artificial water bodies is shown in Figure I.4

Figure I.3 **Water bodies that are considered as provisional artificial water bodies**

Category	Types	Includes
Lake	Lake	Flooded gravel pits Flooded surface mine workings Flooded clay pits Flooded peat workings Large ornamental lakes Large recreational lakes Pumped storage reservoirs Drainage ditches/channels
River	Canal Surface water transfers (open channels only)	Completely artificial dug canals Water diversions Leats Reservoir feeders
Estuarine and coastal waters	Docks and Harbours	Dug docks Flooded clay pits (which experience some saline intrusion) Storage reservoirs

Figure I.4 Outline of rapid artificial water body designation process



### Overview of the detailed designation process

Where a decision on designation was not possible using the rapid process, water bodies were fed through to the detailed designation process.

The detailed designation process took into account all eleven specified uses outlined in Article 4(3);

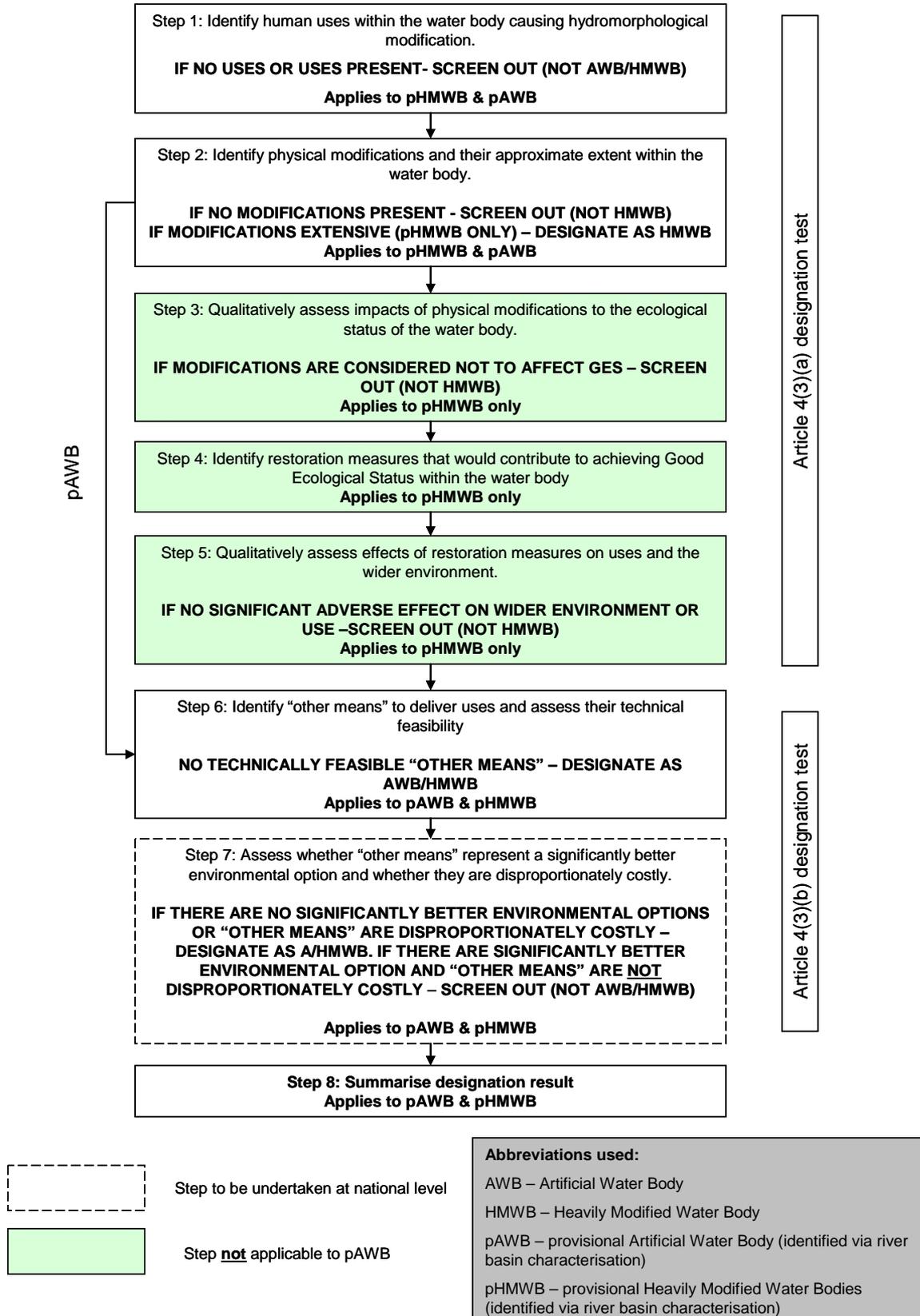
1. Wider environment
2. Navigation including port facilities
3. Recreation
4. Drinking water supply
5. Power generation
6. Irrigation
7. Water regulation, subdivided into i) strategic water transfers and ii) impoundment releases
8. Flood protection
9. Land drainage
10. Urbanisation
11. Other equally important sustainable human development activities

Several specified uses may be extensive within a water body. For example a riverine water body may be used extensively for Navigation, Flood Protection and Urbanisation.

The detailed artificial and heavily modified water body designation process comprised of eight steps (Figure I.5).

The steps highlighted in light green did not apply to artificial water bodies. Further detail on the steps can be found below:

Figure I.5 Outline of detailed artificial and heavily modified water body designation process



Further detail on the steps outlined in Figure I.5:

- Step one involved setting out the links between the pressures identified in the provisional identification of artificial and heavily modified water bodies, and the human uses associated with these pressures. Where water bodies did not have a specified use (and therefore could not have Article 4(3) tests applied), the water body was screened out from further assessment. The water bodies screened out were passed back into the broader river basin management process and have a target objective of good ecological status. Those which are not screened out remained as provisional artificial and heavily modified water bodies and continue to Step two.
- Step two involved the identification of those physical modifications that could result in changes to the hydromorphology of the water body. These changes needed to be long-term and substantially alter the water body morphological and hydrological characteristics. These modifications also needed to have a specified use as determined in Article 4(3). If there were no such physical modifications then the water body was screened out as not heavily modified. For provisional heavily modified water bodies, if there were extensive modifications present that had an associated specified use then it was assumed they would meet the Article 4(3) tests and the water body could be designated as heavily modified and screened out from further tests, provided the justification for the designation was recorded. For provisional artificial water bodies, as the water bodies are artificial, by default there must be extensive modifications associated with the water body, therefore it was not appropriate to apply this step.
- Step three involved bringing together information regarding morphological modifications (from Step two) and expert judgement from the Environment Agency ecology and biodiversity teams regarding the perceived ecological status of the water body. These teams were asked to assess how morphological modifications are affecting ecological status. Where water bodies are thought to be able to achieve good ecological status with existing hydromorphological modifications, the water body was screened out as not heavily modified. Those which were not screened out remained as provisional artificial or heavily modified water bodies and continued to Step four.
- Step four identified any potential hydromorphological restoration actions that could result in the water body achieving good ecological status. This step was informed by the expert knowledge of linkages between modifications and the ecology identified in Step three.
- In step five, information that had been gathered from earlier steps is pulled together in order to qualitatively assess the effects of restoration actions on the specified uses or the wider environment. Water bodies where restoration actions would not significantly affect the use or the wider environment in a negative way were screened out as not designated. These restoration actions to achieve good ecological status should go forward to the river basin management process (and be assessed as to their technical feasibility and cost effectiveness). The remaining water bodies were then assessed further in step six.
- Step six looked for 'other means' of delivering the benefits of the specified uses. If the 'other means' for providing the intended uses benefits were found to be technically infeasible then the water body can be designated as artificial or heavily modified as the water body had met the requirements of Article 4(3)(b). Otherwise the water body is assessed further in Step seven.
- Step seven considered the environmental benefit and monetary cost of any 'other means'. Where the 'other means' were disproportionately costly or a worse environmental option, then water bodies could be designated as artificial or heavily

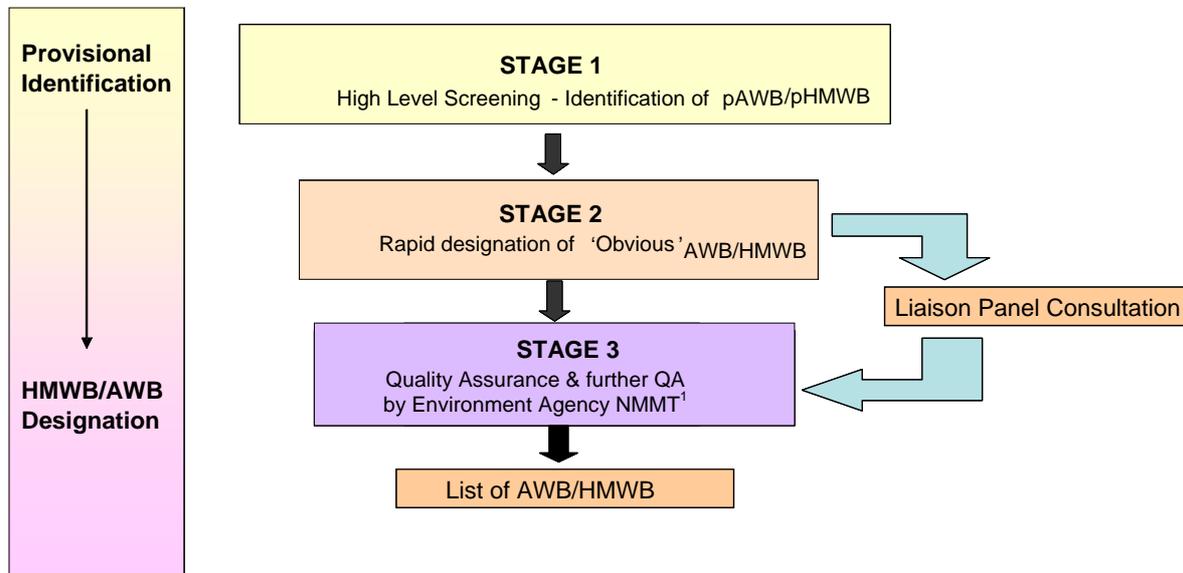
modified. If the 'other means' identified were a better environmental option and were not disproportionately costly then the water body could not be designated and screened out of further assessment. Only a small number of water bodies reached step seven to undergo these economic tests, most had been screened out at earlier stage.

- The final step (step eight) compiled all the steps undertaken during the detailed assessment and reports whether the water body was designated as an 'artificial water body', 'heavily modified water body' or 'not artificial or heavily modified water body' and any relevant comments supporting the designation.

## I.3 Estuarine and coastal waters water bodies

The designation of Artificial and Heavily Modified Water Bodies for Estuarine and Coastal Waters process is described in Figure I.6 below.

Figure I.6. **Summary of steps in the designation of water bodies for estuarine and coastal water bodies**



(<sup>1</sup> National Marine Monitoring Team)

Estuarine and Coastal Water Bodies were designated as Artificial and Heavily Modified Water Bodies for the following uses (outlined in the following sections)

- Flood protection use
- Navigation, ports and harbours use
- Coast protection use
- Marine aggregate extraction use
- Marine shell and fin fisheries use

The thresholds that were applied to the relationships between physical pressures, morphological change and ecological impacts were based on expert judgement.

### Flood protection use

Water bodies were assessed that had significant flood risk management assets that modify the hydromorphological characteristics to protect land. The removal of these assets could therefore compromise the benefits provided by flood protection.

The assessment was based on three separate elements relating to:

- the extent of reclaimed land protected by shoreline flood protection assets;
- barrages and barriers across the width of the main water body or forming a boundary with another water body which provide flood protection benefits; and
- sluices across the width of the main water body or forming a boundary with another water body which provide flood protection benefits.

It is recognised that there are a large number of sluices associated with coastal and estuarine flood protection structures but these generally do not form the boundary with an adjacent water body. The view has been taken that such structures are only likely to be significant in the context of heavily modified water body designation where they span the width of the main water body or form a boundary with an adjacent water body. In addition to barrages/barriers and sluices, there are also a number of weirs in estuarine and coastal waters. However, none of these are considered to provide any flood protection benefit. Their main purpose has generally been to maintain water levels in the vicinity of upstream towns/villages, and they are therefore not considered further in the assessment.

### **Navigation, ports and harbours use**

Water bodies were assessed that had a significant navigation, ports or harbour use that modifies the hydromorphological characteristics of the water body.

The assessment tested whether the actions to achieve good ecological status in these water bodies would compromise the benefits of navigation or ports and harbours.

The key criteria that have been used for the assessment were:

- the extent of navigation dredging in the water body - maintenance of navigable depth in previously deepened areas is critical to maintenance of the navigation use;
- the extent and intensity of dredge material disposal in the water body - disposal of dredge material is critical to the maintenance of the navigation use; and
- the extent of reclaimed areas behind quay lines - loss of quay line will directly affect specified use (unless there is significant long-term spare capacity).

Where the answer to any question was uncertain, the decision on whether to designate as a heavily modified water body for navigation or port and harbour use was deferred and the water body designated using expert judgement from Environment Agency area and national staff (taking into account any stakeholder comments available for the water body).

### **Coast protection use**

Water bodies were assessed that contained significant coast protection structures/structures associated with the manipulation of sediment transport. The assessment examines whether the actions to achieve good ecological status in these water bodies would compromise the benefits provided by the coast protection structures.

The key criteria that have been used for the assessment were:

- the extent of influence of manipulators of sediment transport on inshore waters within the water body; and
- the extent of infrastructure development afforded protection by coast protection structures.

They typically include soft cliff protection structures (linear defences) and beach erosion structures (groynes, offshore breakwaters). In some locations, coast protection is also delivered through beach nourishment. In some instances coast protection structures may also provide a flood defence function.

Where the answer to any question was uncertain, the decision on whether to designate as a heavily modified water body for reasons of coast protection was deferred and subject to more detailed assessment during the Environment Agency quality assurance and stakeholder consultation.

### **Marine aggregate extraction use**

Water bodies were assessed that were subject to marine aggregate extraction. Where such pressures were deemed to be significant, the assessment tested whether the actions to achieve good ecological status in these water bodies would compromise the benefits provided by the activity.

The key criteria that have been used for the assessment were:

- the extent of water body area licensed for marine aggregate extraction (marine aggregate extraction generally occurs offshore and most licensed sites are out of the 1nm from baseline WFD boundary). However, a small number of extractions do take place within WFD water body boundaries including:
  - sub tidal extraction of sand and gravel;
  - intertidal extraction of sand; and
  - subtidal extraction of marl.
- the extent of water body area subject to active extraction or sediment disturbance in the past decade.

Where the answer to any question is uncertain, the decision on whether to designate as a heavily modified water body for reasons of marine aggregate extraction was subject to a more detailed examination using expert judgement from Environment Agency area and national staff (taking into account any stakeholder comments available for the water body).

### **Marine shellfisheries use**

Water bodies were assessed that were subject to marine shellfisheries use. Where such pressures are deemed to be significant, the assessment tested whether the actions to achieve good ecological status in these water bodies would compromise the benefits provided by the activity.

The criteria that has been used for the assessment was the extent of the shell fishing beds within designated shellfish waters within the water body.

The main hydromorphological impacts of shellfisheries include presence of structures (for cultivated shellfisheries) and bed disturbance during harvesting of shellfish (dredging, suction dredging). The alleviation of the pressures associated with shellfisheries can be achieved through reductions in the amount and intensity of harvesting and/or through controls on harvesting methods.

The assessment was based on the following information:

- extent of shellfish beds within designated shellfish waters in the water body; and
- threshold of 15% of total water body area to identify whether the water body is at risk of failing good ecological status.
- whether the shell fishing activities within the water body are likely to cause significant seabed disturbance and cover an area of greater than 15% of the water body area, (information supplied by the local Sea Fisheries Committee).

Where a water body is at risk from shellfisheries bed disturbance pressures (either alone or in combination with other forms of physical modification), two further specific tests need to be applied for a water body to be designated as heavily modified:

- would a reduction in extent of harvesting activity or change in harvesting method have a significant adverse effect on shellfisheries activity;
- would all environmentally better and technically feasible alternatives be disproportionately costly?

Consultation with Sea Fisheries Committees has indicated that the answer to both of these questions would generally be “Yes”. For the purposes of this assessment, if a water body has been identified as “at risk” because of shellfisheries pressure, it has been designated as a heavily modified water body.

Where responses have not yet been provided by the relevant Sea Fisheries Committees, the water body was flagged as “Unsure” and the final designation decision was made taking into account any received stakeholder and Environment Agency area comments before quality assurance.

### **Marine fin fisheries use**

Water bodies were assessed that were thought to be supporting significant fin fisheries activities. The criterion used for the fin fisheries assessment was:

- the extent of fin fishing activities including Otter and Beam trawling known to cause significant seabed disturbance

Where responses were not provided by the relevant Sea Fisheries Committee, the water body was flagged as “Unsure”. These were then further assessed as part of the Environment Agency quality assurance using any additional information from the stakeholder consultation.

## **I.4 Liaison Panel Review and Further Quality Check of Results**

### **Liaison panel review**

After the rapid designation stage was complete, these interim results formed the basis of a liaison panel consultation. Liaison panels were invited to comment on the results from the rapid designation and provide any additional evidence they held on water bodies. Any information provided by the liaison panels was used to augment the existing information held within the Environment Agency. Where designation results from the liaison panels and the rapid designation process were contradictory the water body information was reviewed and designation results were modified where appropriate.

### **Quality check of designation results**

A further quality check of the designation results was undertaken as part of the good ecological potential classification process. This was the first time the water body designations were used operationally in order to classify artificial and heavily modified water bodies. Through this process various corrections were made where designations were found to be inaccurate.

### **Cross check with ecological status of the water body**

After the designation process was completed the Environment Agency made a cross check of the designation results and the ecological status of the water body. In some cases it was found that a water body has been designated as heavily modified yet the biological elements surveyed are showing good ecological status. Where this was the case the HMWB designation was removed. Further biological monitoring will be carried out between 2010 and 2012 to confirm that it was right to remove the designation.

## **I.5 Designation of Additional Water Bodies**

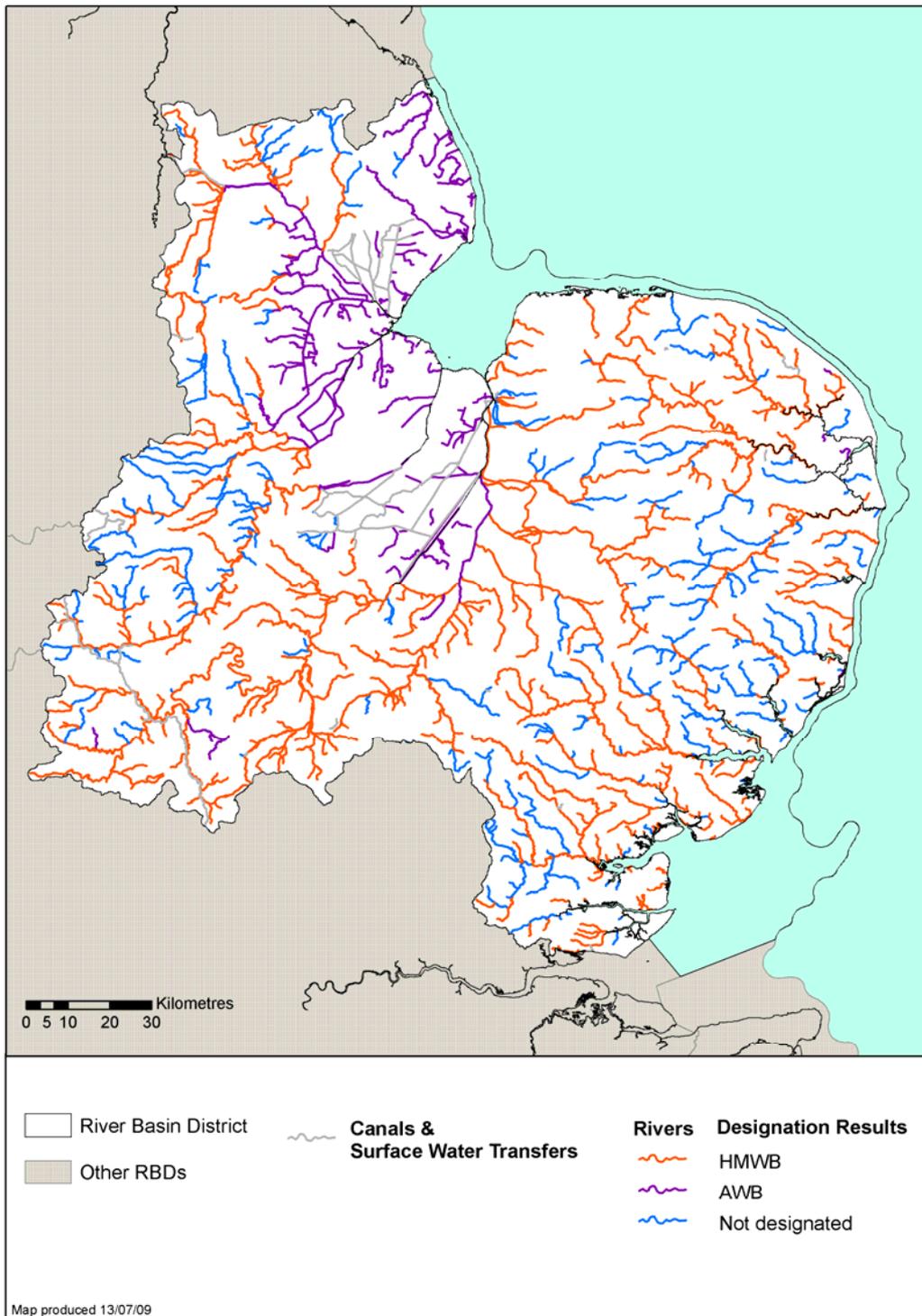
In March 2008, the Secretary of State agreed to the inclusion of additional water bodies and the re-delineation or splitting of a small number of existing water bodies. These water bodies were not identified in time to be included in the designation process described above. Due to resource constraints and limited data availability, these water bodies have been assessed as part of a much simpler designation process, largely based on the results of the hydromorphology risk assessments. Annex G discusses risk assessment in more detail.

Any water body with an 'at risk' or 'probably at risk' classification from the hydromorphology risk assessment process is designated as a provisional HMWB. Further map and aerial photography based analysis is used to identify provisional AWBs (based on physical indicators) which may include changing a previously identified pHMWB to a pAWB. An additional map-based assessment was used to provide a 'reality check' on the provisional designation status before the water bodies are finally identified as HMWBs or AWBs.

Water body use (or reason for designation) is based on the pressures identified in the hydromorphology risk assessment process and any further available information relating to use (e.g. conservation designation, drinking water protected area or freshwater fisheries protected area). The list of uses assigned to freshwater and coastal/estuarine water bodies is the same as that used in the full designation process described above.

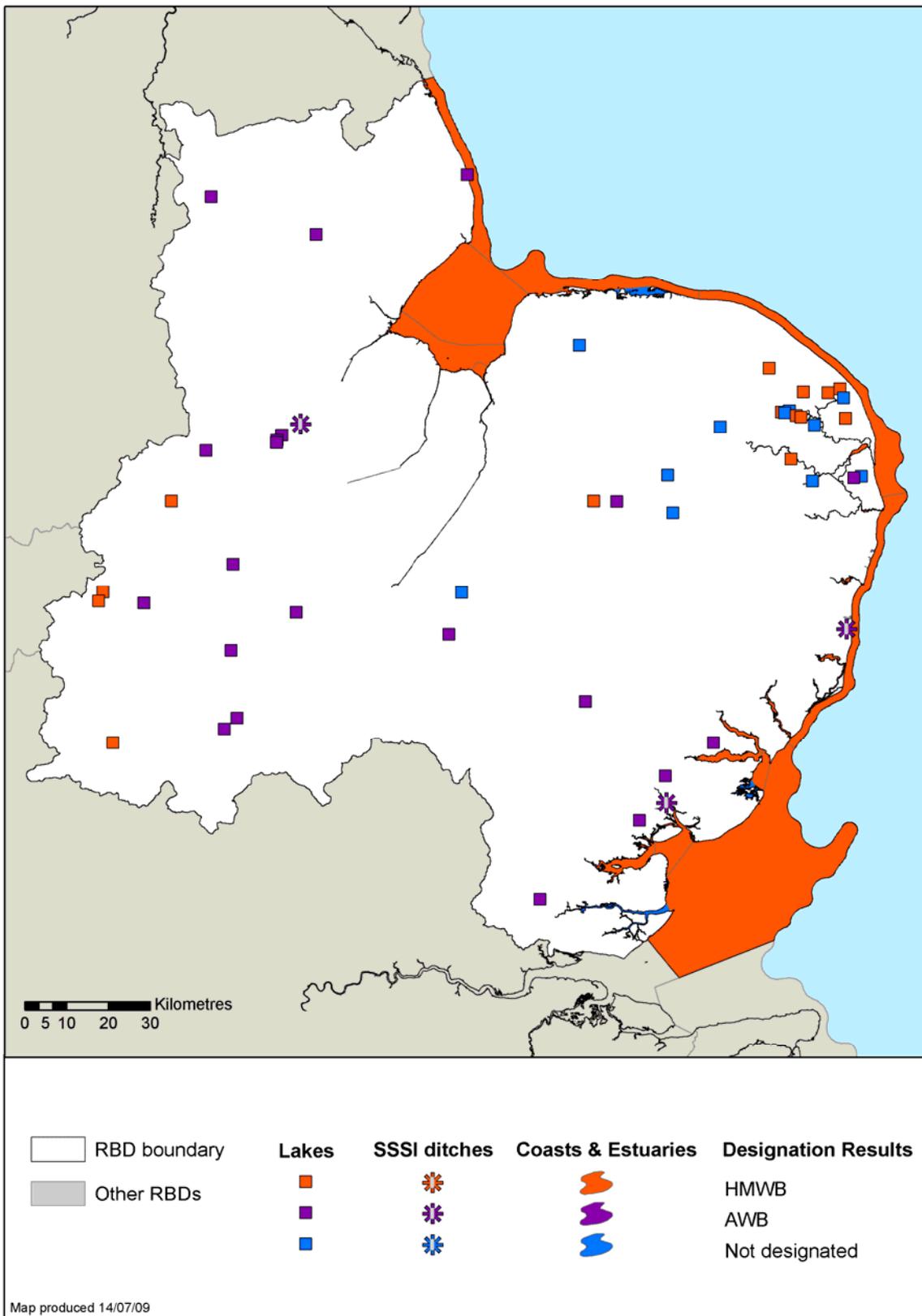
## I.6 Results

Figure I.7 The designation status for riverine water bodies



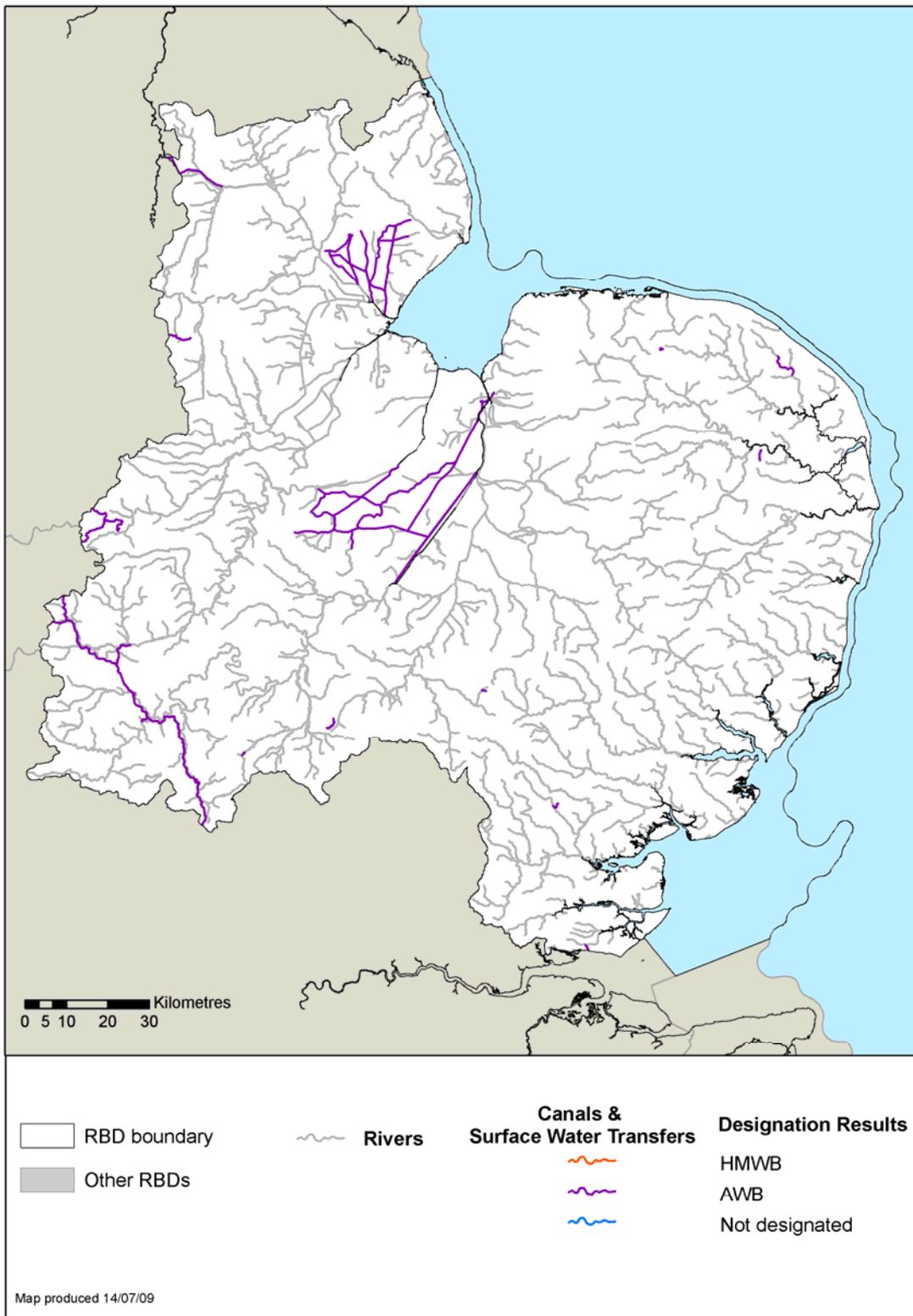
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Figure I.8 The designation status for lake, estuarine and coastal water bodies and SSSI ditches



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Figure I.9 The designation status for canals & surface water transfer water bodies



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# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex J: Aligning other key  
processes to river basin  
management

## **Contents**

<b>J.1</b>	<b>Introduction</b>	<b>3</b>
<b>J.2</b>	<b>Building, town &amp; country planning and regeneration</b>	<b>6</b>
<b>J.3</b>	<b>Rural planning and agriculture</b>	<b>11</b>
<b>J.4</b>	<b>Forestry management</b>	<b>13</b>
<b>J.5</b>	<b>Flood and coastal erosion risk management</b>	<b>13</b>
<b>J.6</b>	<b>Marine</b>	<b>19</b>
<b>J.7</b>	<b>Other processes</b>	<b>20</b>
<b>J.8</b>	<b>Local processes</b>	<b>20</b>
<b>J.9</b>	<b>Summary</b>	<b>20</b>

## J.1 Introduction

### Purpose of annex

Ministerial guidance on River Basin Planning<sup>1</sup> identifies that a large part of river basin management will involve reviewing the wide range of existing policies, plans and measures and amending them where necessary, to meet Water Framework Directive objectives. This includes those for which the Environment Agency is responsible, and some which are the responsibility of other organisations.

This annex starts to identify where and how relevant policies, planning processes, management processes, programmes, initiatives and methods are being better aligned to deliver more sustainable outcomes for the water environment. The annex intentionally focuses on key planning processes that are spatially structured which are somewhat “external” to the river basin management process, namely,

- Urban and rural land use planning; and
- Flood and coastal erosion risk management.

Marine planning is also covered because of ongoing developments with the Marine Bill and alignment to river basin management.

The Annex identifies both national alignment of generic processes as well as more targeted local work.

Alignment, in some respects, represents a measure or an action in itself. It should help deliver more widespread and sustainable outcomes, more quickly, for on-going river basin management. This annex is not intended to be comprehensive, rather more illustrative, with the intention that this alignment should and will continue as part of on-going river basin management. Annex F identifies many of the key legislation, policies, plans and programmes that can help to deliver Water Framework Directive objectives.

### Drivers for alignment

Government and a number of public bodies have a duty to help deliver sustainable development and most other organisations, whether public or private, have made commitments to carry out their activities with sustainable development in mind. In doing this the environmental dimension of sustainability must be balanced against economic and social dimensions. The general aim of the Water Framework Directive is to deliver sustainable water management. Any significant policy, planning process, management process, initiative or programme which has the potential to impact on water or the water environment should therefore consider the philosophy (Water Framework Directive, pre-amble), aims (Water Framework Directive, Article 1) and objectives (Water Framework Directive, Articles 4 & 7) of the Water Framework Directive.

Likewise, in delivering sustainable water management, implementation of the Water Framework Directive will need to consider economic and social dimensions while planning to deliver environmental outcomes. The main processes and mechanisms to do this are through the economic appraisal processes required to justify alternative objectives (Water Framework Directive, Article 4(3-7)) and the supporting impact assessments and recommendations from Strategic Environmental Assessment reports which accompany the draft and this first River Basin Management Plan.

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<sup>1</sup> River Basin Planning Guidance. Department for Environment, Food and Rural Affairs & Welsh Assembly Government. 2006  
**Environment Agency** River Basin Management Plan, Dee River Basin District  
Annex J: Aligning key planning processes to river basin management  
December 2009

In the Regulations<sup>2</sup> implementing the Water Framework Directive in England and Wales there is a general legal duty on all public bodies, in exercising their functions, so far as affecting a river basin district, to have regard to the River Basin Management Plan and any supplementary plans.

Article 4(7) of the Water Framework Directive sets out the circumstances under which a deterioration in water body status or failure to meet Water Framework Directive objectives is permitted, where certain conditions are met. River basin management will involve reviewing the wide range of existing policies, plans and processes, discussed in this annex, in order to manage new physical modification. Managing new modifications will require an assessment of the potential impact of the modification on water body status and an application of Article 4(7) where appropriate. The Environment Agency will review its own policies, plans and processes to incorporate a new process to manage new modifications through environmental assessment. The Environment Agency will provide guidance and advice to external organisations to ensure that no deterioration and water body objectives are met where new modifications are proposed, and an Article 4(7) defence is applied where necessary. The baseline water body status against which deterioration will be assessed is that reported in this River Basin Management Plan (see Annex B).

All new physical modifications occurring in water bodies between December 2006 and March 2009 have been assessed according to Art 4(7) requirements. Where a physical modification was identified as likely to have caused a deterioration in status or prevented a water body from meeting its water body objectives, then the Article 4(7) tests were applied. The results of this assessment are reported in Annex B of this plan. The list of physical modifications considered as part of the assessment was compiled from Environment Agency functions and external bodies (for example British Waterways and the Association of Inland Navigation Authorities).

Ministerial guidance on river basin management planning<sup>3</sup> identifies that the Environment Agency should:

- promote and encourage awareness of impacts that activities and policies of other public bodies have on the water environment;
- work with other public bodies to develop good links between river basin [management] planning and other relevant plans and strategies, especially those plans that have a statutory basis (for example Regional Spatial Strategies and Local Development Frameworks/ Local Development Plans);
- promote and encourage the inclusion of Water Framework Directive considerations in public bodies' plans, policies, guidance, appraisal systems and casework decisions;
- take action to integrate and streamline its own plans and processes.

The guidance identifies that this should be a two way process.

Ministerial guidance on classification and standards for water<sup>4</sup> identifies the environmental standards that must be embedded into Environment Agency policies, planning processes and classification schemes.

European and UK policies on climate change adaptation are also developing on the basis not only that climate change considerations need to be aligned into existing processes but also that aligning existing processes should, in itself, help deliver significant benefits for climate change adaptation (see Annex H).

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<sup>2</sup> The Water Environment (Water Framework Directive)(England and Wales) Regulations 2003, Statutory Instrument 2003 No. 3242

<sup>3</sup> River Basin Planning Guidance. Department for Environment, Food and Rural Affairs & Welsh Assembly Government. 2006.

<sup>4</sup> Water Framework Directive: Directions to the Environment Agency on Classification of Water Bodies Department for Environment, Food and Rural Affairs & Welsh Assembly Government 2009

**Environment Agency** River Basin Management Plan, Dee River Basin District  
Annex J: Aligning key planning processes to river basin management  
December 2009

This annex addresses almost unanimous stakeholder support<sup>5</sup> for the principle of better alignment and where possible integration of relevant processes to:

- help deliver more sustainable water outcomes more quickly;
- identify synergies and the possibility of more radical multiple-benefit solutions;
- deliver more efficient stakeholder engagement.

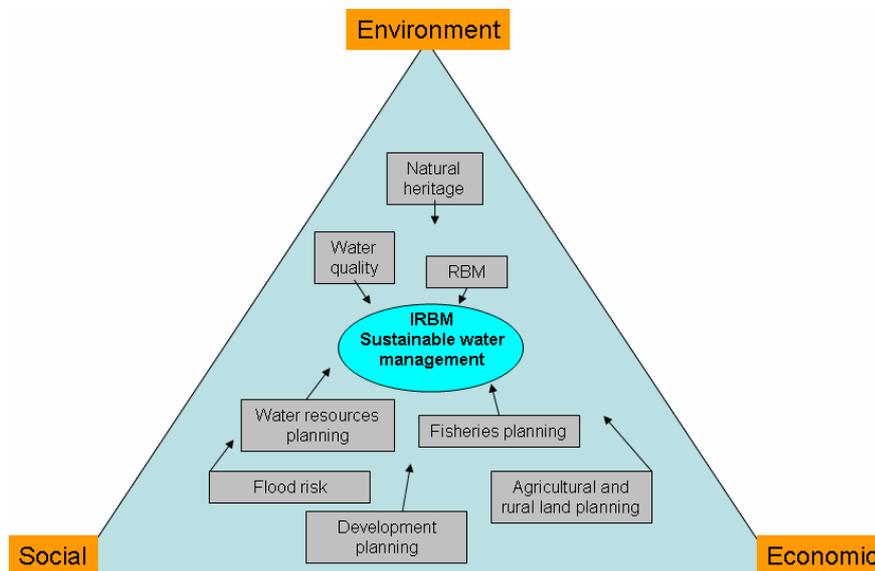
### Opportunities for alignment

There are considerable overlaps between the aims, objectives and processes of many existing activities to those of the Water Framework Directive<sup>6,7</sup>. This means there are significant opportunities for alignment. However there are issues which make this alignment complex such as differences in: responsible parties; spatial and temporal scale of planning and implementation; processes and tools; source funding restrictions and priorities. However significant progress can be made if parties are willing and clearly guided.

Alignment can be performed through better integration of policy (EU and UK), the consideration of the objectives and outcomes of different processes through planning and implementation activities and the embedding of process steps (e.g. option appraisal and justification of alternative objectives and standard methods in existing processes. It is important that this alignment is ongoing through close working between key stakeholders at different organisational levels from national to local.

Figure J1 illustrates some of the key processes, which have an impact on sustainable water management and where they might sit, in terms of emphasis, in the three key dimensions of sustainability: environmental, societal and economic.

Figure J1: **Some of the key processes which have an impact on sustainable water management.**



<sup>5</sup> Water for life and livelihoods. A framework for river basin planning in England & Wales. Environment Agency. Feb 2006

<sup>6</sup> A research study into the production of Registers of Strategic Management Plans and Stakeholders. Feb 2002. For the Environment Agency by Land Use Consultants (in association with Conlan Consulting)

<sup>7</sup> Consistent Economic Appraisal Approaches with Respect to the Water Framework Directive River Basin Management Plans. Collaborative Research Programme on Water Framework Directive economics Final report. Jan 2006. For the Welsh Assembly Government and Water Framework Directive Collaborative Research Programme by Jacobs in association with ADAS

Environment Agency River Basin Management Plan, Dee River Basin District

Annex J: Aligning key planning processes to river basin management  
December 2009

The Strategic Environmental Assessment reports which accompany the draft and this first River Basin Management Plan identifies some of the potential positive and negative impacts of other processes on the river basin management process and vice-versa.

## **J.2 Building, town & country planning and regeneration**

### **Introduction**

In England despite the current economic conditions, the National Housing and Planning Advice Unit feels that, housing affordability and unsatisfied housing need has not lessened the demand for new homes and associated infrastructure (roads, schools, waste management and utilities etc). Government still expects the number of new homes to rise significantly with three million additional homes proposed by 2020. This represents an increase of up to 40 percent over existing housing development rates and these are reflected in the latest rounds of Regional Spatial Strategies. Recent National Housing and Planning Advice Unit advice has suggested a possible need to consider even higher rates of housing delivery in England. This would be tested through revisions to Regional Spatial Strategies or the new Single Regional Strategies required under the Local Democracy, Economic Development and Construction Bill.

The impacts of all these new homes on the water environment and achieving Water Framework Directive objectives would be tested through the spatial planning system and its examination and appraisal processes as outlined below. For example, some of this development is in already water-stressed areas. The Government's Strategy for Water in England "Future Water"<sup>8</sup> identifies that water efficiency will be taken into account in planning and delivery of housing growth.

### **Main aims of the spatial planning system**

Under Section 39 of the Planning & Compulsory Purchase Act 2004, planning in England and Wales has the statutory purpose of contributing to the achievement of sustainable development as set out in the UK Sustainable Development Strategy<sup>9</sup> and the Welsh Assembly Government's Sustainable Development Scheme for Wales<sup>10</sup>. The planning and management of development must therefore protect and improve the environment, respect environmental limits and contribute to a healthy and just society.

The spatial planning system has a direct and legitimate role in addressing the potentially significant sustainability implications of growth and development, particularly those arising through increased house building rates. This includes the very real impact new development can have on the water environment.

Local Authorities in England and Wales, Regional Assemblies in England, the Greater London Authority, National Parks Authorities and the Broads Authority constitute Planning Authorities. They are required to develop spatial land use plans to guide development and land use activity within their areas.

At the level of the English Regions and Greater London this is through Regional Spatial Strategies and the London plan, respectively. These set policies in relation to development and land use, including the setting of specific house building targets for local authorities within their areas. Below these are local authority produced Local Development Frameworks. These identify locations for certain types of developments, including a 5 year

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<sup>8</sup> Future Water- The Government's Water Strategy for England. Defra. HM Government, Feb 2008.

<sup>9</sup> Securing the future- delivering the UK sustainable development strategy. Defra Mar 2005.

<sup>10</sup> <http://wales.gov.uk/topics/sustainabledevelopment/publications/onewalesoneplanet/?lang=en>

supply of housing sites to meet their housing targets and policies to control certain aspects of their form, location and, potentially, timing of development.

Together these represent the 'development plan' which provides the policy framework against which development must be assessed

These plans are subject to Sustainability Appraisal (incorporating Strategic Environmental Assessment) and will be tested through an Examination in Public.

Guiding the overall operation of this system is a range of planning policy guidance provided by Planning Policy Statements.

### **The new Infrastructure Planning Commission and National Policy Statements**

Major infrastructure projects such as ports, power stations and transport schemes will have significant potential impacts on the water environment. Currently these are dealt with through other planning regimes<sup>11</sup>.

The Planning Act 2008 creates a new system of development consent for certain types and scales of nationally significant infrastructure. Part 3 of the Act outlines the types and scales of development which will be covered by this new consent regime. This has established the formation of an Infrastructure Planning Commission who will examine and determine these proposals. To guide them a set of National Policy Statements covering these infrastructure types is currently being developed and, when in force, will set the framework for the Infrastructure Planning Commission's decisions.

### **Spatial Planning and the delivery of the Water Framework Directive**

The role of spatial planning is hugely important in improving the water environment, and as a minimum, the activities of all public bodies must not lead to a deterioration of the water environment. Regional and sub-regional and local plans and activities have a far-reaching influence on local business and communities.

The sustainable development duty which underpins spatial planning provides a real opportunity for the control of development to ensure we get the right type and quality of development, in the right place and at the right time. The spatial planning system can therefore be better aligned with Water Framework Directive to take Water Framework Directive objectives into account through national guidance and local processes. For example, it is essential that sustainable water management is incorporated into spatial plans and local guidance (such as Supplementary Planning Documents) and the control of applications for planning permission (such as Planning Conditions and section 106 Agreements). One way to ensure this happens is through their Strategic Environmental Assessment, for which the Environment Agency is one of the statutory consultees.

Public bodies should also identify opportunities for improvements and restoration work to maximise any contribution to meeting the Water Framework Directive objectives. Key areas of work are flood risk, land management and transport. Tools such as Water Cycle Studies (in England) at a project level can help identify and realise significant benefits for the water environment.

These spatial plans are also subject to Habitats Regulations Assessment which will assess their impact on and need to avoid and reduce impact to water-based Natura 2000 sites.

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<sup>11</sup> These regimes include the Transport & Works Act 1992, the Electricity Act 1989, the Highways Act 1980, the Gas Act 1965, the Harbours Act 1964, and the Pipelines Act 1962.

The table below identifies the main Water Framework Directive pressures affected by growth and development and how spatial planning can contribute to addressing these.

**Table J1- Main Water Framework Directive pressures affected by growth and development and how spatial planning responses can contribute to addressing these.**

<b>Water Framework Directive pressure</b>	<b>Contribution of growth and development to pressure</b>	<b>What spatial planning may be able to do address this</b>
Point Source pollution	<ul style="list-style-type: none"> <li>• increased loads for waste water (Biological Oxygen Demand, nutrients, chemicals) treatment of additional flows from new development.</li> </ul>	<ul style="list-style-type: none"> <li>• timing and phasing development to coincide with delivery of additional capacity to meet demands from urban growth and industry.</li> <li>• include policy in spatial planning documents (e.g. for sustainable drainage systems and place conditions on the grant of planning permission to control the rate of runoff from new development into combined sewer systems – reducing frequency of storm overflow discharges.</li> <li>• ensure that development is designed to integrate these principles from the outset.</li> <li>• use of water cycle strategies early in development planning</li> </ul>
Diffuse non-agricultural pollution	<ul style="list-style-type: none"> <li>• during construction (mobilisation of contaminants, sedimentation, pollution incidents etc).</li> <li>• afterwards through biological, chemical and other pollutants/sediments washing off from hard standing areas into watercourses.</li> <li>• risk of misconnections</li> </ul>	<ul style="list-style-type: none"> <li>• where land may be affected by contaminants, include policies in development plan documents which encourage sustainable remediation techniques which reduces/removes/render them harmless.</li> <li>• encourage good construction practices.</li> <li>• require sustainable drainage systems which improve the quality of runoff rather than just controlling its quantity/rate.</li> </ul>
Pressure on the quantity of water	<ul style="list-style-type: none"> <li>• abstraction and other artificial flow pressures arising from need to supply water to new developments.</li> <li>• developments leading to physical modification of water courses, affecting the quantity and dynamics of flow (the hydrological regime).</li> </ul>	<ul style="list-style-type: none"> <li>• slow the increasing demand for water, e.g. through water efficiency policies (the code for sustainable homes and BREEAM incl. water efficiency measures).</li> <li>• production and promotion of design guidance including retro-fitting.</li> <li>• timing and phasing development to coincide with delivery of enhancements to water storage, transfer systems and local supply networks.</li> <li>• use of water cycle strategies early in development planning.</li> </ul>
Other impacts on the status of water	<ul style="list-style-type: none"> <li>• pressure for physical modification of watercourses (morphology).</li> <li>• development in areas of flood risk (or development which increases flood risk elsewhere).</li> <li>• biological pressures - including fish stocking, biota removal, invasive non-native species.</li> <li>• increased pressure from</li> </ul>	<ul style="list-style-type: none"> <li>• spatial planning documents to include policies which protect natural water bodies from modification, and the improvement and naturalisation of heavily modified water bodies.</li> <li>• applying Policy Planning Statement (flood risk) by locating development sites outside of flood risk areas, controlling the rate and impact runoff downstream and mitigating the potential impacts of flood defences, drainage works and surface water management on water bodies.</li> <li>• seek the inclusion of green infrastructure policies within spatial planning documents. Green</li> </ul>

<b>Water Framework Directive pressure</b>	<b>Contribution of growth and development to pressure</b>	<b>What spatial planning may be able to do address this</b>
	Recreation (e.g. boating, fishing). <ul style="list-style-type: none"> <li>• loss and fragmentation of habitats and green space</li> <li>• soil sealing (extensions, drives patios)</li> </ul>	infrastructure can help deliver sustainable water management to help address existing issues and mitigate the effects of new development.

Each of the responses outlined above can be addressed sequentially at different stages of the planning process. For example, to address water resources it is necessary to analyse capacity and major infrastructure in a region (within Regional Spatial Strategies), consider local infrastructure and housing and other growth delivery trajectories in particular locations (Local Development Frameworks and Plans), and influence water efficiency in buildings through master-planning and the planning application process.

However, it should be noted that spatial planning does not generally influence the performance of existing development and the significant and ongoing impacts this will have on the water environment. There may be some exceptions where, to be sustainable, new development is subject to ‘neutrality’ policies which require efficiencies (i.e. water use) to be made within existing development. However initially the Environment Agency expect only a limited number of these situations. Other mechanisms will be required to manage this impact<sup>12</sup>. It is clear however that more needs to be done, with Local Authorities, in housing renovation programmes. Work is ongoing to develop and ensure the implementation of appropriate actions to address this.

### **Aligning spatial planning and river basin management planning**

As a statutory consultee, the Environment Agency already has much involvement in the spatial planning system through its existing work. Whilst the Spatial Planning system provides structures and mechanisms for delivering some of the outcomes of the Water Framework Directive, further work is already underway to better align these so they support the delivery of Water Framework Directive objectives.

To properly align river basin management and spatial planning to achieve the objectives of each regime we will all have to apply new standards, and over a period of time, review external guidance and policy and Environment Agency advice to spatial planners so that development plans and planning applications become Water Framework Directive compliant.

There are three main areas in which Spatial and river basin management can be better aligned. These are set out below:

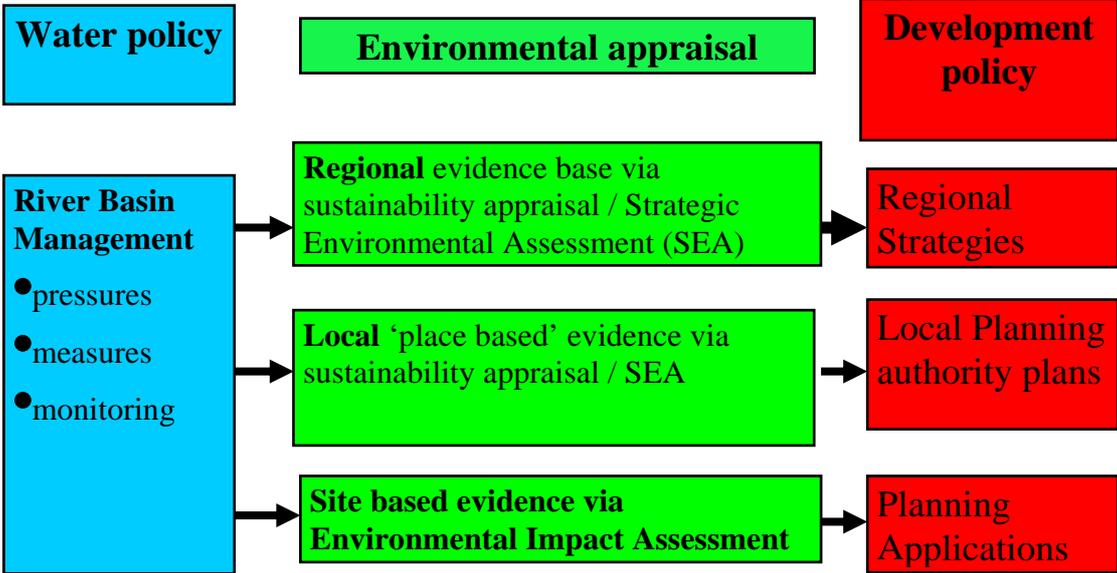
- **Providing the evidence support to the spatial planning system through river basin management**

River basin management under the Water Framework Directive and the River Basin Management Plans provide key information on the pressures on the water environment. As such the river basin management process can provide a robust evidence base to help the key planning stages of spatial plan options development and site allocations. It will also provide confidence in the deliverability and soundness of plans and be an invaluable input into any public examinations, including technical seminars and evidence sessions. A key

<sup>12</sup> See “Future Water: The Governments water strategy for England. HM Government. Feb 2008  
**Environment Agency** River Basin Management Plan, Dee River Basin District  
 Annex J: Aligning key planning processes to river basin management  
 December 2009

way align the spatial and water planning systems is to ensure the analysis done for river basin management (and the River Basin Management Plans) feeds into the evidence and appraisal process required for all plans and the consideration of individual planning applications (see below).

Figure J2 – Proposed interaction of river basin management with the planning system



• **Providing Planning Guidance**

Further work by Government (supported by the Environment Agency) is already underway to clarify the implications for spatial planning and delivery of planned development. In England, primarily, this will occur through the production of a Water and Planning guide by Communities and Local Government – aimed for publication in late 2009 or early 2010. This guidance will set out government policy on water relevant to spatial planning and specifically what considerations local authorities and others involved in planning should take. It will also detail steps local authorities should or could take to reflect these considerations in local spatial plans.

Additionally, through the public consultation on National Policy Statements (and their accompanying Appraisals of sustainability) the impacts of these significant infrastructure projects on Water Framework Directive objectives will have to be embedded into this policy framework which will guide the Infrastructure Planning Commission’s decisions.

• **Providing spatial planning advice as statutory consultee**

There is also a need to ensure Water Framework Directive objectives are better aligned with existing Environment Agency processes for engaging with spatial planning and the advice we provide to planning authorities. To these ends the Environment Agency intends to:

- Better co-ordinate its internal spatial planning policy work with other internal policy teams such as sustainable communities and river basin management teams;
- Influence Government Departments and national bodies to issue Water Framework Directive guidance and training for the planning profession;

- Review internal Environment Agency processes for dealing with Regional Spatial Strategies, Local Development Frameworks/Plans and planning applications and ensure that they meet Water Framework Directive requirements;
- Review and improve our internal guidance to our teams to influence the spatial planning system to take account of Water Framework Directive objectives in spatial planning documents and policies;
- Review and issue work instructions for our staff on how to take Water Framework Directive objectives into account when responding to planning consultations;
- Make Water Framework Directive information available to planning authorities in a useful format (e.g. Environment Agency “Environmental Information for Decision Makers project”).

## **Timescales**

Overall timescales align, however the timescales for the production and review of regional spatial strategies and local development frameworks and the production and publication of the first River Basin Management Plans do not.

There is much variation on the production and adoption of spatial planning documents across England and Wales. Many spatial planning documents will have reached the submission stage before the first River Basin Management Plan has been published. This means that the emerging first River Basin Management Plans will have less weight in planning terms and may not have fully influenced the spatial planning documents. However, as adopted spatial plans are reviewed and the first River Basin Management Plan is published in December 2009, the spatial planning system will have to consider how to “have regard to River Basin Management Plans” and how much weight is given to this in the decision making process.

## **J.3 Rural planning and agriculture**

### **Introduction**

Because of the long-term risk of agricultural activities to the water environment, water supplies and to the quality of groundwater, it has recently been the focus of new policy development and programmes.

### **The current planning process for rural areas in England and Wales**

The Town and Country Planning system (See Spatial Planning above) provides the most significant controls over land use planning in rural areas. However agricultural land managers still retain many permitted development rights for built development and are able to use land for different types of agriculture, or manage it in different ways which change environmental impacts. The current planning system for development does not address agricultural impacts on water.

### **Public incentive and subsidy led programmes**

There are a variety of programmes, which provide substantial incentives and subsidies for land managers for a range of purposes, which can create a very strong motivation for changing land management or land use.

Programmes with a clear relevance to the river basin management process include:

- The Single Farm Payment of the Common Agricultural Policy and the design and implementation of the associated cross-compliance conditions;

- The Rural Development Programme for England;
- The EU Structural Fund programmes.

Regional Government offices, Regional Development Agencies, Natural England and the Forestry Commission are in charge of a large proportion of the planning and implementation of areas of work regarding rural development.

Single Farm Payments and the Rural Development Programme for England operate on different funding cycles to the Water Framework Directive, making coordinated planning more difficult. Water Framework Directive objectives are included in agri-environment schemes, but it is a relatively recent driver for investment. The England Catchment Sensitive Farming Delivery Initiative, currently funded by Defra separately from the Rural Development Programme for England, aims to address biodiversity and water quality issues related to diffuse water pollution from agriculture and will also help to meet Water Framework Directive objectives. The Government's Land Use Foresight Project will look at how to address the impacts of water and land on each other in the longer term.

### **Coordination of the rural planning system**

Planning for rural areas is co-ordinated largely through Regional Spatial and Economic strategies which include both urban and rural issues. Delivery bodies in the Regions tend to plan individually. In order to deliver successfully in rural areas, river basin management will need good co-operation between delivery bodies.

Rural planning processes that can potentially be aligned to the river basin management process, at a *policy and planning* level, are:

- Future diffuse pollution reviews, scientific evidence and related strategies and policy development that will derive from them;
- Future development of agriculture-specific and forestry-specific regulations addressing issues of significant risk;
- EU Common Agricultural Policy health check challenge agenda and periodic reviews of cross-compliance regulatory requirements;
- Future development of cross-compliance standards under the reformed Common Agricultural Policy;
- Future review of Rural Development Programmes particularly further development of Land Management Schemes and Catchment Sensitive Farming initiatives;
- Future reviews of National and regional strategies for trees, woodland and forestry focusing on the use of broadleaf woodland to reduce pollution risk.

There are also numerous, more specific, strategies which will offer an opportunity for future alignment with the river basin management process to reflect water planning objectives.

Strategy developers should be encouraged to accept the link between activities on land and their effect on water quality and the water environment. They should increase their emphasis on protection and improvement of soil and water quality and resources, make specific reference to the need of promoting better water quality outcomes and to the roles of agriculture and forestry in meeting Water Framework Directive objectives. Where possible, they should seek development of integrated strategies covering both agricultural and forestry management for each country, and provide a consistent message to land managers.

## **Anglian River Basin District activity on alignment of rural planning and agriculture for Water Framework Directive**

Here we identify some specific examples of alignment of rural planning and agriculture that have occurred in the Anglian River Basin District.

The Common Ground initiative has been developed to improve communication routes with the agricultural advisers and businesses working with and advising farmers in the Anglian River Basin District. The aim of the initiative is to promote best practice so that the advisers recognise the importance of resource protection and climate change adaptation to farm business sustainability. Common Ground workshops will run on an annual basis within the river basin district.

### **J.4 Forestry management**

Both commercial and recreational forestry activities deliver significant economic and social benefits, but they can also impact on the environment.

Forest management and planning falls outside the boundaries of development planning regulation and the Environment Agency is not a statutory consultee on forestry issues. A key element for successful implementation of the Water Framework Directive will therefore be the establishment of appropriate links between the river basin management and the forest planning and regulation systems in England and Wales. The Environment Agency is currently able to comment on a non-statutory basis on license applications submitted to the Forestry Commission. The Environment Agency also serves on steering groups involved with the Regional Forestry Frameworks and can exert influence via this route too.

#### **Operational issues**

The Forestry Commission produced (in conjunction with a working group) the 'Forests and Water Guidelines'. These guidelines provide the basis for sustainable management of the water environment by forest planners and managers. The fourth edition of these guidelines is currently being revised, and will take into account the Water Framework Directive. In order to ensure the sustainable management of the water environment by forest planners and managers it is important to bring about the widespread adoption of the "Forests and Water Guidelines", both in terms of management practices and in the planning of new forests.

Going forward we will all have to build on our assessments of the extent and types of pressures affecting the aquatic environment in forested catchments. Parties will need to work in partnership to implement river basin management in relation to both planning and management and influence forestry management practices with appropriate agreed management actions.

### **J.5 Flood and coastal erosion risk management**

#### **EU Floods Directive**

Implementation of the EU Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) will be closely co-ordinated with the Water Framework Directive. The assessment and management units (e.g. river basin districts) and the planning cycles for the two directives will be closely aligned. The EU Common Implementation Strategy for the Water Framework Directive also supports the implementation of the Floods Directive, through Working group F on Floods. This group

is co-ordinating implementation as a core activity in its work-programme. As well as administrative co-ordination, the Floods Directive requires that the environmental objectives of the Water Framework Directive are taken into account in flood and coastal erosion risk planning.

### **Flood and Coastal Erosion Risk Management Strategies**

The Government, through the draft strategy for Flood and Coastal Erosion Risk Management (FCRM), 'Making Space for Water'<sup>13</sup>, has expressed the intention to move towards a more holistic approach to FCRM that takes into account all sources of flooding.

Their stated aim is to manage risks by employing an integrated portfolio of approaches which reflect both national and local priorities, so as to:

- reduce the threat to people and their property; and
- deliver the greatest environmental, social and economic benefit, consistent with the Governments' sustainable development principles.

This shift in emphasis fits in with the concept of integrated river basin management that the Water Framework Directive seeks to establish. However there are other FCRM initiatives that are already moving the sector towards this way of working and that will help to deliver Water Framework Directive objectives and measures.

### **Flood and Coastal Erosion Risk Management Outcome Measures**

From 1<sup>st</sup> April 2008 "Outcome Measures" became the new performance framework to measure the overall benefits of FCRM investment in England. The outcome measures have been developed as part of the "Making Space for Water" programme, to provide greater clarity on what policies and funding for flood and coastal erosion risk management are intended to achieve. As well as providing criteria for the prioritisation of projects, the outcome measures have also been used to set targets for FCRM over the current spending review period.

Through the delivery of outcome measures 4 and 5 (table J2), FCRM activities already contribute to delivering more sustainable water outcomes for river basin management.

Table J2 "Making Space for Water" outcome measures 4 & 5

<b>Outcome Measure</b>	<b>Description</b>
Outcome measure 4. Nationally important wildlife sites	This measure will record, through liaison with Natural England and Countryside Council for Wales, the delivery of flood, water level and coastal management remedies which contribute to the government target to have 95 per cent of Sites of Special Scientific Interest in favourable condition by 2010.
Outcome measure 5. UK Biodiversity Action Plan habitats	This measure will record the overall increase in Biodiversity Action Plan habitat achieved through flood and coastal erosion risk management activities by March 2011. This is to contribute towards delivery of the Environment Agency Wetland Policy to 'conserve, enhance and re-create the wetland capacity of catchments as part of our contribution to rebuilding biodiversity on a landscape scale'.

<sup>13</sup> First Government response to the autumn 2004 Making space for water consultation exercise, March 2005  
**Environment Agency** River Basin Management Plan, Dee River Basin District  
 Annex J: Aligning key planning processes to river basin management  
 December 2009

## **Pitt Review**

The Pitt Review provided recommendations following flooding which struck much of the country in England and Wales in June and July 2007. The floods were extreme, affecting hundreds of thousands of people and was the most serious inland flood since 1947.

The Review contains 92 recommendations that are addressed to the Government, Environment Agency, local authorities, Local Resilience Forums, providers of essential services, insurers and others, including the general public<sup>14</sup>.

The Government supports all of the recommendations in the Review. Recommendations that could affect the delivery of River Basin Management Plans are mostly concerned with improvements to the spatial planning system, or high level flood risk management planning processes that could lead to diffuse pollution from urban sources and working better with natural processes whilst delivering flood risk management. The Environment Agency has already acted on many of these recommendations.

## **Surface Water Management Plans**

The Pitt Review (recommendation 18) concluded that surface water management plans should provide the basis for managing local flood risk. A Surface Water Management Plan is a framework through which key local partners with responsibility for surface water and drainage work together to understand the causes of surface water flooding and agree the most cost effective way of managing that risk.

The Surface Water Management Plan can also provide a framework for the management of urban water quality (e.g. the control of discharges from combined sewer overflows, surface water drainage outfalls, sustainable drainage systems and the urban surface generally). Solutions which can address both flood and pollution risk have dual benefits, and can contribute to fulfilling improvements and compliance in ecology, water quality and habitats required under the Water Framework Directive.

## **Integration of Water Framework Directive objectives through environmental assessment**

FCRM plans and projects will try to deliver river basin management objectives and measures in parallel where an opportunity exists to do this. Environmental assessment and compliance under the Environmental Impact Assessment and Strategic Environmental Assessment Directives entails that FCRM projects already take account of the Water Framework Directive, and this requirement is supported by Guidance on the Appraisal of Flood and Coastal Erosion Risk Management<sup>15</sup>.

A number of research and development projects are being conducted to support this work including: Defra's FD2609 research project 'Water Framework Directive and Expert Assessment' will set out appropriate ways of assessing the ecological impact of a FCRM scheme; The 'Mitigation Measures Manual for Flood and Coastal Erosion Risk Management and Land Drainage' will provide an online toolkit for project managers to design appropriate hydromorphological mitigation measures into FCRM schemes; and the Environment Agency project 'Mitigation Measure Trials' will put in place a programme of trialling and monitoring of a number of mitigation measures (e.g. Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution; Increase in-channel morphological diversity etc).

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<sup>14</sup> 'Learning lessons from the 2007 floods', Sir Michael Pitt, June 2008

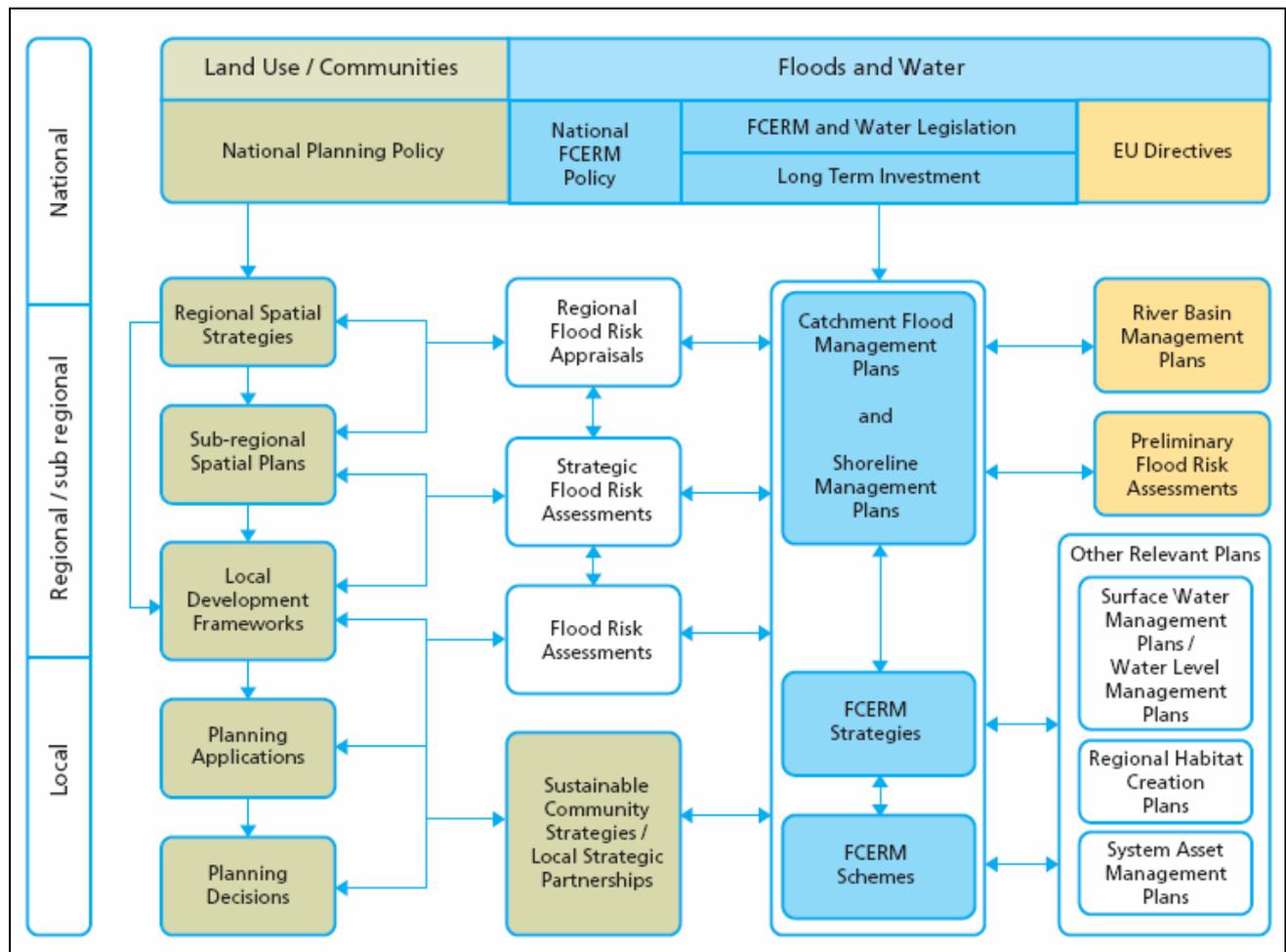
<sup>15</sup> Appraisal of flood and coastal erosion risk management - A Defra policy statement, June 2009

**Environment Agency** River Basin Management Plan, Dee River Basin District  
Annex J: Aligning key planning processes to river basin management  
December 2009

## Taking river basin management into account in high-level Flood and Coastal Erosion Risk Management planning

River basin management will be taken into account in all levels of FCRM planning (see figure J3- for England).

Figure J3- The flood and coastal erosion risk management planning framework for England



**Shoreline Management Plans:** The second generation of Shoreline Management Plans are currently being developed. Guidance has been published that enables these plans to take Water Framework Directive objectives into account<sup>16</sup>. The guidance also requires a high level assessment of the ecological impact of each Shoreline Management Plan policy, to ensure that any conflict with the objectives of the Water Framework Directive are flagged up as early as possible in the coastal FCRM planning process.

**Catchment Flood Management Plans (CFMPs):** Policies and their supporting actions that have been set out in the recently published CFMPs will move FCRM towards a catchment-based approach that will help to deliver sustainable water objectives. However these actions are not yet funded and will be subject to further planning so cannot be included as measures within the River Basin Management Plans.

<sup>16</sup> Assessing shoreline management plans against the requirements of the Water Framework Directive, April 2009

The Environment Agency has carried out an exercise to determine where CFMPs policies may present opportunities and constraints in each River Basin Management Plan. The generic CFMP policies and their possible ramifications for river basin management are listed below in table J3. A river basin district specific analysis of the distribution of these policies is found in table J4.

**Table J3 – Catchment Flood Management Plan policies**

<b>Policy</b>	<b>Description of policy</b>	<b>Interaction with River Basin Management Plans</b>
1	Areas of little or no flood risk where the Environment Agency will continue to monitor and advise	This policy unit is unlikely to be currently managed for flood risk so no change.
2	Areas of low to moderate flood risk where the Environment Agency can generally reduce existing flood risk management actions	Opportunities to remove or allow the natural decay of existing physical modifications. Maintenance may be reduced, so pressures stemming from biota removal and other maintenance activities could be addressed. Diffuse and point source pollution may increase with the effects of climate change (such as increased storminess), as will sedimentation.
3	Areas of low to moderate flood risk where the Environment Agency are generally managing existing flood risk effectively	May require the same level of physical modification to be sustained. The frequency of instances of point source pollution are likely to remain similar, but there may be more diffuse pollution and sedimentation in line with increased storminess from climate change leading to more run-off from agricultural and urban infrastructure.
4	Areas of low, moderate or high flood risk where the Environment Agency are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change	Level of physical modification may have to increase to cope with increased risk from climate change. However, more holistic solutions may be found to compliment existing structures and minimise increases in run-off, possibly providing opportunities for diffuse pollution and sedimentation reduction. Biota removal and other maintenance activities might also be increased or decreased.
5	Areas of moderate to high flood risk where the Environment Agency can generally take further action to reduce flood risk	Probable increase rather than reduction in the level of physical modification, but the area is likely to already be designated as 'heavily modified'. Biota removal and other maintenance activities may increase. Complimentary Flood and Coastal Erosion Risk Management solutions may be promoted that improve the way land is managed, or utilise natural flood storage on tributaries that contain less risk. This could offer opportunities for the reduction of pressure on water bodies from diffuse pollution and sedimentation.
6	Areas of low to moderate flood risk where the Environment Agency will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits	Opportunities to reduce pressure from diffuse pollution and sedimentation. Levels of physical modification may increase or decrease in these policy units as flood storage may be natural floodplain storage or artificially created flood storage. Maintenance activities such as biota removal could also increase or decrease depending on the type of flood storage required.

## Anglian River Basin District activity on alignment of flood risk and coastal erosion risk management for Water Framework Directive

Here we identify some specific examples of flood risk and coastal erosion risk management that have occurred in the Anglian River Basin District.

### Catchment Flood Management Plans

The Environment Agency recently developed Catchment Flood Management Plans (CFMPs) set out the long term direction of flood risk management for individual catchments. They set holistic policies for managing flood risk for the next 50-100 years, taking into account changes such as climate change, urbanisation and land management.

Each of the six generic policies found in CFMPs offer different opportunities and constraints for delivery of the Water Framework Directive. The generic CFMP policies and their possible ramifications for river basin management are listed above in table J3.

The Environment Agency have analysed the distribution of CFMP policies in each catchment of the Anglian River Basin District to see where these opportunities and constraints are, the results are found below in table J4. The figure represents the proportion of water bodies in each catchment of the river basin district that could be affected\* by each generic CFMP policy. Please note that these are Water Framework Directive management catchments rather than CFMP catchments.

\*those where 20 per cent or more of the water body is located within a CFMP policy type.

Table J4 – Distribution of Catchment Flood Management Plan policies in Anglian River Basin District

Anglian River Basin District - Catchment Name	Number of water bodies	Policy 1	Policy 2	Policy 3	Policy 4	Policy 5	Policy 6
Broadland Rivers	93	0%	72%	26%	3%	1%	8%
Cam and Ely Ouse (including South Level)	83	CFMP policies are not finalised					
Combined Essex	125	0%	63%	38%	8%	7%	2%
East Suffolk	65	0%	97%	6%	0%	5%	0%
Nene	69	0%	77%	6%	23%	3%	25%
North Norfolk	6	0%	100%	0%	0%	0%	0%
North West Norfolk	19	CFMP policies are not finalised					
Old Bedford including the Middle Level	12	CFMP policies are not finalised					
Upper and Bedford Ouse	94	CFMP policies are not finalised					
Welland	46	0%	59%	7%	43%	0%	0%
Witham	125	1%	32%	8%	62%	3%	10%
<b>Anglian River Basin District</b>	<b>737</b>	CFMP policies are not finalised					

## National Indicators

In meeting one of the overall aims of Water Framework Directive; reducing the effects of floods, we are working with flood and coastal erosion risk management staff to tie into the delivery of Local Government National Indicator 189 Flood and Coastal Erosion Risk Management.

This performance measure identifies the need for local authorities to deliver actions within CFMPs relevant to them. Local Authorities also have a duty to have regard to the River Basin Management Plans. Local Authorities are identified as one of the key external partners that can help us deliver actions within the River Basin Management Plans. By identifying relevant actions within the CFMPs and prioritising Local Authorities according to our artificial and heavily modified water bodies the Environment Agency will be able to be more proactive in our engagement and delivery of environmental improvements.

## J.6 Marine

The Marine and Coastal Access Bill introduces a new strategic planning framework for the marine environment across England and Wales. Marine plans will be underpinned by a UK-wide Marine Policy Statement that will provide a consistent policy steer for decision makers and a mechanism to achieve the Governments' High Level Marine Objectives for achieving sustainable development in the marine area. They will help deliver the Government's vision of 'clean, safe, healthy, productive and biologically diverse oceans and seas by guiding licensing decisions for activities in the marine area. Achievement of good status required by the Water Framework Directive, along with Good Environmental Status for Marine Strategy Framework Directive are two stated measures of success for achieving this vision.

Work to develop the Marine Policy Statement and marine planning guidance is underway. The Marine Policy Statement will be published within two years of Royal Assent and marine plans will follow on a phased basis (to be determined). Marine plans will set out in detail how the Marine Policy Statement will apply in specific parts of UK waters, and guide licensing decisions for activities in the marine area (marine plans will apply up to Mean High water spring). The new Marine Management Organisation will be responsible for producing marine plans and issuing licences in English inshore and English offshore areas.

### Links to other plans and policies

The Marine Policy Statement will be consistent with the new National Policy Statements for nationally significant infrastructure projects that the Infrastructure Planning Commission will licence.

There will be overlaps at the coast between marine plans and other planning regimes, including terrestrial plans, Shoreline Management Plans and River Basin Management Plans. In 2008 Defra published "A strategy for promoting an integrated approach to the management of coastal areas in England" that recognises progress made to date with joining up management at the coast and sets the direction for future work.

Development of marine plans will involve producing a Statement of Public Participation and a large amount of consultation. Marine plans covering transitional and coastal waters will play an important role in supporting achievement of River Basin Management Plans through setting out what activities may or may not be permitted in particular areas. It will be important to ensure that the aims of River Basin Management Plans and Shoreline Management Plans

are complemented by marine plans, particularly as the cycles for each planning regime are not aligned.

The Environment Agency are working closely with Defra, Welsh Assembly Government and others to ensure that development of the Marine Policy Statement and marine planning guidance is consistent with, and supports delivery of River Basin Management Plan measures to achieve good water status. The Environment Agency have also undertaken partnership projects with Natural England, the Countryside Council for Wales and the National Trust to investigate what marine planning at the coast and across administrative borders will mean for all of our organisations. As marine plans are developed and implemented we will work closely with the Marine Management Organisation, Welsh Assembly Government and other coastal interests to ensure there is compatibility with River Basin Management Plans and Shoreline Management Plans.

## J.7 Other processes

Other key national planning and management processes that are currently and/or need to be further aligned, which are not discussed further here, include:

- Water quality;
- Water resources;
- Natural heritage (conservation and biodiversity);
- Fisheries;
- Navigation and recreation;
- Transport planning and management;
- Energy;
- Industry (e.g. Integrated Pollution Prevention and Control (IPPC)).

Addendum 1 (to this annex) identifies some of the specific policies, processes and plans for the processes identified in J.2-J.7.

## J.8 Local processes

There are numerous specific initiatives which have a significant effect on the water environment which are not guided or constrained by national policies, frameworks or a strategic governing body. Some of these were identified in the “River Basin Planning: Working together” consultation documents published in 2007. These cannot be directly aligned through national policies in the first instance. Rather, they need to be influenced locally to ensure they align (if they are not aligned already) to help deliver sustainable water outcomes. This could include the initiatives of regional development authorities, local environment groups, local waterways groups, farming groups, broad and fenland management groups and land owners.

## J.9 Summary

Alignment of policies, planning processes and initiatives related to water management was a key driver for the development of the Water Framework Directive. This was seen as essential to the effective and efficient delivery of sustainable water management.

Some processes are already reasonably well aligned in terms of intent (e.g. water quality). Others have made significant progress in terms of taking on board the need to protect the water environment as a valuable asset (flood risk and coastal erosion risk management). Others have made steps in the right direction (development planning and rural land

management in Wales) while others need to change quite significantly (e.g. rural land management in England). A significant effort is required by all involved and interested parties in ongoing river basin management to review and if possible amend existing policies, plans and measures. In many cases this will require influencing European developments and amending them where necessary, to meet Water Framework Directive objectives. This includes those for which the Environment Agency is responsible, and some which are the responsibility of other organisations.

Ministerial guidance to the Environment Agency<sup>17</sup> has made it clear that a large part of river basin management should involve reviewing and aligning the wide range of existing policies, plans and measures to meet Water Framework Directive objectives. The Environment Agency will drive this agenda forward both internally and externally. We have already reviewed a large number of internal and external processes to look at commonality in objectives and processes. We will be working with key stakeholders to propose and guide this alignment where we can at European, England and Wales and local levels through policy development to implementation “on the ground”.

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<sup>17</sup> River Basin Planning Guidance. Department for Environment, Food and Rural Affairs & Welsh Assembly Government. 2006  
Environment Agency River Basin Management Plan, Dee River Basin District  
Annex J: Aligning key planning processes to river basin management  
December 2009

## Addendum J1: Specific policies, processes, plans which may require alignment to river basin management.

Adapted from “Consistent Economic Appraisal Approaches with Respect to the Water Framework Directive River Basin Management Plans. Collaborative Research Programme on Water Framework Directive economics final report. Jan 2006. For the Welsh Assembly Government and Water Framework Directive Collaborative Research Programme by Jacobs in association with ADAS”

Sector	Policy, programme, process or plan	Main aim (of relevance to river basin management)	Lead England and Wales organisation	Key partner organisations
Agriculture	Common Agricultural Policy	Framework for financial support of agriculture: food and fuel production; agricultural economy; rural development	Defra / Welsh Assembly Government	Rural Payments Agency (RPA), Natural England, Rural Inspectorate Wales, Environment Agency, Farming Unions
	Cross Compliance – Good Agricultural and environmental Conditions, Perm Pasture, Soil Protection Review and Statutory Management Requirements	Avoidance of pollution, soil erosion, environmental damage	Defra / Welsh Assembly Government	Rural Payments Agency, Rural Inspectorate Wales, Natural England, Countryside Council for Wales, Environment Agency
	England Catchment Sensitive Farming Delivery Initiative	Reduce diffuse water pollution	Defra	Environment Agency, Natural England
	Environment Agency Wales catchment coordinators initiative	Provide and co-ordinate advice to land managers that will allow them to improve environmental performance. Integrating diffuse pollution mitigation with habitat creation, flood risk management and fisheries issues	Environment Agency	Farming Unions, land managers
	The EU Structural Fund programmes Objectives 1 and 2	Major EU funding mechanism for supporting social and economic restructuring across the EU.	Defra / Welsh Assembly Government	Government Offices, Regional Development Agencies
	Nitrate Vulnerable Zones and Nitrate Action Programme	To reduce nitrate pollution from agriculture	Defra / Welsh Assembly Government	Environment Agency
	Rural Development Programme / Plan	Framework for operation of integrated schemes to protect and improve rural environmental, social and economic development	Defra / Welsh Assembly Government	Natural England, Countryside Council for Wales, Farming Unions and Regional Development Agencies

Agriculture	Wales Environment Strategy	To reduce pollution, including diffuse pollution from soil erosion	Welsh Assembly Government	Environment Agency, Countryside Council for Wales, Forestry Commission Wales
	Soil Strategy for England	To reduce pollution, including diffuse pollution through soil erosion	Defra	Environment Agency, Natural England
	Agri-environment schemes England	Protect and enhance biodiversity, protect and enhance natural resources, protect historic environment	Defra	Natural England, Farming Unions, Royal Society for Protection of Birds, Environmental NGOs
	Agri- environment schemes Wales. Tir Gofal Tir Cynnal Organic Farming / organic entry level Tir Mynydd  The above schemes will all cease in 2012 to be replaced by the new Glastir land management scheme (for all new entrants).	Protect and enhance biodiversity, protect and enhance natural resources, protect historic environment  The new Glastir land management scheme will also deliver on the EU CAP Health Check Challenge Agenda for soil carbon and improved water quality and quantity management	Welsh Assembly Government	Environment Agency, Countryside Council for Wales, Farming Unions, Royal Society for Protection of Birds, Environmental NGOs  Organic Centre Wales
	Energy Crops Scheme (Short Rotation Coppice)	Reduce greenhouse gas emissions	Defra / Welsh Assembly Government	
	Organic Farming Scheme	Increase area of organic farming	Defra	Organic certification bodies,
	Environmentally Sensitive Areas Scheme (ESAS)	Landscape preservation	Defra / Welsh Assembly Government	
	Woodland Grant Scheme (WGS) / English Woodland Grant Scheme (EWGS)	Encourage establishment of areas of woodland on farms which can be positioned to reduce diffuse pollution	Forestry Commission	Natural England, Countryside Council for Wales, Environment Agency
	Farm Woodland Premium Scheme (FWPS)	N/A	Defra	Forestry Commission
	Integrated Regulation of Agriculture (IRAP).	Targeted effort and inspections to areas and activities that pose the greatest environmental risk.	Environment Agency	
	Sustainable Farming and Food Strategy	Published in December 2002, sets out how industry, Government and consumers can work together to secure a sustainable future for our farming and food industries, as viable industries contributing to a better environment and healthy and prosperous communities	Defra	

Agriculture	Farming Food and Countryside-Building a Secure Future Strategy/ Farming for the Future	Welsh Assembly Government's strategy aimed at helping secure a viable future for farming in Wales - sustainable economically, environmentally and socially	Welsh Assembly Government	Farming Unions, Environment Agency, Countryside Council for Wales, Royal Society for Protection of Birds
	The Defra Whole Farm Approach project	One of several initiatives that see a long term integration in delivering Defra's Sustainable Farming and Food Strategy. Developed as an electronic only system, it uses a questionnaire system intended to make form filling easier and provides convenient links to best practice advice and guidance.	Defra	Farming industry, the wider Defra network (including Environment Agency, Rural Payments Agency) and other regulators including Food Standards Agency and the Health and Safety Executive.
Water resources and quality	Future water	Defra water strategy for England	Defra	
	Periodic Review Process (PRP)	Process to agree set of management and investment plans plus associated water tariffs over a 5 year period.	Ofwat (the Water Services Regulatory Authority)	Environment Agency, Water Companies
	Asset Management Plans (AMP) (incl. Drainage Area Plans) and Water Cycle Strategies (WCS)	Forms part of the Periodic Review Process and this looks at quality improvements required and the most cost effective way of achieving these. They also identify additional price rises required to deliver the plans recommendations. Water Cycle Strategies provide plan, programme and costs of Water Services Infrastructure implementation for major developments.	Water Companies	Ofwat (the Water Services Regulatory Authority), Environment Agency, English Nature, Countryside Council for Wales, Defra, Drinking Water Inspectorate, Welsh Assembly Government
	Water Company water resource management plans	Plan which specifically outlines the balance between water supply and demand in a socially/ environmentally acceptable way (including efficiency of use). Used to inform the periodic review of prices	Water companies	Defra and Welsh Assembly Government (receive plans). Environment Agency -review of social and environmental aspects; Ofwat (the Water Services Regulatory Authority)-economic issues
	Water Resources Strategies	A broad strategy for a region for 15-20 years covering water resources In Wales, the current strategy is to 2050 and beyond.	Environment Agency	Stakeholders
	Restoring Sustainable Abstraction (RSA) Programme (Environment Agency) incl. Low flow alleviation plans/ programmes and Abstraction licence review/consenting process	Catalogues wetlands and rivers that may be at risk from abstraction (as identified by Catchment Abstraction Management Strategies). Programme of investigations, appraisal of options and implementation of solutions where abstraction identified as an impact.	Environment Agency	Abstraction licence holders

<b>Water resources and quality</b>	Water Company and Environment Agency Drought Contingency Plans	Operational management tool to look at water shortage scenarios	Water companies, Environment Agency	Defra/Welsh Assembly Government (receive plans) Environment Agency -review drought plans
	Catchment Abstraction Management Strategies (CAMS)	Identifies discrete licences that may be impacting upon the environment to guide management of abstraction licences.	Environment Agency	Abstraction Licence Holders e.g. Water Companies, CBI, National Farmers Union etc Local Authorities, Environmental Groups
	Groundwater protection policy (Groundwater regulations)	Risk based policy. Water Framework Directive has three elements related to Groundwater: classification of status; identification of pollution trends in Groundwater; prevention of input of pollutants to GW. The details of these elements are expected to be in the Groundwater Directive.	Environment Agency	Environmental Groups, and Industries
	Eutrophication Control Action Plan	Local plans - pilot exercise assessing eutrophication and identifying measures to tackle problems	Environment Agency	Local Key Stakeholder
	Chemical strategy pollution reduction plans	Tackle issue at a substance level and are not location based. Water, air, land - all mediums considered.	Environment Agency	Defra own Existing Substances Regulations
	Endocrine disrupting substances in the Environment strategy	A consultation exercise urging companies to take precautionary measures to protect the environment from endocrine disrupting chemicals.	Environment Agency	
<b>Flood Risk Management</b>	Shoreline Management Plans	Shoreline Management Plans set out strategic guidance designed to assist coastal defence decision making for a defined length of coast over the next 50 years	Environment Agency	Defra and Welsh Assembly Government
	Catchment Flood Management Plans	Plan to identify future measures needed to ensure management of flood risk within river catchments	Environment Agency	Defra and Welsh Assembly Government
	Flood and Coastal Erosion Risk Management Appraisal Guidance – Practitioner’s Guide	This will provides the framework for decision making in Flood and Coastal Erosion Risk Management strategies and schemes.	Environment Agency	Defra, other Flood and Coastal Erosion Risk Management operating authorities
	System Asset Management Plans (SAMPs)	A management plan to address assets and maintenance of assets.	Environment Agency	
	Coastal Habitat Management Plans (CHaMP)	CHaMPs relate to shoreline management of flood defences in relation to the Habitats and Birds Directives in a limited number of locations (pilot sites) on the east and south coast (7 locations). Coastal Squeeze element of Shoreline Management Plans.	Defra/ Welsh Assembly Government	Defra and Welsh Assembly Government

<b>Flood Risk Management</b>	Drainage Area Planning (surface water)	Carried out by Internal Drainage Boards (IDBs)	Internal Drainage Boards	Overseen by Defra
	Water level management plans	Plan for wetland SSSIs to balance water needs of conservation, flood defence and other needs (e.g. recreation/agric/industry). Requirements of other organisations or other parts of Environment Agency. Conservation is the main objective and give operational requirements to other parties	Environment Agency/Internal Drainage Boards	
	Surface water management plans	Framework through which key local partners with responsibility for surface water and drainage in their area work together.	Local authorities	Environment Agency
	Regional habitat creation programmes	A strategic approach to habitat re-creation for projects and as compensation for coastal squeeze caused by sea-level rise. Co-ordinates achievement of Defra Outcome Measures 4 and 5 and corporate Biodiversity targets.	Environment Agency	Land owners
	Managed realignment plans	Habitat creation programmes		
<b>Development and Land use</b>	National Policy Statements	National Policy Statements will set out the justification for major infrastructure projects and provide guidance on how to implement them. National Policy Statements will be subject to an 'appraisal of sustainability' where they give location information for projects. National Policy Statements will be prepared by the government department responsible for that type of project.	Welsh Assembly Government, Communities and local Government /Infrastructure Planning Commission	
	England Rural Development Programme	Funded by the European Commission and the Department for Environment, Food and Rural Affairs (Defra). The majority of programme funds are allocated to improving the environment through Environmental Stewardship - administered by Natural England and the English Woodland Grant Scheme - administered by the Forestry Commission.	Communities and local Government	Forestry Commission, Natural England
	Wales Rural Development Plan	Joint Welsh Assembly Government/European Union (EU) strategy to improve Welsh environment and encourage sustainable economic development.	Welsh Assembly Government	
	Planning Policy Statements (England)	Planning Policy Statements explain statutory provisions and provide guidance to local authorities and others on planning policy and the operation of the planning system.	Communities and local Government	
	Regional spatial strategies (RSS)	With the objective to contribute to the achievement	Regional planning	Government Office

Development and Land use	England , the Wales Spatial Plan and the London Plan	of sustainable development, the RSS, incorporating a Regional Transport Strategy (RTS), provides a broad development strategy for the region for a fifteen to twenty year period. It covers housing, environment, transport, waste, minerals issues and informs other more local spatial plans	bodies	
	Local Development Frameworks (LDFs) including Local Development Documents (LDD) England	A Local Development Framework is a suite of documents that sets out how the local area may change over the next 10-15 years. Will also cover issues of waste and minerals for relevant authorities. Local Development Frameworks must be in general conformity with RSS	District and Borough Authorities and Unitary Authorities	Government Office
	Waste and mineral development frameworks	Cover issues of waste and minerals for relevant authorities.	Counties (in two-tier areas) and unitary authorities	
	Planning Policy Wales	Current land use planning policy is contained in 'Planning Policy Wales' (March 2002) which provides the strategic policy framework for the effective preparation of local planning authorities' development plans.  'Planning Policy Wales', the Technical Advice Notes (TANs) and the circulars, may be material to decisions on individual planning applications and will be taken into account by the National Assembly for Wales and Planning Inspectors in the determination of called-in planning applications and appeals.	Welsh Assembly Government	
	Technical Advice Notes (TANS) (Wales)	Planning policy Wales is supplemented by 20 topic based Technical Advice Notes (Wales) (TANs) which provide procedural guidance on interpreting the policy and operation of the planning system in Wales.	Welsh Assembly Government	
	Local Development Plans (Wales)	Local Development Plans should provide for an adequate and continuous supply of land to meet society's needs in a way that is consistent with overall sustainability principles and objectives. In doing this these plans must set out an authority's objectives for the development and use of land in its administrative area and general policies to implement them.	Local Authorities	Welsh Assembly Government

Development and Land use	England Sustainable Communities Strategy	Prepared by local strategic partnerships as a set of goals and actions which they, in representing the residential, business, statutory and voluntary interests of a local area, wish to promote. The community strategy should inform the local development framework and act as an umbrella for all other strategies devised for the local area and promote or improve the economic, social and environmental well-being of their areas, and contributing to the achievement of sustainable development in the UK	Local Authorities	Dept. for Communities and Local Government
	Port Development Plans	Business plans for port development which usually consider environmental issues	Port Authorities	
Natural Heritage	Habitats Directive Assessment of plans and projects	All proposals affecting Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) must be assessed to show no adverse effect on site integrity. There is also a requirement to review some types of plans and projects that existed before the implementation of the Habitats Directive to assess their implication on the sites conservation objectives.	Natural England Countryside Council for Wales	All competent authorities are responsible for assessing plans and projects
	Special Sites of Scientific interest (SSSIs) improvement programme	In England there is a Public Service Agreement (PSA) target to have 95 per cent of the SSSI area in favorable or recovering condition by 2010. The SSSI remedies programme identifies the organisation that has prime responsibility for resolving or 'remedying' the reason for unfavourable condition on each SSSI unit. Financial incentives are available to support some of the work, these are usual tied into a contractual management agreement between Natural England and the landowner/occupier.  Wales Environment Strategy (WES) Outcome 21 aims to restore 95 per cent of international sites by 2010, 95 per cent of SSSIs by 2015, and all sites by 2026	PSA target is led by Defra and its delivery is co-ordinated by Natural England.  WES is led by Welsh Assembly Government	Organisations responsible for resolving the reason for unfavourable condition on each SSSI unit. e.g. individual site owners, central and local government, private companies, non government organisations. Delivery is co-ordinated by the Countryside Council for Wales.

Natural Heritage	England River Basin Biodiversity Framework	Summary and Geographic Information System (GIS) presentation of water-related biodiversity targets and assets in each river basin, for inclusion in WFD River Basin Management Plans where appropriate.	Environment Agency and Natural England	Royal Society for the Protection of Birds, Wildlife Trusts, Defra
	UK Biodiversity Action Plan	UK Biodiversity Action Plan is a plan for dealing with biodiversity conservation in response to the Convention on Biological Diversity 1992 which called for the creation and enforcement of national strategies and action plans to conserve, protect and enhance biological diversity.	UK Biodiversity Partnership	UK Biodiversity Partnership comprises a wide range of people from those who provide funds, amateur and professional experts to those who are interested in the wildlife and natural They are private individuals, business, government and non government representative  Environment Agency lead on action plans for many freshwater habitats and species.
	Local Biodiversity Action Plans (LBAPs)	Action plans to safeguard biodiversity features. Each Local Biodiversity Action Plan works on the basis of partnership to identify local priorities and to determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets	Local Biodiversity Action Plan Partnerships	Natural England, Local Authorities, Environment Agency, Countryside Council for Wales
	Site management plans for Natura 2000 sites	The designation of a site under the 'Birds' or 'Habitat' Directives will often lead to the production of a management plan for the site in question.	Natural England, Countryside Council for Wales	Site owners and managers
	Wetland Vision for England	Wetland Vision is a partnership project which describes how the partners would like England's wetland landscapes to be in 50-years time.	Wetland Vision Partnership	English Heritage, Environment Agency, Royal Society for the Protection of Birds, Natural England, Wildlife Trusts
	The Invasive Non Native Species Framework Strategy for Great Britain.	This is a co-ordinated plan to reduce the threat to Britain's native biodiversity from invasive non-native species  To help prevent introductions in the first place by raising awareness of the risks and increasing understanding of the impacts; to better enable early detection and rapid response	Defra Welsh Assembly Government The Scottish Government	

Natural Heritage		<p>to introductions before they become major problems; and, to develop longer-term control programmes based on sound science.</p> <p>The GB Strategy also contains measures to improve the effectiveness of legislation, to improve integration of activities and programmes and to better focus research effort.</p>		
Transitional and coastal	Marine Protected Area strategy (draft)	Delivering an ecologically coherent network of Marine Conservation and Zones and European Marine Sites by 2012.	Defra / Welsh Assembly Government	Joint Nature Conservancy Council (JNCC), Natural England, Countryside Council for Wales
	Marine Policy Statement (MPS) and marine planning	Will be introduced through Marine and Coastal Access Bill and set strategic framework for management and protection of the marine environment in England and Wales. Marine licensing decisions for development activities will have to conform with marine plans which will overlap with RBMPs in estuaries and coastal waters.	Defra/ Welsh Assembly Government	Environment Agency, Local Authorities
	Integrated Coastal Zone Management (ICZM)	ICZM is a management approach not a plan. The purpose of ICZM is to bring stakeholders together with a common interest often to resolve conflict. In 2007, the Welsh Assembly Government produced Making the Most of Wales' Coast - the Integrated Coastal Zone Management Strategy for Wales. The document provides an overview for the development of actions that will bring together the coastal policies and activities in Wales. In 2008 Defra published "A strategy for promoting an integrated approach to the management of coastal areas in England" that recognises progress made to date with joining up management at the coast and sets the direction for future work.	Defra / Welsh Assembly Government	All groups with regulatory, management, commercial, recreational or other interests at the coast

<b>Fisheries</b>	Common Fisheries Policy	Sustainable fisheries management driven through the ecosystem approach.	EU UK delivery through Defra and devolved administrations	Marine and Fisheries Agency/Sea Fisheries Committees/ Environment Agency, Welsh Assembly Government
	Freshwater Fish Directive Designations	Statutory water quality protection for designated cyprinid and salmonid fisheries.	EU England and Wales delivery through Environment Agency	Water Utilities.
	Fisheries Action Plans	Consultative processes to develop wide stakeholder engagement in freshwater fisheries management	Environment Agency	Angling organisations
	Salmon Action Plan	Catchment based strategic plans to deliver sustainable salmon management	Environment Agency	NASCO, Salmon and Trout Association and many others
	National Trout and Grayling Strategy	National Strategy to deliver sustainable species management	Environment Agency	Salmon and Trout Association, Grayling Society.
	Eel Management Plan	National strategy to deliver sustainable species management within the European Environment Agency context.	Environment Agency	
	Fisheries Strategy	National Strategy to provide an overview for the functional plan and related plans and policies.	Environment Agency	National Angling Bodies
<b>Forestry</b>	Forest Strategy	The Strategy was prepared in 1997-98 and provides a vision for forestry for the medium to long term (i.e. 20-50 years). It was prepared before the WFD was implemented in the UK.	Defra	Forestry Commission
	Regional Forestry Frameworks	Charts a route to help develop a vibrant sector to maintain and enhance the tree, woodland and forestry assets that can bring social, environmental and economic benefits to a region	Forestry Commission	
	The Strategy for England's Trees, Woods and Forests	Shows how we can meet the opportunities and challenges of making trees and woodlands productive, healthy and attractive	Defra	
	The Woodlands for Wales Strategy.	Establishes the role that woodlands sustaining the wider environment and in providing opportunities for people and communities in Wales and establishes importance of woodland management	Welsh Assembly Government	Forestry Commission Wales

Forestry	'Forests and Water Guidelines'	Provide the basis for sustainable management of the water environment by forest planners and managers	Forestry Commission	Forestry Commission, Forest Research, Environment Agency, Scottish Environment Protection Agency, Joint Nature Conservation Committee, Forest Service (Northern Ireland)
Industry/ chemicals	Integrated Pollution Prevention and Control (IPPC) permits	To ensure industrial installations have minimal environmental impacts and emissions are regulated	Environment Agency	
Transport	Transport Strategy	A vision for transport development in the medium to long term.	Dept. for Transport	
	The Wales Transport Strategy	Sets out the steps to achieve delivery of sustainable transport networks	Welsh Assembly Government	Local Authorities
	Regional Transport Strategies	These are part of Regional Spatial Strategies	Dept. for Transport	Environment Agency
	Local Transport Plans	Local Authority driven plans that take account of Regional and National transport plans	Dept. for Transport	Local Authorities
	Individual Transport Schemes	Scheme over £5M that require funding from Dept. for Transport.	Dept. for Transport	Developer
Recreation and Navigation	British Waterways Strategy	Management of 2,000 miles of canals and rivers in England, Wales and Scotland.	British Waterways	Defra and Welsh Assembly Government
	'A better place to Play' Environment Agency strategy for water-related sport and recreation.	Strategy to plan and promote water-related sport and recreation to achieve the maximum economic, social and environmental benefits.	Environment Agency	
	Action plan for navigation		Environment Agency	
	Waterways for tomorrow	For inland waterways to see an improving quality of infrastructure; a better experience for users through more co-operation between navigation authorities; and increased opportunities for all through sustainable development.	Defra	

Recreation and Navigation	National Parks Management Plans	Overarching strategic document and central to the future of the National Park to: show co-ordination and integration with other plans,, strategies and actions in the National Park where they affect the National Park purposes and duty; indicates how the National Park purposes and associated duty will be delivered through sustainable development; sets the framework for all activity pursued in the National Park by stakeholders.	National Parks	
	Waterways development plans, strategies, frameworks	Various documents associated with waterways regeneration and management	Various	
	Bank protection policies	Policies to give sufficient structural strength to the bank, to protect the bank from erosion (both on the waterline and from the user on the path) and to prevent leaks.		
	Green-blue initiative	The 'Green Blue' initiative gives examples of good environmental practice for boaters.	British Marine Federation and the Royal Yachting Association.	Environment Agency, Scottish Environment Protection Agency, Scottish Natural Heritage, Welsh Assembly Government, Crown Estate, Countryside Council for Wales



# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex K: Economic analysis of  
water use

## Content

<b>K1</b>	<b>Economic Analysis of Water Use</b>	<b>2</b>
<b>K2</b>	<b>Key points about the economic analysis of water use</b>	<b>6</b>
<b>K3</b>	<b>Data to be provided</b>	<b>11</b>
<b>K4</b>	<b>Other information</b>	<b>11</b>

### **K1 Economic Analysis of Water Use**

Department for Environment, Food and Rural Affairs (Defra), Welsh Assembly Government (WAG), the Environment Agency (EA) and partners<sup>1</sup> have been engaged in a comprehensive economic analysis of water use to support the implementation of the Water Framework Directive. At the highest level this involved participation in the Common Implementation Strategy for the Water Framework Directive (WATECO) group and subsequent drafting groups (ECO1 and ECO2). These groups were given a remit by the Water Directors under the Common Implementation Strategy to develop information and guidance materials to assist in interpreting the requirements of Article 5 and Annex III of the Directive as well as provide methodologies and share experiences in relation to cost-effectiveness assessment and disproportionate cost assessment.

One of the earliest contributions was a series of economic analysis reports to support the reporting under Article 5 of the economic analysis of water use. Four reports were developed with the help of the Economic Steering Group and the Economic Advisory Stakeholder Groups for England and Wales; these were<sup>2</sup>:

- Report on the Economic Importance and Dynamics of Use for River Basin Characterisation
- Report on Cost Recovery and Incentive Pricing
- Report on Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Cost
- Report on Private Water Services

These reports provided the basic information with which to develop the Article 5 reports, details of which can be found at the following link:

<http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/wfd/economics/index.htm#eco>

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<sup>1</sup> Of special note has been the work of the Collaborative Research Programme on River Basin Management Planning Economics which undertook a programme of research between 2003 and 2007. Work by the Cross Government Economics Steering Group and the Economic Advisory Stakeholder Group should also be noted.

<sup>2</sup> Available at

<http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/wfd/economics/index.htm#eco>

Each Article 5 report provides information relevant to the reporting guidance of the Water Framework Directive. It takes account of various guides and other documentation produced through the Common Implementation Strategy (CIS).

In line with this guidance, the following areas are covered by each report:

- **Driving forces:** This section sets out the socio-economic characteristics of each river basin district and provides forecasts for population, number of households, output (in gross value added terms) and employment to 2015;
- **Pressures:** This section reports on the attempts to link economic information with the most important activities for the characterisation of water bodies and associated risk assessment;
- **Water services and cost recovery:** This section presents information received from the Water Services Regulation Authority (Ofwat) on the financial cost of public water supply and sewerage services within each river basin district. Details are also provided on the level of environmental expenditure by the water and sewerage companies in the river basin district;
- **Cost-effectiveness:** This section details the progress made towards ensuring cost-effectiveness in implementing the programme of measures (PoMs). The gaps that exist are also identified; and
- **Improving knowledge and the information base:** The final section sets out the research programme needed to support further work under the Water Framework Directive.

The Article 5 reports represented a landmark in terms of undertaking a comprehensive, river basin district-based, economic analysis of water use. However, they represented only a beginning of a much longer and more in depth analysis. Each of the Article 5 reports and their supporting economic analysis was accompanied by a draft programme of research to take forward the main analytical gaps. This was based on the development of a research programme to be taken forward by the Collaborative Research Programme on River Basin Management Planning Economics (CRP)<sup>3</sup>. The main outputs of the CRP were:

Project 1a – Economic Analysis and Decision Making for programme of measures under the Water Framework Directive – Initial Identification of Processes and Issues. This project was instrumental in developing an approach which built as far as possible on existing analysis and decision making processes.

Project 1b – Consistent Economic Appraisal Approaches with respect to the Water Framework Directive river basin management plans. This report examined in detail the appraisal frameworks to determine the extent to which they developed the analysis required for decision making for river basin planning.

Project 1c – Screening of water pricing policies, cost recovery mechanisms and economic instruments for inclusion in programme of measures and in relation to Article 9 of the Water Framework Directive. This report looked in detail at possible measures that might be needed to fulfil the requirements of Article 9 and the aims of the Directive in terms of Incentive Pricing.

Project 2a/2b – Development of a methodology to determine the cost effectiveness of measures and combinations of measures for the Water Framework Directive. This project developed an initial methodology for undertaking cost-effectiveness analysis.

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<sup>3</sup> Outputs of the CRP can be accessed here: [www.wfdcrp.co.uk](http://www.wfdcrp.co.uk)

Project 2c – Benchmark costs database and guidance on the application of the cost-effectiveness methodology. This provided a database of unit costs for use in cost-effectiveness analysis. Two detailed associated reports were prepared for the Water Industry entitled:

- Water Framework Directive: Economic analysis of water industry costs, and
- Review of econometric cost modelling of chemical phosphorus removal works

Project 2e – Deriving the Costs and Effectiveness of Delivery Mechanisms. This extended the 2c cost database to cover delivery mechanisms as well as measures.

Project 3 – Report on guidance on the evidence required to justify disproportionate cost decisions under the Water Framework Directive. This Project provided guidance on what information should be provided and how it should be presented in order to use the exemptions in the Directive related to disproportionate costs.

Project 4a – Workshop report on CRP Strategic Approach to Benefits. This report set out the approach to the assessment of Environmental and Resource Costs which was to be taken for the first planning round given the absence of information on benefits generally and limitations of the science of assessing status against standards and predicting improvements from measures. It dealt in particular with the problem of quantifying benefits of a national programme versus site specific improvements.

Project 4bc – Report on The Benefits of Water Framework Directive Programmes of Measures in England and Wales. This report presented the finding of a stated preference study into the benefits (measured as willingness to pay) for Water Framework Directive objectives. As a measure of achieving good status it represents a measure of the environmental and resource costs of water bodies which are at less than good status. It presents a national picture of benefits and hence an envelope within which action to meet the objectives of the Directive can be regarded as being proportionate.

Project 4d – Prioritisation. Project 4bc provides an envelope for the total benefits estimate; however, further information is required in order to undertake prioritisation of actions within that envelope. This project attempted to examine possible rules for this type of prioritisation to aid the Environment Agency and partners in developing the most value for money programmes of measures.

Project 4e – Direct Market Benefits. While Project 4bc looked at total non-market benefits, this study addressed direct market benefits. A range of potential benefits were examined although most were found to be significant at the national level.

Project 4f – Valuation of recreational benefits of improvements in water quality – potential benefits and data requirements. This project provides a blueprint for future benefits valuation for the Water Framework Directive. Demonstrating the data requirements of possible approaches to developing a revealed as opposed to stated preference approach to benefit estimation, with a view to improving the robustness of future benefits estimation for river basin management planning.

A series of related reports were prepared during the period of operation of the CRP. These included: reports looking at whether and how differences in the cost of capital should be taken into account for the purpose of cross-sectoral cost-effectiveness analysis (where availability of financing might be a relevant consideration in judging the cost-effectiveness of measures. These reports were entitled Economic analysis for the Water Framework Directive

Discounting and the calculation of the present value (Phase 1 – Theory and Phase 2 – Practical methods).

Following on from the work to prepare a cost-effectiveness analysis under the CRP a related study was undertaken for transitional and coastal waters. This study was entitled Scoping of Economic Impacts and Issues in Transitional and Coastal Waters.

Related work on agriculture was undertaken as part of the development of policies related to Catchment Sensitive Farming. This includes a cost-effectiveness manual and work related to the benefits of agricultural measures<sup>4</sup> Similarly an analysis of potential measures to control non-agricultural diffuse pollution was also undertaken<sup>5</sup>.

A detailed study was undertaken during the period of operation of the CRP into baselines and trends. This study was entitled: Water Framework Directive Economic Analysis: Information On Trends To Improve The Baseline Scenarios. It provided a substantial synthesis of information regarding possible baseline issues and trends which could be incorporated into river basin management planning.

Further economic analysis was performed in relation to the Daughter Directives on Groundwater and on Priority Substances including Impact Assessments. Information from these analyses was integrated into the overall economic analysis of water use through the National Impact Assessment<sup>6</sup>.

The above represents a fairly comprehensive analysis of the economics of water use in England and Wales, although it is the use of this analysis which is perhaps most relevant. The following paragraphs attempt to explain the main ways in which this information was used in preparing the river basin management plan (RBMP) documents.

The main use of the above information was to inform two sets of guidance to the Environment Agency as the competent authority for river basin management planning<sup>7</sup>. This guidance provided the framework within which river basin management planning could take place. The second volume of guidance was accompanied by an Impact Assessment. This National Impact Assessment used the outputs of the economic analysis of water use discussed above to consider a series of strategic options for the first set of RBMPs. The Guidance required the Environment Agency to perform similar analysis (Impact Assessment) for each of the RBMPs.

The National Impact Assessment was the first time that the cost, benefits and other impacts of the Directive had been considered in full since the transposition of the Directive and the publication of the Water Framework Directive regulations in 2003<sup>8</sup>. Transposition of the Directive was accompanied by a Regulatory Impact Assessment (RIA) which was the first comprehensive attempt to assess the potential costs and benefits of the Directive. The key finding of this RIA was that the Directive could be cost-beneficial for the UK but this depended to a large degree on finding a way of targeting requirements to areas where actions were most cost-effective and benefits highest.

Prior to the National Impact Assessment a Preliminary Cost-Effectiveness Analysis (pCEA) was undertaken. The pCEA was carried out by Defra with technical inputs from the Environment Agency and significant stakeholder involvement, starting in autumn 2006 and

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<sup>4</sup> <http://www.defra.gov.uk/foodfarm/landmanage/water/csf/programme.htm>

<sup>5</sup> <http://www.wfdcrp.co.uk/pdf%5CNADWP%20pCEA.pdf>

<sup>6</sup> <http://www.defra.gov.uk/environment/quality/water/wfd/daughter-dirs.htm>

<sup>7</sup> See <http://www.defra.gov.uk/environment/quality/water/wfd/management.htm>

<sup>8</sup> <http://www.defra.gov.uk/environment/quality/water/wfd/transposition.htm>

continuing until summer 2007. The pCEA to the extent possible used the outputs from the CRP analysis and built on this wherever necessary. The pCEA aimed to identify the most cost effective package of measures across sectors that will achieve the requirements of the Water Framework Directive, taking into account the level of uncertainty associated with the different packages, their distributional and affordability implications and the potential for phasing implementation over the three river basin planning rounds, from 2009-2027.

The National IA used information from the pCEA together with a model of benefits developed from Project 4bc of the CRP to undertake a national assessment of options for implementing the Directive. Two main options were considered:

- Option 1 'Not Phased' – all technically feasible measures are initiated with the aim of meeting Water Framework Directive good status objectives by 2015 and to meet the progressive reduction/cessation requirements for chemical status, or as soon as possible due to natural conditions. This implies that provisions in the Water Framework Directive to extend deadlines and set less stringent objectives when costs are disproportionate are not used at all.
- Option 2 'Phased' – phased implementation to ensure an adaptive, cost-effective and proportionate long term approach meeting all Water Framework Directive requirements by 2027 or as soon as possible thereafter given feasibility, proportionality and natural conditions. It assumes that alternative objectives (less stringent objectives and extended deadlines) are set to meet Water Framework Directive good status requirements by 2027, where appropriate, and to meet the progressive reduction/cessation requirements.

The National IA also provided an analysis of the consequences of introducing the environmental quality standards and associated methods developed by United Kingdom Technical Advisory Group (UKTAG) to support good status. The main conclusion of this analysis was that, given the standards, there was a clear case for phasing the costs of the Directive in order to ensure that its implementation was proportionate. Numerous measures were ruled out as either technically infeasible or likely to be disproportionate. This information was subsequently used by the Environment Agency to prepare the more detailed Impact Assessment which accompanies the river basin management plans (RBMPs).

## **K2 Key points about the economic analysis of water use**

The following provides a commentary on key issues relating to the economic analysis of water use to assist in interpreting the work done and the way in which it has supported River Basin Planning.

### *2.1 Have Member States prepared a comprehensive economic analysis including all elements of and being consistent with the Directive?*

The United Kingdom has provided a comprehensive economic analysis. This is demonstrated through:

- the Article 5 report economic analysis supporting documents,;
- preliminary cost effectiveness analysis;
- collaborative research programme reports; and
- various Impact Assessments that have been undertaken on the Water Framework Directive.

Further details of this information can be found on the Department for Environment, Food and Rural Affairs website at the following link:

<http://www.defra.gov.uk/environment/quality/water/wfd>

*2.2 Where necessary, have estimates of the volume, prices and costs associated with water services been provided?*

Estimates of the volume, prices and costs associated with water services have been used within the economic analysis at various stages. In particular this information was used to determine the extent of recovery of the costs of water services as set out in the report on cost recovery and incentive pricing<sup>9</sup> and the associated Article 5 Economic Analysis supporting documents<sup>10</sup>. Up to date information on these financial costs and revenues is provided by water companies annually to the economic regulator for the water industry in England and Wales (Ofwat) in a report called the June Return. This is available on the Ofwat website at the following link: <http://www.ofwat.gov.uk>. Information on the prices, costs and volumes for private water services is provided in the report on private water services.

*2.3 Where necessary, have estimates of the relevant investment including forecasts of such investments been provided?*

Estimates of investments and forecasts of investments have been used at various stages during the economic analysis of water use. In particular this information was relevant to the production of the various reports on water industry costs for the CRP cost-effectiveness work (see above) and also the water sector reports for the pCEA.

*2.4 How has long term forecasts of water supply and water demand been taken into account in the principle of the recovery of the costs of water services?*

In the United Kingdom water service providers recover the costs of providing water services from customers within their water service areas. Revenue in the companies arises from the provision of a range of services that make up the overall water service. These are measured and unmeasured water and sewerage charges, trade effluent charges, large user charges and other sources. The cost recovery mechanism is slightly different in each case but for each source of charge, prices are broadly cost-reflective. The process of recovery of costs guarantees that financial costs are recovered and the five yearly periodic review process internalises environmental costs through the prices paid by customers. The price setting process for the Water Industry (Periodic Review) is the mechanism through which costs are recovered and cost-recovery is on the basis of efficiently incurred costs which are allowed to finance necessary investments as determined during the periodic review process. Details of this process and how it relates to cost-recovery calculations can be found in the report on cost-recovery and incentive pricing (see above).

*2.5 Have approaches been identified showing that the economic analysis was used to assist in judging cost effectiveness?*

The cost-effectiveness of measures used information developed during the economic analysis of water use. This included information from the pCEA (sector and pressure reports) and the CRP's development of benchmark cost-effectiveness information on measures and

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<sup>9</sup> See

<http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/wfd/economics/pdf/cripreport.pdf>

<sup>10</sup> See

<http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/wfd/economics/index.htm>

mechanisms. In addition the Environment Agency developed further cost-effectiveness information during the development of the RBMP and the IAs (see IAs and Annex E for more detail).

*2.6 What progress that has been made since 2005 to address the uncertainties and data gaps in the economic analysis?*

Each of the 2005 Article 5 supporting economic analysis reports contains information on improving the knowledge and information base. These sections detail how the proposed work of the CRP aimed to address uncertainties and knowledge gaps. Hence the CRP and associated outputs represent the main response to the uncertainties and data gaps revealed by the initial economic analysis.

*2.7 Have Member States ensured that the measures to implement Article 9 address all three main elements of Art 9: i) incentive pricing; ii) adequate contribution to cost-recovery including environment and resource costs, iii) polluter pays principle?*

The main way in which the measures to implement Article 9 have considered the three elements of Article 9 has been through the analysis to screen potential water pricing policies and cost-recovery mechanisms. The original work to undertake this screening is summarised in the report: Screening of water pricing policies, cost recovery mechanisms and economic instruments for inclusion in programme of measures and in relation to Article 9 of the Water Framework Directive.

This report screened water pricing policies, cost recovery mechanisms and economic instruments which may be included in programmes of measures to achieve compliance with the Water Framework Directive in England and Wales. This included:

- Compliance of candidate mechanisms with cost-recovery and incentive-pricing objectives set out in Article 9 of the Water Framework Directive;
- Cost-effectiveness in furthering Article 4 objectives, that is in mitigating environmental pressures arising from abstraction, point-source pollution, diffuse pollution, morphological impacts and alien species.

In terms of compliance of candidate economic mechanisms with Article 9 the report screened charging policies and cost-recovery mechanisms against the Article 9 requirements that they provide for, i.e.:

- Adequate incentives for users to exploit water resources efficiently and thereby contribute to Article 4 objectives (Article 9.1., 2nd sentence, 1st indent);
- An adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of costs of water services, based on the economic analysis conducted according to Annex III and taking account of the polluter pays principle (Article 9.1., 2nd sentence, 2nd indent).

The analysis found that most, if not all, mechanisms were broadly aligned with or not immediately relevant to Article 9 obligations. It was noted however that questions may arise in relation to a number of mechanisms in particular abstraction charging arrangements; changes for industrial discharges to sewer; surface water drainage charges and metering/volumetric charging measures. In all cases further work was recommended following the screening exercises.

In terms of compliance with cost-effectiveness with regard to Article 4 environmental objectives, the study examined economic mechanisms based on polluter pays principles and incentive pricing approaches that might be used to drive necessary measures. The starting

point was a compilation of a list of economic mechanisms used or which had previously been considered and rejected in England and Wales or Scotland to address each of the five pressures identified in the Water Framework Directive, i.e. abstraction, point-source pollution, diffuse pollution, physical change and alien species. The initial assessment of mechanisms proposed or implemented in the UK suggests that further work was needed in relation to: abstraction and discharge charging regimes, surface water charging and metering and volumetric charging.

Since the publication of this report further work has been ongoing in these areas. The issues raised by this initial screening as part of the economic analysis of water use were included within Government's proposed strategy for water (Future Water)<sup>11</sup> in particular in relation to charging for water, competition and surface water drainage policy. Future Water announced two independent reviews to take forward these issues in the form of the Cave and Walker Reviews.

Professor Martin Cave led an independent review of competition and innovation in water markets between March 2008 and April 2009. The Review published its final report on 22 April 2009 with recommendations to the UK and Welsh Assembly Governments and sectoral regulators (Ofwat, the Environment Agency and the Drinking Water Inspectorate). The Cave Review<sup>12</sup> aimed to:

- deliver benefits to both business and household customers. This could be through lower bills, better service and more responsive products; and
- increase the efficiency and sustainability of water use; through assessing the scope for competition and innovation throughout the water and sewerage industries.

As part of the Review Cave examined abstraction and discharge policy and made a number of recommendations which Government is currently considering how to take forward. The outcomes of this work will have important implications for future river basin management planning and are likely to provide a range of alternative mechanisms which may be used to meet Water Framework Directive targets.

Anna Walker led an independent Review of Household Charging and Metering for Water and Sewerage Services in the UK. Terms of reference for this review were to:

- examine the current system of charging households for water and sewerage services;
- assess the effectiveness and fairness of current and alternative methods of charging; and
- consider and make recommendations on any actions that should be taken to ensure that England and Wales has a sustainable and fair system of charging in place.

The Review looks at social, economic and environmental concerns. An interim report was published on 29 June 2009<sup>13</sup>. Government is currently awaiting the final report from the Review which, as with the Cave review, will have important implications for future river basin plans in relation to Article 9.

Both the Cave and Walker Reviews commissioned research on cross subsidies, price structures and competition in the water industry<sup>14</sup>.

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<sup>11</sup> <http://www.defra.gov.uk/environment/quality/water/strategy/pdf/future-water.pdf>

<sup>12</sup> <http://www.defra.gov.uk/environment/quality/water/industry/cavereview/documents/cavereview-finalreport.pdf>

<sup>13</sup> <http://www.defra.gov.uk/environment/quality/water/industry/walkerreview/documents/walker-call-for-evidence.pdf>

<sup>14</sup> <http://www.defra.gov.uk/environment/quality/water/industry/cavereview>

Together these reports show that the UK is taking the issue of incentive pricing seriously and demonstrate the UK's commitment towards a continual process of improvement. This will ensure that water prices in the UK more fully reflect the true environmental and social cost of abstraction and provide greater incentives for water to be used efficiently, thus satisfying the aims of Article 9.

Agricultural diffuse pollution was explicitly outside the scope of the initial screening research as all measures related to agricultural diffuse pollution were under consideration during the development of the Catchment Sensitive Farming Initiative. This considered the balance between voluntary, regulatory and economic incentive based approaches. It began with an initial screening of potential measures<sup>15</sup> and concluded that the most appropriate package was a combination of advisory services, use of agri-environment schemes and the development of a new mechanism based on Water Protection Zones<sup>16</sup>. During the development of this policy a substantial evidence base was developed relating specifically to the economic analysis of agricultural water use<sup>17</sup>.

## *2.8 How has the definition of water services and uses been implemented in practice?*

In the United Kingdom the definition of water services encompasses the Water Industry: i.e., services provided by the water and sewerage industries.

## *2.9 How have water pricing policies provided adequate incentives for users to use water resources efficiently?*

The economic analysis of water use has examined the way in which pricing policies provide adequate incentives for users to use water resources efficiently. The main analysis has been with respect to CRP Project 1c (as detailed above). The outcomes of this screening of pricing policies and cost-recovering mechanisms were incorporated into the Future Water Strategy and further work undertaken as part of the Cave and Walker Reviews (see above).

## *2.10 Which approach was taken to ensure that water uses are providing an adequate contribution to the recovery of the costs of water services?*

The methodology for undertaking cost recovery of water uses is explained in each of the river basin district Article 5 reports and in more detail in the report on cost-recovery and incentive pricing. Further work in relation to the need for changes to cost-recovery mechanisms is summarised in the CRP Project 1c report.

## *2.11 Whether future plans have been put in place to address any continuing uncertainties and data gaps on the recovery of the costs of water services?*

Further work on the recovery of the costs of water services will take place as a result of the Cave and Walker Reviews. In addition there are plans to undertake further longer term work on benefits assessment. This will provide better evidence on what the level of environmental and resource costs relevant to the recovery costs of water services. This research is being scheduled by Defra to deliver answers in time for the 2<sup>nd</sup> river basin management planning process.

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<sup>15</sup> <http://www.defra.gov.uk/foodfarm/landmanage/water/csf/document-archive.htm>

<sup>16</sup> <http://www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/diffuse-consult-govresponse.pdf>

<sup>17</sup> <http://www.defra.gov.uk/foodfarm/landmanage/water/csf/document-archive.htm>

## K3 Data to be provided

### 3.1 Volumes abstracted/discharged per water service

This information is available for water company areas but not on a river basin district basis. Data are contained in the relevant Article 5 report or can be obtained from the Ofwat website at the above link.

### 3.2 Estimated investments for water services

The estimated investment costs for water services relevant for the Water Framework Directive are set out in the river basin district impact assessment documents that will be published at the same time as the plan documents on 22<sup>nd</sup> December 2009.

### 3.3 Costs of water services

This information is available on a water company basis not on an river basin district basis. Data is contained in the relevant Article 5 report or can be obtained from the Ofwat website at the above link.

## K4 Other information

*Hyperlinks to more detailed supporting documents including references to legal documents or methodology documents should be provided.*

Article 5 reports for the UK River Basin Districts:

<http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/wfd/economics/index.htm#eco>

River Basin Management Planning guidance document:

<http://www.defra.gov.uk/environment/quality/water/wfd/documents/riverbasinguidance.pdf>

Ofwat website:

<http://www.ofwat.gov.uk>

Department for Environment, Food and Rural Affairs website on Water Framework Directive

<http://www.defra.gov.uk/environment/quality/water/wfd>

Cave report findings:

<http://www.defra.gov.uk/environment/quality/water/industry/cavereview/documents/cavereview-finalreport.pdf>

Walker review interim report

<http://www.defra.gov.uk/environment/quality/water/industry/walkerreview/documents/walker-call-for-evidence.pdf>

The UK would like to work with the Commission to produce common methods for reporting on economic analysis across Member States. This is relevant in the context of the planned workshop for next year to consider methods for improving the process.



# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex L: Record of consultation  
and engagement

## Contents

L.1	<a href="#"><u>Introduction</u></a>	2
L.2	<a href="#"><u>Public access to information</u></a>	3
L.3	<a href="#"><u>Consultations</u></a>	6
L.4	<a href="#"><u>Involvement in the planning process</u></a>	23

### L.1 Introduction

This annex presents a summary of the steps taken nationally and within the Anglian River Basin District to ensure that the River Basin Management Plan (RBMP) has been produced through consultation and engagement with interested parties.

It is an important principle of the Water Framework Directive (WFD) to encourage a wide range of stakeholders to be involved in improving the water environment. As a first step to securing meaningful engagement stakeholders and the public need access to the information about the work in hand. Significant efforts to make information easily accessible have been made and they are described below under the heading “Public access to information”.

As a step on from making information available, and in order to gain a more detailed insight into the views of stakeholders on different aspects of river basin management, there have been a number of consultations on general and specific aspects of implementation. Some of these were led by the Department for Environment, Food and Rural Affairs and the Welsh Assembly Government, some by the Environment Agency, and some by other bodies such as the United Kingdom Technical Advisory Group. Some of the consultations have had a river basin district focus and some have been for England and Wales (“national” in the context of this chapter). All of these consultations have helped develop the proposals for river basin management and provided the benefit of wide geographical, sectoral and stakeholder coverage, and linked into a number of groups focussed on specific water management issues. All these activities are listed below under the heading of “Consultations” along with a summary of their outcomes.

Finally, the process of producing this River Basin Management Plan has benefited from the active involvement in the planning process itself by many different stakeholders. These have taken place at the national (England and Wales) and at the regional level through very wide ranging activities, which include for example the work of the National stakeholders, the river basin district liaison panels and many local groups. These forms of engagement are listed and described below under the heading “Involvement in the planning process”. Because this engagement has been extensive over a number of years this list is not exhaustive.

## L.2 Public access to information

Means of dissemination	Activities
<b>Environment Agency</b>	
Environment Agency website	<ul style="list-style-type: none"> <li>• Initial Article 5 information (River Basin Characterisation outputs) on 'What's in your backyard' (WIYBY) – 2005</li> <li>• Technical waterbody level information on objectives, classification status and identified risks as presented in the draft River Basin Management Plans - December 2008</li> </ul> <p>A river basin management web page has been set up and is updated regularly. Information on website includes:</p> <ul style="list-style-type: none"> <li>• Background documentation used in River Basin District Liaison Panel meetings and the minutes of meetings</li> <li>• All consultation documents and supporting information posted on the web site (different sites depending on the lead organisation for each consultation)</li> <li>• Posting of all statement of response to consultations</li> <li>• The internet address of the online consultation was promoted to local stakeholders' websites to enable web links to be created</li> <li>• Use of electronic consultation to facilitate responses</li> <li>• Technical supporting information including further characterisation (risk assessment) outputs, classification, objectives and measures as presented in the draft River Basin Management Plans.</li> <li>• Contact details for Environment Agency staff involved in river basin management</li> </ul>
Use of public libraries	<ul style="list-style-type: none"> <li>• Electronic and hard copy versions of the consultation documents ('draft Anglian River Basin Management Plan', 'River Basin Planning: Working Together' and 'River Basin Planning: Summary of Significant Water Management Issues') were made available at the district's central library and all local branches</li> </ul>
Use of Environment Agency offices	<ul style="list-style-type: none"> <li>• Copies of all Environment Agency led consultation documents were made available free of charge at the Head Office in Bristol and in the principal office in the Anglian River Basin District at Kingfisher House, Goldhay Way, Orton Goldhay, Peterborough, PE2 5ZR.</li> </ul>
Direct mail outs	<ul style="list-style-type: none"> <li>• Copies of 'The Water Framework Directive – Guiding Principles on the Technical Requirements' mailed to National stakeholders</li> <li>• 27 paper copies and 800 electronic copies of the consultation document 'River Basin Planning: Working Together' sent to stakeholders.</li> <li>• 27 paper copies and 800 electronic copies of 'River Basin Planning: Summary of Significant Water Management Issues' sent to stakeholders.</li> <li>• 12 paper copies and 30 electronic copies of the 'draft Anglian River Basin Management Plan' sent to stakeholders.</li> <li>• Direct notification of consultations sent to 870 River Basin District stakeholders.</li> </ul>

Means of dissemination	Activities
Public notices	<ul style="list-style-type: none"> <li>• Notice published in London Gazette for one day stating submission on 22 September 2009 of the 'River Basin Management Plans 2009-2015' to Ministers for approval, under Regulation 13(1)(b) of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.</li> <li>• Notice of consultation on the 'draft Anglian River Basin Management Plan' published in the Eastern Daily Press for 2 weeks from 22<sup>nd</sup> Dec 2008</li> <li>• Notice of consultation on 'River Basin Planning: Summary of Significant Water Management Issues' published in the Eastern Daily Press for two weeks on the 24 and 31 July 2007.</li> <li>• Notice of consultation on 'River Basin Planning: Working Together' published in the Eastern Daily Press for two weeks on 22 and 29 December 2006.</li> </ul>
Technical pamphlets/ information sheets	<ul style="list-style-type: none"> <li>• General Water Framework Directive introductory material distributed at conferences</li> <li>• Issue/ sector based briefing sheets distributed at conferences</li> <li>• The dRBMP consultation ran from 22<sup>nd</sup> December 2008 to 22<sup>nd</sup> June 2009.</li> <li>• Issued nearly 2000 leaflets some of which have been distributed by the Regional Stakeholders and Liaison Panel members.</li> <li>• Information has also been distributed to all the statutory Committee Members.</li> <li>• All County Libraries have been provided with pamphlets and CD copies of the full plan.</li> <li>• Sector specific leaflets were also produced</li> </ul>
Publicity material	<ul style="list-style-type: none"> <li>• Publication of leaflets and postcards to publicise and promote Photography competition launched in April 2009 for Under 16s to promote the value of water participation in consultations</li> <li>• Significant Water Management Issues news release for trade press on 13 August 2007.</li> <li>• Working Together consultation newspaper adverts on 22 December and 29 December 2006, and news release published for trade press on 3 January 2007.</li> <li>• 2000 Leaflets on RBMP</li> <li>• Sector specific leaflets.</li> </ul>
Interviews/articles in local media	<ul style="list-style-type: none"> <li>• Press piece: the Water Industry's expectation of Significant Water Management Issues (SWMI), 8 January 2007.</li> <li>• Article in 'Buckingham Today' to promote SWMI, 11 September 2007.</li> <li>• Radio Cambridgeshire interview: public participation on SWMI document, July 2007.</li> <li>• Organisations such as Association of Drainage Authorities (ADA), National Farmers Union, Great Ouse Boating Association (GOBA) and Environmental Campaigns (ENCAMS) have published articles in their monthly newsletters and magazines with links to the consultation.</li> </ul>

Means of dissemination	Activities
Public meetings/drop in events, other	<ul style="list-style-type: none"> <li>• Presentation of the WFD in East of England at Peterborough Rotary Club, June 2006.</li> <li>• Presentation of the WFD in East of England at Bedford Rotary Club, May 2006.</li> <li>• dRBMP 11 primary workshops, which were split on a sectoral and catchment basis. 800 invitations and received around 300 attendees.</li> <li>• dRBMP 29 focussed workshops; small group meetings and teleconferences. These were aimed at tackling more specific questions and providing any necessary additional information.</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Offer for translations of documents to be made available on request</li> </ul>

### Department for Environment, Food and Rural Affairs

Publication of background documents on the economic aspects of implementation	<ul style="list-style-type: none"> <li>• Scoping study for Water Framework Directive Annex III (economic analysis)</li> <li>• Regulatory Impact Assessment on potential costs and benefits associated with new environmental standards</li> <li>• Report on economic importance and dynamics of use of River Basin Characterisation led by Department for Environment, Food and Rural Affairs, Welsh Assembly Government also involved.</li> <li>• Report on cost recovery and incentive pricing led by Department for Environment, Food and Rural Affairs, Welsh Assembly Government also involved.</li> <li>• Report on cost-effectiveness analysis and methodology for assessing disproportionate costs led by Department for Environment, Food and Rural Affairs, Welsh Assembly Government also involved.</li> <li>• Report on private water services</li> <li>• Groundwater daughter directive partial Regulatory Impact Assessment covering England and Wales</li> <li>• Priority substances partial Regulatory Impact Assessment</li> </ul>
Department for Environment, Food and Rural Affairs website	<ul style="list-style-type: none"> <li>• Article 5 reports</li> <li>• Advert for the draft River Basin Management Plans consultation and links to details on the competent authority websites.</li> </ul>

### United Kingdom Water Framework Directive Technical Advisory Group

United Kingdom Water Framework Directive Technical Advisory Group website	<p>Access to information on technical interpretation of Water Framework Directive requirements including</p> <ul style="list-style-type: none"> <li>• Environmental standards</li> <li>• Classification</li> </ul>
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## L.3 Consultations

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Draft Anglian River Basin Management Plan	<p>This document presented the main issues for the Anglian River Basin District and briefly set out the actions proposed to be taken to deal with them. The annexes to the document gave much more detail on the conditions in the River Basin District, the actions proposed and the mechanisms that can be used to take these actions forward.</p>	<p>There were 47 responses via the online system, 87 email responses, 8 written responses and 23 requests for information to the consultation. The main comments received were concerning</p> <ul style="list-style-type: none"> <li>• Presentation and Structure</li> <li>• Objectives and Ambition</li> <li>• Waterbody Classification</li> <li>• Actions and Implementation</li> <li>• Legislation</li> <li>• Climate Change</li> <li>• Impact Assessment</li> <li>• Strategic Environmental Assessments (SEA)</li> </ul> <p>As a result of the comments made, The Environment Agency have:</p> <ul style="list-style-type: none"> <li>• Revised local measures including moving Scenario C measures to B where possible</li> <li>• Revised local text where advised through the consultation responses.</li> </ul>	December 2008 – June 2009

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Strategic Environmental Assessment Environmental Reports for the draft River Basin Management Plans	The Water Framework Directive requires the production of River Basin Management Plans across the United Kingdom. These plans require assessment under the Strategic Environmental Assessment (SEA) Directive (2001/42/EC) to identify wider effects on the environment. The environmental report presented the methodology we used in the SEA, an explanation of how environmental factors have been considered within the decision-making, and the results and conclusions of the SEA process.	<p>Further detail is provided in 'draft River Basin Management Plans, a consultation response for the Anglian River Basin District'</p> <p><a href="http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx">http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx</a></p> <p>A total of 3 opinions were received relating directly to the Anglian Plan. A summary of comments across all river basin districts included:</p> <ul style="list-style-type: none"> <li>• The importance of ensuring the maintenance of water supplies to canals and the need to maintain canals open for navigation and at suitable depth. Concerns were also raised about measures that may require the screening of abstractions and transfers to supply water to reservoirs and canals.</li> <li>• The importance of river basin management process in delivering habitat creation, green infrastructure, re-instatement of habitat, and the enhancement of protected and UKBAP, LBAP and other locally important species.</li> </ul>	December 2008 – June 2009

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Strategic Environmental Assessment Environmental Reports for the draft River Basin Management Plans		<ul style="list-style-type: none"> <li>• Concerns were raised about how the SEA has considered the historic environment (including historic landscape character, historic built environment, archaeological remains and deposits). Sensitivities include: changes in water quality, water levels, habitat restoration schemes, managed realignment and pollution.</li> <li>• Respondents wished to see further evidence of how the SEA had influenced the Plan process and how it may be possible to influence other future plans and strategies.</li> </ul> <p>Further detail and the action the Environment Agency has taken to all comments is provided in the 'Strategic Environmental Assessment Statement of Particulars'.</p> <p><a href="http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx">http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx</a></p>	

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Strategic Environmental Assessment Scoping Reports consultation	The Water Framework Directive requires the production of River Basin Management Plans across the United Kingdom. These plans require assessment under the Strategic Environmental Assessment Directive (2001/42/EC) to identify wider effects on the environment. The Scoping Reports set out the information to be included in this assessment	The results of the consultation were considered in finalising the approach to the Strategic Environmental Assessment (SEA). Further details for each river basin district can be obtained on the Environment Agency website.	October to November 2007 (extended to January 2008)
River Basin Planning – Summary of Significant Water Management Issues [Anglian River Basin District]	This document set out what the Environment Agency believe are the most significant issues that face the Anglian River Basin District. The Environment Agency has worked together with the members of the Anglian River Basin District liaison panel to identify the significant water management issues. To identify the significant issues for this report, a list of pressures or ‘potential issues’ will be assessed	<p>The majority of responses agreed with the proposals. As a result of the comments made, the Environment Agency will:</p> <ul style="list-style-type: none"> <li>• take account of the impact of flood and erosion management, as well as the impact of new developments (e.g. Water Cycle Strategies and encouraging water efficiency).</li> <li>• ensure that actions they implement are as effective now as they will be in future as the climate changes.</li> <li>• continue to dredge in areas where it is appropriate.</li> <li>• consider the ‘polluter pays’ principle, implement and extend voluntary and statutory initiatives, and work with co-deliverers to achieve aims of the WFD.</li> <li>• ensure that costs are</li> </ul>	July 2007 to January 2008

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
River Basin Planning – Summary of Significant Water Management Issues [Anglian River Basin District]		<p>proportionately distributed.</p> <ul style="list-style-type: none"> <li>• use woodland as a measure to alleviate flood risk and diffuse pollution.</li> <li>• take into account economic, environmental and social implications of measures.</li> </ul> <p>Further detail is provided in ‘River basin planning: Summary of significant water management issues, a consultation response for the Anglian River Basin District’ at <a href="http://www.environment-agency.gov.uk/static/documents/Research/anglian_swmidoc_1953860.pdf">http://www.environment-agency.gov.uk/static/documents/Research/anglian_swmidoc_1953860.pdf</a></p>	
River Basin Planning – Working Together [Anglian River Basin District]	<p>This document presented information and proposals about the way river basin planning could work in the Anglian River Basin District and how and when people interested in participating in this process could do so.</p>	<p>The majority of responses agreed with the proposals. As a result of the comments made, the Environment Agency:</p> <ul style="list-style-type: none"> <li>• will make the best use of the limited time and resources available. For the first cycle they will do as much as they can, whilst accepting that they will have greater knowledge over time.</li> <li>• will continue to assess and discuss comments received in relation to the planning process. This will help to ensure that working groups have adequate time to deal with any information and issues arising. We will concentrate on providing guidance rather than instructions, allowing</li> </ul>	<p>December 2006 to June 2007</p>

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
River Basin Planning – Working Together [Anglian River Basin District]		<p>liaison panels a greater degree of flexibility.</p> <ul style="list-style-type: none"> <li>• have compiled a communications strategy with budgeting for workshops and meetings, which sets out how they will work with stakeholders to implement the WFD.</li> <li>• will ensure that information on the WFD is included in various publications and websites that target different sector groups.</li> <li>• use the communications networks to cascade information, maintaining the ARBD contact list. This includes distributing the quarterly River Basin Planning newsletters.</li> </ul> <p>Further detail is provided in ‘River basin planning: working together, a consultation response for the Anglian River Basin District’ at <a href="http://www.environment-agency.gov.uk/static/documents/Research/wt_anglian_response_2034576.pdf">http://www.environment-agency.gov.uk/static/documents/Research/wt_anglian_response_2034576.pdf</a></p>	
Water for life and livelihoods – a strategy for River Basin Planning in England and Wales	This document set out proposals for how the Environment Agency was planning to work to develop River Basin Management Plans and implement the Water Framework Directive. In particular how it would engage	Responses were received from many different stakeholders. These contributed to refining the planned approach to river basin management, particularly in relation to the terms of reference for stakeholder engagement. This	January to April 2005

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Water for life and livelihoods – a strategy for River Basin Planning in England and Wales	with and encourage participation from stakeholders at national, regional and local level; and how it would integrate different aspects of managing the water environment	consultation process also helped the process of aligning the thinking about implementation of the Directive between the Department for Environment, Food and Rural Affairs, the Welsh Assembly Government and key stakeholders.	
River Basin Characterisation	District based consultation on River Basin Characterisation (Water Framework Directive Article 5)	<p>There were many varied and constructive responses, with many suggesting improvements to the Environment Agencies proposals. As a result of these comments, The Environment Agency:</p> <ul style="list-style-type: none"> <li>• made method statements clearer;</li> <li>• refined and corrected the assessments for authorised point and diffuse sources, where necessary;</li> <li>• updated morphological pressure assessments where new information was available;</li> <li>• improved assessment of alien species risks to surface waters; and chemical and quantitative risks to ground water.</li> </ul>	September to November 2004
The Water Framework Directive – Guiding Principles on the Technical Requirements	This document presented the Environment Agency's interpretation of the technical requirements from Annex II and V of the Water Framework Directive. Aspects covered by these annexes included the characterisation of	Responses were received from a number of the main stakeholders. These allowed the Environment Agency to achieve a common understanding of the technical requirements of the Directive and informed the work undertaken to complete	June to September 2002

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
The Water Framework Directive – Guiding Principles on the Technical Requirements	surface and groundwater body types; identification of pressures and impacts; review of impacts of human activity; classification of surface water and groundwater bodies; and the design of monitoring programmes.	the Characterisation Reports; the design of the monitoring programmes; and the approach to status classification for water bodies.	

**Led by the Department for Environment, Food and Rural Affairs and Welsh Assembly Government**

Consultation on the Draft Flood and Water Management Bill	<p>The draft Flood and Water Management Bill will:</p> <ul style="list-style-type: none"> <li>• deliver improved security, service and sustainability for people and their communities</li> <li>• it will be clear who is responsible for managing flood risk</li> <li>• protect essential water supplies</li> <li>• modernise the law for managing flood risk and reservoir safety</li> <li>• encourage more sustainable forms of drainage</li> <li>• enable water companies to control more non-essential uses of water during droughts</li> <li>• make it easier to resolve misconnections to sewers</li> </ul> <p>The overall effect will be a healthier environment, better service and greater</p>	<p><a href="http://www.defra.gov.uk/corporate/consult/flood-water-bill/index.htm">http://www.defra.gov.uk/corporate/consult/flood-water-bill/index.htm</a></p>	<p>April to July 2009</p>
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Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
<p>Consultation on the second phase of Environmental Permitting Programme (EPP2)</p>	<p>protection for people, their communities and businesses.</p> <hr/> <p>EPP2 is a Better Regulation initiative designed to reduce costs for operators and the regulator by cutting unnecessary red tape, while continuing to protect the environment and human health. This consultation proposes to extend the single EP system formed under EPP1 to create a common system of risk-based environmental permitting and compliance for an extended range of regimes. These include:</p> <ul style="list-style-type: none"> <li>• Water Discharge consents: Permits to control certain discharges to surface water;</li> <li>• Groundwater Authorisations: Permits to control the disposal of specific substances into groundwater, and;</li> <li>• Radioactive Substances Regulation: permits for keeping and use of radioactive materials; and for accumulation and disposal of radioactive waste.</li> </ul>	<p><a href="http://www.defra.gov.uk/corporate/consult/env-permitting/letter.htm">http://www.defra.gov.uk/corporate/consult/env-permitting/letter.htm</a></p>	<p>February to May 2009</p>
<p>Consultation on new arrangements for establishing Water Protection</p>	<p>For England, the principle of new Water Protection Zone arrangements was included in all options</p>	<p><a href="http://www.defra.gov.uk/corporate/consult/water-protection-zones/index.htm">http://www.defra.gov.uk/corporate/consult/water-protection-zones/index.htm</a></p>	<p>Catchment Sensitive Farming consultation in England ended in November 2007</p>

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Zones	for the consultation on Catchment Sensitive Farming. A Welsh consultation will consider the need for new Water Protection Zone arrangements alongside other agricultural diffuse pollution measures.	<a href="http://wales.gov.uk/consultations/environmentandcountryside/waterprotectionzones/?lang=en&amp;status=closed">http://wales.gov.uk/consultations/environmentandcountryside/waterprotectionzones/?lang=en&amp;status=closed</a>	December 2008 to March 2009
Consultation on Directions to the Environment Agency on Classification of Water Bodies	This consultation is the final stage in a process of developing the environmental quality standards and other criteria recommended for use in classification in the first river basin planning cycle. It also includes recommendations on methodologies for the use of those standards and criteria to classify all WFD water bodies.		October to December 2008
Ministerial Guidance - Consultation on River Basin Planning Guidance Volume 2	Consultation seeks views upon draft guidance in relation to standards, objectives, emerging policy trends, issues around technical feasibility and disproportionate cost; and impact assessments associated with the Water Framework Directive.	<a href="http://www.defra.gov.uk/environment/quality/water/wfd/documents/consult-guidance-response-letter.pdf">http://www.defra.gov.uk/environment/quality/water/wfd/documents/consult-guidance-response-letter.pdf</a>	February to May 2008
Consultation on Implementation of European Union Legislation in England and Wales: Aquatic Animal Health Directive	This paper asks to: <ul style="list-style-type: none"> <li>• note the provisions in the Directive which are obligatory;</li> <li>• comment on the interpretation;</li> <li>• respond on the proposals relating to the areas of choice.</li> </ul>	<a href="http://www.defra.gov.uk/corporate/consult/khv/khv-consultation-doc.pdf">http://www.defra.gov.uk/corporate/consult/khv/khv-consultation-doc.pdf</a>	December 2007 to March 2008

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
	<p>The Directive and the implementing proposals generally cover the aquatic animals when they are caught, kept or moved by humans. There are also some obligations in relation to aquatic animals in the wild.</p>		
<p>Consultation on the implementation of the revised Bathing Water Directive</p>	<p>The purpose of this Consultation paper was to seek views on:</p> <ul style="list-style-type: none"> <li>• the number and type of bathing waters where measures should be taken to improve the water quality;</li> <li>• the development of a prediction and discounting system; and</li> <li>• the development of public information for beach signage.</li> </ul>	<p><a href="http://www.defra.gov.uk/environment/quality/water/waterquality/bathing/documents/summary-responses.pdf">http://www.defra.gov.uk/environment/quality/water/waterquality/bathing/documents/summary-responses.pdf</a></p>	<p>November 2007 to February 2008</p>
<p>Consultation on the review of schedule 9 to the Wildlife and Countryside Act 1981 and a ban on the sale of certain species</p>	<p>This consultation sought comments on proposals for a prohibition on the sale of certain species. The prohibition will be achieved by an Order made under section 14ZA of the Wildlife and Countryside Act 1981.</p>	<p><a href="http://www.defra.gov.uk/wildlife-pets/wildlife/management/non-native/documents/consultation.pdf">http://www.defra.gov.uk/wildlife-pets/wildlife/management/non-native/documents/consultation.pdf</a></p>	<p>November 2007 to January 2008</p>
<p>Consultation on Non-Agricultural Diffuse Pollution</p>	<p>General binding rules for non-agricultural diffuse pollution; Control on phosphates in laundry detergents; Sustainable Urban Drainage Systems: permeable surfaces, filter strips and swales, infiltration devices, basins and ponds.</p>	<p>Various steps are being considered and the Consultation on options for controls on phosphates in domestic laundry cleaning products in England has been launched.</p>	<p>February to May 2007</p>

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Consultation on mechanisms to deliver Water Framework Directive Requirements on hydromorphology	This document looks at the range of legislative, economic and voluntary mechanisms that are available in England and Wales for delivering measures to avoid or reduce effects resulting from hydromorphological pressures, and whether they are sufficient to meet Water Framework Directive requirements.	<p>The majority who responded welcomed the consultation and most provided practical and constructive comments.</p> <p>Various options are being considered with the Environment Agency taking on board responses to recent consultation. Any new powers that might be needed would have to be in place by the end of 2009.</p> <p>The idea of a catchment restoration fund is being actively considered to address the physical restoration of a number of water bodies.</p>	February to May 2007
Article 5 economic analysis of water use supporting document	Article 5 (characterisation) requirement for River Basin District based assessments of the 'Economic analysis of water use'.	<p>Reports summarising, for each River Basin District, the analysis required by Article 5 of the Directive have been reported by the Department for Environment, Food and Rural Affairs (on behalf of the United Kingdom) to the European Commission.</p> <p><a href="http://www.defra.gov.uk/environment/quality/water/wfd/characterisation.htm">http://www.defra.gov.uk/environment/quality/water/wfd/characterisation.htm</a></p>	March 2005
Consultation on Guidance for River Basin Planning	This guidance set out the expectations of the Department for Environment, Food and Rural Affairs in relation to river basin planning.	Set out in two parts. See Ministerial Guidance Consultation.	December 2004 to March 2005
Second consultation on the Water Framework Directive	This second consultation invited views on the key issues arising from transposition and implementation of the	The summary of responses and the response to them is detailed in the document below, from pages 14 – 53.	October 2002 to January 2003

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
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Water Framework Directive into national legislation.

[http://www.freshwaterlife.org/servlet/BinaryDownloaderServlet?filename=1060944568091\\_WFD\\_consult3\\_chapters\\_only.pdf](http://www.freshwaterlife.org/servlet/BinaryDownloaderServlet?filename=1060944568091_WFD_consult3_chapters_only.pdf)

First consultation on the Water Framework Directive

This consultation invited views on key issues arising from the implementation of the Water Framework Directive. It was the first step, including discussions with the principal affected parties. It also served as an introduction to the Directive's provisions and principal obligations.

In addition to the main themes, the role of wetlands and the degree to which they could be protected under the Water Framework Directive and the definition and timing of the "no deterioration" in status requirement were discussed.

As a result of the comments made the Department for Environment, Food and Rural Affairs and Welsh Assembly Government:

- agreed that its important to develop techniques to trace and monitor diffuse sources of pollution.
- gave their intention to implement the Water Framework Directive by means of secondary legislation (regulations).

March to June 2001

### Led by the Department for Environment, Food and Rural Affairs

Consultation on proposals for time limiting of water abstraction licenses

This consultation is gather views on proposals for time limiting of water abstraction licenses. The time limiting of existing abstraction licenses is vital in ensuring water resources can be

<http://www.defra.gov.uk/corporate/consult/water-abstraction/consultation.pdf>

May to August 2009

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
	<p>managed and allocated efficiently, in order to cope with the anticipated impacts of climate change and achieve water quality objectives set out in the UK Government's 2008 water strategy for England <i>Future Water</i>.</p>		
<p>Consultation on implementing the abstraction elements of the Water Act 2003</p>	<p>This consultation is to seek views on draft proposals from Defra and the Welsh Assembly Government on the removal and creation of various exemptions from license control. The proposed new Regulations to bring these proposals into force will implement the remaining abstraction provisions of the Water Act 2003.</p>	<p><a href="http://www.defra.gov.uk/corporate/consult/water-act/index.htm">http://www.defra.gov.uk/corporate/consult/water-act/index.htm</a></p>	<p>April to July 2009</p>
<p>Environmental Standards for Farming - Consultation on proposed changes to standards in cross compliance Good Agricultural and Environmental Condition (GAEC) and related measures in England</p>	<p>This consultation is to seek your views on a range of proposed changes to cross compliance following the conclusion of the review of the Common Agricultural Policy (CAP Health Check). These proposals relate to cross compliance standards and related measures in England, including recapturing the environmental benefits of set-aside.</p>	<p><a href="http://www.defra.gov.uk/corporate/consult/gaec/index.htm">http://www.defra.gov.uk/corporate/consult/gaec/index.htm</a></p>	<p>February to May 2009</p>
<p>Consultation on modernisation of salmon and freshwater fisheries legislation; new order to address the passage of fish</p>	<p>Proposals to improve the free passage of fish and to allow free access to breeding, nursery and feeding grounds for fish in England and Wales. These proposals follow recommendations</p>	<p><a href="http://www.defra.gov.uk/corporate/consult/fisheries-legislation/letter.htm">http://www.defra.gov.uk/corporate/consult/fisheries-legislation/letter.htm</a></p>	<p>January to April 2009</p>

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
	<p>made in the Salmon and Freshwater Fisheries Review, published in 2000, and were included in the consultation which started in February 2007 on "Mechanisms to Deliver Water Framework Directive Requirements on Hydro-morphology" and in the new water strategy for England, Future Water on 7 February 2008.</p>		
<p>Consultation on Draft Statutory Instrument to amend provisions of the Water Resources Act 1991 for Water Protection Zones, and related Draft Statutory Guidance for the Environment Agency</p>	<p>This consultation follows on from one on diffuse water pollution from agriculture that was conducted in 2007. Defra concluded in the light of that earlier consultation that the need to provide a power to regulate where necessary to implement the Water Framework Directive would be best met by simply updating the existing power to designate Water Protection Zones. This power would be available for use where appropriate under the River Basin Management Plans now being developed by the Environment Agency with the aim of achieving good chemical and ecological status in inland and coastal waters by 2015. Parts of this consultation will also apply in Wales.</p>	<p><a href="http://www.defra.gov.uk/corporate/consult/water-protection-zones/">http://www.defra.gov.uk/corporate/consult/water-protection-zones/</a></p>	<p>December 2008 to March 2009</p>

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Consultation on improving surface water drainage	<p>This consultation develops some of the key policy proposals set out in the Government's new Water Strategy, <i>Future Water</i>. The strategy sets out a vision for more effective drainage of surface water, in order to resolve existing problems and prepare for the impacts of climate change. The floods last summer brought into sharp focus the real damage that surface water flooding can cause. The interim report from the Pitt Review on lessons learned has urged early action to improve the way that surface water is managed, particularly in high risk areas.</p>	<p><a href="http://www.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-consult.pdf">http://www.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-consult.pdf</a></p> <p><a href="http://www.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-consult-sum.pdf">http://www.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-consult-sum.pdf</a></p>	February to April 2008
Consultation on the future of the Pesticides Safety Directorate (PSD)	<p>This consultation paper sought views on the future of the Pesticides Safety Directorate, following recommendations made by the 2005 Hampton Review, which aimed to make Government's inspection and enforcement functions simpler and more customer focussed.</p>		November 2007 to January 2008
Protection of Waters Against Pollution from Agriculture	<ul style="list-style-type: none"> <li>• The purpose of this Consultation paper was to seek views on:</li> <li>• proposals for revised Action Programme measures to control pollution caused by nitrogen from</li> </ul>	<p><a href="http://www.defra.gov.uk/environment/quality/water/waterquality/diffuse/nitrate/documents/consultation-supportdocs/consultation.pdf">http://www.defra.gov.uk/environment/quality/water/waterquality/diffuse/nitrate/documents/consultation-supportdocs/consultation.pdf</a></p>	August to December 2007

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
	<p>agricultural sources.</p> <ul style="list-style-type: none"> <li>whether to apply these measures within discrete Nitrate Vulnerable Zones (as revised) or throughout the whole of England.</li> </ul>		
<p>Consultation on the revised Code of Good Agricultural Practice to protect water, soil and air quality.</p>	<p>This consultation invited views on the draft revised Code of Good Agricultural Practice.</p>	<p><a href="http://www.defra.gov.uk/foodfarm/landmanage/cogap/documents/summary-responses.pdf">http://www.defra.gov.uk/foodfarm/landmanage/cogap/documents/summary-responses.pdf</a></p>	<p>August to November 2007</p>
<p>Catchment Sensitive Farming Programme: Consultation on diffuse sources of water pollution from agriculture.</p>	<p>Three policy packages are presented for consideration for inclusion in Programme of Measures: supportive, regulatory and economic. Also whether Water Protection Zones should be merged with Nitrate Vulnerable Zones.</p>	<p>Government response:</p> <p><a href="http://www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/diffuse-consult-govresponse.pdf">http://www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/diffuse-consult-govresponse.pdf</a></p>	<p>August to November 2007</p>
<p>Consultation on options for controls on phosphates in domestic laundry cleaning products in England</p>	<p>This consultation paper covers the need to take action on phosphates in the water environment and the contribution that controls on domestic laundry cleaning products might make to that process.</p>		<p>February 2007 to April 2008</p>
<p>Consultation on draft statutory social and environmental guidance to the Office of Water Services (Ofwat)</p>	<p>This consultation delivers on a commitment made by the Government in the Regulatory Impact Assessment which accompanied the Water Act 2003, that a full public consultation would take place on the draft Guidance.</p>		<p>February 2007to April 2008</p>

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
Partial Regulatory Impact Appraisal	<p>This Regulatory Impact Assessment concerns environmental quality standards for implementation of the Water Framework Directive. The Directive requires the United Kingdom administrations to introduce environmental standards and conditions to help with the classification and objective setting process that will form the basis for the river basin management planning required to meet the Directive objectives.</p>	<p><a href="http://www.defra.gov.uk/environment/quality/water/wfd/documents/pdf-ria-draft/ria-wfd-excludingannexes.pdf">http://www.defra.gov.uk/environment/quality/water/wfd/documents/pdf-ria-draft/ria-wfd-excludingannexes.pdf</a></p> <p><b>Note:</b> the United Kingdom Water Framework Directive Technical Advisory Group issued their initial proposals for standards for stakeholder review in early 2006. This Regulatory Impact Assessment takes into account the changes proposed as a result of the stakeholder review and reflects the final recommendations made.</p>	2007
<p>Consultation: <i>Making Space for Water:</i> Environment Agency strategic overview – strengthening our strategic approach to sea flooding and coastal erosion risk management</p>	<p>This consultation paper seeks views on the proposals of the Department for Environment, Food and Rural Affairs for the way in which the Environment Agency will exercise a strategic overview in relation to sea flooding and coastal erosion risk management. A separate consultation will take place at a later stage regarding the Environment Agency's strategic overview in relation to inland sources of flooding.</p>	<p><i>Making space for water</i> has identified the need to explore a greater range of delivery mechanisms for flood and coastal erosion risk management, with a view to developing more sustainable approaches which maximise the environmental, social and economic benefits achieved and which may also deliver wider benefits.</p>	August to November 2006

Title	Brief description of document	Key outputs of consultation and actions	Period of consultation
<b>Led by United Kingdom Water Framework Directive Technical Advisory Group</b>			

- Environmental Standards and Conditions – Phase 1
- Environmental Standards – part 2
- United Kingdom Environmental Standards and Conditions (Specific Pollutants/Groundwater Standards/Surface Water) (SR1-2007)

For more information visit <http://www.wfduk.org/>

### Other

- Towards Sustainability (United Kingdom Water Industry Research)

For more information visit <http://www.ukwir.org/site/web/content/home>

## L.4 Involvement in the planning process

Sectors, Groups and networks	Activity
<b>River Basin District Level</b>	

The liaison panel was created as a new forum for co-deliverers to discuss and influence the development of the River Basin Management Plan and assist with its implementation. The panel works on a representational system and core membership will be based around the key organisations that are responsible for implementation, and others who can both represent the public and other sectors.

The liaison panel is made up of representatives from key stakeholder sectors:

Anglian River Basin District Liaison Panel

Sector	Key Representative	Organisation (Role)
<b>Ports</b>	John Brien	Harwich Haven (Harbour Engineer)
<b>Consumers</b>	Melinda Appleby	Consumer Council for Water (Member)
<b>Environment Agency</b>	Harvey Bradshaw	(former Regional Director)
	Paul Woodcock	(Regional Director)
	David Whiles	(River Basin Programme Manager)
	Dave Freeman	(Principal Officer, River Basin Planning)
	Fran Sykes Jemma Pawley	(former WFD Communications Officer)
	Regan Harris	(WFD Communications Officer)
<b>Local Authority</b>	Richard Belfield	Lincolnshire County Council (Director – Sustainable Communities)
<b>Business &amp; Industry</b>	Jane Burch	Country Landowners Association (Regional Adviser)
	Richard Bindless	East of England Business Group (Director)

Sectors, Groups and networks		Activity	
	<b>Farming</b>	Paul Hammett	National Farmers Union (Environment and Land Use Adviser)
	<b>Natural England</b>	Peter Grimble Jonathan Burney Gareth Dalgish	Natural England (Regional Projects Manager) (Area Manager) and (Regional Advocacy and Partnerships)
	<b>Recreation</b>	Peter Holloway	Anglian Regional Fisheries Consultative Forum (Chairman) and Essex Angling Consultative Association (Chairman)
	<b>Regional Development Agency</b>	Steve Cox Johnathan Reynolds	East of England Development Agency (Director – General Development) East of England Development Agency (Sustainable Development Manager)
	<b>Regional Assembly</b>	Graham Nelson Alan Wheeler	East of England Regional Assembly (Joint Head of Planning) East of England Regional Assembly (Consultant)
	<b>Water Companies</b>	Clive Harward	Anglian Water (Head of Water Quality and Environmental Performance)
	<b>Consumer Council for Water</b>	Melinda Appleby	Consumer Council for Water (Environment and Agriculture Consultant)
	<b>Internal Drainage Boards</b>	Iain Smith	Middle Level Commissioners (Clerk and Chief Executive)
	<b>Inland Navigation and National Parks</b>	Trudi Wakelin	Broads Authority (Director of Navigation)
	<b>Extraction and Minerals</b>	Mark North David McCabe	Lafarge Aggregates (National Planning and Estates Manager) Aggregate Industries (Midlands Estates Surveyor)

Sectors, Groups and networks	Activity
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<b>Environmental Non-Governmental Organisations (NGOs)</b>	John Sharpe	RSPB (Vice Chairman of East of England Environment Forum)
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Eleven meetings of the Liaison Panel were held in different venues within the River Basin District. Minutes are available in <http://www.environment-agency.gov.uk/research/planning/33230.aspx>

All Sectors	20 March 2006	Workshop/ presentations to engage stakeholders in the WFD. David Whiles (DW), Paul Woodcock & Sarah Fowler (former Regional Strategy Unit Manager) present.
	30 March 2006	Managing Waterside Environments conference. DW present.
	11 May 2006	Planning and the Environment conference. DW invited by East Midlands Regional Assembly.
	5 June 2006	DW delivered presentation at World Environment Day conference.
	21 July 2006	Anglian River Basin District (RBD) Liaison Panel meeting. All sectors represented & Melanie Munro (Cranfield University).
	2 October 2006	Anglian RBD Liaison Panel meeting. All sectors represented & Claire Merritt from GO-East.
	3 November 2006	National Liaison Panel criteria setting workshop for setting significant issues. DW attended.
	31 January 2007	Anglian RBD Liaison Panel meeting. Lesley Clarke (Strategic Environmental Assessment Officer) & Dougal McNeil (Natural England) present.
	24 April 2007	Anglian RBD Liaison Panel meeting. Julian Wright (Climate Change Policy Advisor) & Dave Corbelli (Hydromorphology Lead).
	8 June 2007	Central Area Advisory Panel. Presentation of WFD developments and impact of physical modifications.
	11 July 2007	Anglian RBD Liaison Panel meeting. Julian Wright, Jennifer Johnson (Chemical Monitoring & Data Officer) & Anthony Footit attended.
6 September 2007	Site visit to Reedham organised by the Broads Authority (general WFD update given). DW and Fran Sykes attended.	

**Sectors, Groups  
and networks****Activity**

23 September 2007	Anglian RBD Liaison Panel meeting. Rob Hitchen (River Basin Management Policy Advisor) attended.
26 November 2007	Workshop to develop programme of measures for Northern Area/ Fens and coastal areas. 31 stakeholders attended from all sectors.
28 November 2007	Workshop to develop programme of measures for Eastern Area/ Broads and coastal areas. 60 stakeholders attended from all sectors.
30 November 2007	Workshop to develop programme of measures for Central Area/ Fens and coasts. 32 stakeholders attended from all sectors.
17 December 2007	Anglian RBD Liaison Panel meeting. Rob Hitchen attended.
15 January 2008	Northern Area Advisory Panel: WFD update and workshop. Dave Freeman (DF) attended.
16 January 2008	Joint Regional Implementation Group (RIG)/ Regional Fisheries, Ecology and Recreation Committee (RFERAC) / Regional Environmental Protection Committee (REPAC) meeting to develop local PoMs. DW, DF & Jemma Pawley (JP) attended.
21 February 2008	Groundwater Program Of Measures (PoM) workshop. 30 stakeholders present from all sectors.
7 March 2008	Sifting and Scenario development workshop using local database. 27 stakeholders present from all sectors.
13 March 2008	Anglian RBD Liaison Panel meeting. Rob Hitchen, Lesley Clarke & Paul Hunt (Sustainable Development Project Manager) present.
17 March 2008	DW presented WFD update to East of England Regional Assembly (EERA) Environment Group.
15 April 2008	Artificial Water Bodies & Heavily Modified Water Bodies (AWB/HMWB) GEP classification training sessions. 24 attendees; mainly EA staff. Internal Drainage Board (IDBs) & Ports represented.
11 June 2008	Anglian RBD Liaison Panel meeting. Lesley Clarke & Martin Booth (WFD Environmental Quality Manager) attended.
17 September 2008	Anglian RBD Liaison Panel meeting. Lesley Clarke, Martin Booth, and Joanne Hayward (Regional Communications Manager) attended.

Sectors, Groups and networks	Activity
	18 September 2008 WFD display and information provided by DW at the Association of Drainage Authorities (ADA) Catchment 08 event, East of England Showground.
	4 November 2008 WFD presentation to Regional Advisory Panel, Barton upon Humber.
	18 December 2008 Anglian RBD Liaison Panel meeting. Martin Booth attended.
	6 January 2009 Paul Hammett - NFU, WFD update
	8 January 2009 Central Area Regional Flood Defence Committee (RFDC) - Statutory Committee, WFD presentation
	15 January 2009 Regional Launch Event for RBMP
	3 February 2009 WFD Consultation workshop – Huntingdon
	4 February 2009 RFERAC Statutory Committee - WFD presentation
	10 February 2009 WFD Consultation Workshop – Newmarket
	18 February 2009 WFD Consultation Workshop - Norman Cross
	24 February 2009 WFD Consultation Workshop – Lincoln
	26 February 2009 WFD Consultation Workshop - St Ives
	3 March 2009 WFD Consultation Workshop – Norwich
	4 March 2009 East Midlands Biodiversity Forum
	12 March 2009 Chartered Institute of Water Environment Management (CIWEM)/ Institute of Civil Engineers (ICE)/ Royal Institution of Chartered Surveyors (RICS)/ Royal Institute of Town Planners (RITP) - WFD presentation
	20 April 2009 WFD Consultation Workshop – Peterborough
	21 May 2009 EEEF WFD Presentation
Business Sector	4 April 2006 DW delivered a presentation on 'Water Resources and the WFD' to the Rotary Club, Peterborough.

Sectors, Groups and networks	Activity
	14 March 2007 Attendance and assistance at 'Climate Change and the Fens' workshop. DW and Julian Wright attended.
	28 March 2007 Meeting with Paul Hammett (NFU) and Jane Birch (Country Landowners Association - CLA) to review sector communications and explain SWMI process. DW and Fran Sykes attended.
	13 June 2007 Meeting with Richard Bindless (Director of the East of England Business Group - EEBG) to introduce the WFD. DW and Fran Sykes attended.
	1 October 2007 WFD update for Richard Bindless (EEBG). DW, DF and Sarah Fowler attended.
	3 October 2007 Agricultural organisations event. 10 representatives from Agricultural organisations, Jane Burch (CLA), Peter Grimble (Natural England) & Paul Hammett (NFU).
	16 October 2007 EEBG WFD updates presentation. Sarah Fowler (former Regional Strategy Unit Manager) attended.
	29 November 2007 WFD update meeting with the Norfolk Reed Cutters Association. DW provided update.
	11 January 2008 National Industrial Symbiosis Programme (NISP) 'Ways of working with industry' meeting. DF attended.
	23 July 2008 Business and Industry sector meeting – discussion of Measures and Annex 12. DW, DF, JP, Richard Bindless (EEBG), Jane Burch (CLA), Dave McCabe (Aggregate industries), Lesley Anderson (EEDA) & Nicola Owen (Quarry Products Association - QPA) present.
	1 October 2008 DW met with Jane Burch and Paul Hammett to discuss the draft RBMP.
	30 January 2007 Water sector briefing for next Liaison Panel meeting. DW attended.
	8 March 2007 Meeting with Melinda Appleby (CCW) to review sector communications and explain SWMI process. DW and Fran Sykes attended.
Water Industry	17 April 2007 Water UK Diffuse Urban Pollution Think Tank. DW attended, water industry & planning authorities represented.
	6 June 2007 Meeting with AWS to discuss communications, SWMI and how to develop relationship. DW attended.

**Sectors, Groups  
and networks****Activity**

- 11 September 2007 Water sector update with Emily Payne (Anglian Water Services - AWS). DW attended.
- 14 September 2007 Update meeting with Melinda Appleby (Consumer Council for Water - CCW). DW attended.
- 11 October 2007 Update meeting with AWS. DW, DF & Lesley Clarke attended.
- 5 December 2007 Meeting with AWS to discuss Drinking Water Safety Plan. DF attended.
- 7 December 2007 AWS/ EA Joint Business Team meeting. WFD update plus report on AWS investigation in to River Nene. DW and DF attended.
- 17 January 2008 Working Together Initiative (WTI) Sponsors Group - AWS/EA. DW attended.
- 4 February 2008 Meeting with AWS - follow-up from WTI Sponsors meeting. DW and DF attended.
- 28 February 2008 AWS/ EA Joint Business Team meeting. Water companies update. DF attended.
- 19 March 2008 AWS Drinking Water Safety Plans. QA of process. DF attended.
- 3 April 2008 Joint Business Team meeting: WFD update, especially English Catchment Sensitive Farming Delivery Initiative (ECSFDI) and Periodic Review 09 (PR09). DW and DF attended.
- 8 April 2008 Water Resource AWB/HMWB workshop. Designation and classification of AWB/HMWBs for Good Ecological Potential (GEP). DW and Steve Dines (Senior Technical Specialist) attended.
- 18 April 2008 PR09 meeting to discuss potential WR investigations. DW, DF, Steve Dines, Bob Hillier (Environment Planning Manager) & Richard Thompson (Principal Environmental Planning Officer) attended.
- 29 May 2008 AWS/EA Joint Business Team meeting. Water companies update. DF attended.
- 27 June 2008 GEP - classification of impounded rivers. DW, DF and AWS involved.
- 10 July 2008 Water Industry sector meeting – discussion of Measures and Annex 12. DW, DF, JP, Melinda Appleby (CCW), Clive Harward (AWS), Iain Smith (IDBs), Essex & Suffolk Water, and Three Valleys Water attended.

Sectors, Groups and networks	Activity	
		26 September 2008 Joint Business Team meeting/ discussion with Mandy Fletton. DW attended.
		6 October 2008 DW met with Melinda Appleby (CCW) to discuss the draft RBMP.
		21 November 2008 Anglian Water Catchment Work meeting. Discussion of CSF Strategic Partnerships with AWS. DF attended.
		4 December 2008 Meeting with AWS to discuss AWS business groups' engagement in WFD consultation. DF attended.
		12 December 2008 Joint Business Team meeting with AWS. DF attended.
		28 January 2009 CCW combined East of England and Midlands region meeting
		19 March 2009 Lark Valley Abstraction Group WFD Presentation
		30 April 2009 East Suffolk Water Abstraction Group WFD Presentation
		25 January 2007 Minerals and the Water Environment workshop. DW attended.
		16 July 2007 Meeting with Mark North (Lafarge Aggregates) and Ian Mundy. DW and Fran Sykes attended.
		25 January 2008 Meeting with Dave McCabe (Aggregate Industries). DW attended.
Minerals & Extraction		23 July 2008 Business and Industry sector meeting – discussion of Measures and Annex 12. DW, DF, JP, Richard Bindless (EEBG), Jane Burch (CLA), Dave McCabe (Aggregate Industries), Lesley Anderson (EEDA) & Nicola Owen (QPA) present.
		10 October 2008 DW met with Dave McCabe to discuss the draft RBMP.
		20 March 2007 Meetings with Graham Nelson (EERA), John Brien (Ports) and Peter Holloway (Recreation) to review sector communications and explain SWMI process. DW and Fran Sykes attended.
Ports		19 October 2007 WFD update for John Brien (Harwich Haven). DW attended.
		29 September 2008 DW met with John Brien to discuss the draft RBMP.
Land Drainage		2 July 2006 Meeting with Middle Level Commissioners to discuss impact of the WFD. DW attended.

**Sectors, Groups  
and networks****Activity**

15 February 2007	Presentation about the WFD and its impact on IDBs to AGM of the Lincolnshire IDBs. DW attended.
13 March 2007	Presentation to the AGM of Great Ouse Branch of the Association of Drainage Authorities (ADA). DW attended.
19 March 2007	Meetings with Mark North (Lafarge Aggregates) and Iain Smith (IDBs) to review sector communications and explain SWMI process. DW and Fran Sykes attended.
7 September 2007	Discussion of Hydromorphology Review with Stan Pywell (Weland and Deepings Drainage Board) and Paul Sharman (North Level). DW and Fran Sykes attended.
4 October 2007	WFD presentation to Lincolnshire ADA AGM. Mark Grant (Senior Environmental Planning Officer) attended.
1 November 2007	WFD presentation to Middle Level IDBs AGM. DW attended.
20 November 2007	AWB/HMWBs meeting with Middle Level Commissioners to agree designations. DW attended.
10 April 2008	Meeting with Middle Level Commissions to discuss ways of working to classify AWB/HMWBs for GEP. DW attended.
9 May 2008	IDB GEP classification training. 25 IDBs represented.
9 June 2008	Discussions on mapping and GEP classification with Black Sluice IDB. DW attended.
30 June 2008	Navigation Sector meeting - Discussion of measures and Annex 12. DF attended.
8 July 2008	Agriculture and Land Management Sector meeting - Discussion of Measures and Annex 12. DW, DF and JP attended.
10 July 2008	Water Industry Sector meeting - Discussion of Measures and Annex 12. DW, DF, and JP attended.
18 September 2008	Attendance at national Association of Drainage Authorities Catchment 08 event.
2 October 2008	ADA Lincolnshire Branch meeting to discuss the draft RBMP. DW attended.
16 October 2008	DW met with Iain Smith to discuss the draft RBMP.

Sectors, Groups and networks	Activity
	21 May 2009 Witham 4 <sup>th</sup> IDB WFD Presentation
	10 July 2006 Lake restoration workshop. DW participated.
	21 August 2006 Presentation to Broads Authority staff on navigation and sediment management. DW attended.
	17 November 2006 East of England Biodiversity Forum workshop. Broads Authority, NGOs, local authorities, and DW attended.
	16 March 2007 Presentation by DW to Inland Waterways Amenity Advisory Committee (IWAAC).
	12 April 2007 Presentation by DW of WFD to EA Regional Navigation Group.
	13 April 2007 DW meeting with Broads Authority (Trudi Wakelin) and NGOs (John Sharpe) to review sector communications and explain SWMI process.
	25 June 2007 DW meeting with Broads Authority (Trudi Wakelin) and Recreation representative (Peter Holloway) to discuss next Panel meeting and communications.
Navigation and Ports	5 October 2007 DW provided update for Andrea Kelly (Broads Authority).
	29 May 2008 GEP classification meeting between DW and Broads Authority.
	30 June 2008 DF chaired Navigation sector meeting with Ports representative (John Brien), Land Drainage representative (Iain Smith) and Broads Authority (Trudi Wakelin) to discuss Measures and Annex 12.
	11 July 2008 Discussion with Cam Conservators of Measures and Annex 12. DW and DF present.
	10 September 2008 Recreation sub-group meeting to discuss the draft RBMP. DW attended.
	24 September 2008 Meeting with Trudi Wakelin (Broads Authority) to discuss the draft RBMP.
	29 September 2008 Meeting with Harwich Haven to discuss draft Plan.
	5 November 2008 RFERAC meeting. DW gave an update presentation.
Recreation	17 January 2007 RFERAC meeting. WFD update paper issued.

Sectors, Groups and networks	Activity
	16 March 2007 Presentation by DW to Inland Waterways Amenity Advisory Committee (IWAAC).
	20 March 2007 Meetings with Graham Nelson (EERA), John Brien (Ports) and Peter Holloway (Recreation) to review sector communications and explain SWMI process. DW and Fran Sykes present.
	18 April 2007 RFERAC meeting. Update paper issued.
	25 June 2007 DW meeting with Trudi Wakelin (Broads Authority) and Peter Holloway (Recreation) to discuss next Panel meeting and communications.
	19 September 2007 Update meeting with Peter Holloway (Recreation). DW attended.
	4 February 2008 Recreation sub-group meeting to provide WFD update and discuss local measures/ GEP. DW attended; National Federation of Sea Anglers (NFSA), GOBA, Broads Authority, RYA, British Canoe Union (BCU), and IDBs represented.
	2 April 2008 Recreation sub-group meeting. DW attended; NFSA, GOBA, Broads Authority, RYA, BCU, and IDBs represented.
	14 May 2008 Recreation sub-group meeting. DW attended; NFSA, GOBA, Broads Authority, RYA, BCU, and IDBs represented.
	4 June 2008 RFERAC meeting – DW delivered progress update.
	9 July 2008 Fishing and Conservation sector meeting – discussion of Measures and Annex 12. DW chaired; Angling, Broads Authority, Natural England, NGOs represented.
	9 July 2008 Recreation sub-group meeting to discuss contents of Annex 12. DW attended; NFSA, GOBA, Broads Authority, RYA, BCU, and IDBs represented.
	10 September 2008 Recreation sub-group meeting to discuss the draft RBMP. DW attended.
	5 November 2008 RFERAC meeting. DW gave an update presentation.
Conservation	3 May 2006 NGO workshop to ascertain NGO membership of the Liaison Panel. DW chaired.
	10 July 2006 DW participated in lake restoration workshop. BA and NGOs represented.
	17 November 2006 DW attended East of England Biodiversity Forum workshop. NGOs, BA and Local Authorities involved.

**Sectors, Groups  
and networks**

**Activity**

	13 April 2007	DW attended meeting with Trudi Wakelin (Broads Authority) & John Sharpe (NGOs) to review sector communications and explain SWMI process.
	5 October 2007	Update meeting between DW and John Sharpe (NGOs).
	17 October 2007	DF delivered WFD presentation to Wash Group.
	13 December 2007	DW gave WFD presentation to St Neots Town Initiative. NGOs and planning authorities represented.
	9 July 2008	Fishing and Conservation sector meeting – discussion of Measures and Annex 12. DW chaired; Angling, Broads Authority, Natural England, and NGOs (RSPB) represented.
	11 February 2009	REPAC Statutory Committee - WFD Presentation
	27 April 2009	National Parks WFD Workshop
	21 April 2009	Wildlife Trust WFD Presentation
	6 July 2006	UKIA Sustainable Farming & Food Strategy open day at Eleveden Farms: DW delivered presentation on WFD to farming groups.
	24 August 2006	Meeting between Environment Agency (DW & Lynsey Craig (Regional Agriculture Officer)) and senior CSF officer to discuss CSF process and linkages to WFD.
	15 November 2006	Fran Sykes attended CSF meeting at Ely with CSF officers.
	15 February 2007	DW gave a presentation to AGM of the Lincolnshire IDBs.
Farming	13 March 2007	DW gave a presentation to the AGM of the Great Ouse Branch of the Association of Drainage Authorities (ADA).
	14 March 2007	DW attended and provided assistance at 'Climate Change and the Fens' workshop organised by Diocese of Ely. Community, Business & Industry, and agricultural representatives involved.
	28 March 2007	DW and Fran Sykes met with Paul Hammett (NFU) and Jane Burch (CLA) to review sector communications and explain SWMI process.
	23 April 2007	DW and Fran Sykes met with Paul Hammett (NFU) to discuss amendments to SWMI document.

## Sectors, Groups and networks

### Activity

	2 July 2007	DW and Fran Sykes met with Paul Hammett (NFU) to discuss next panel meeting and communications.
	11 September 2007	DW and Lynsey Craig gave a presentation to Nufarm UK (Agricultural chemicals) about the WFD.
	3 October 2007	DW, DF and Lynsey Craig gave a presentation to agricultural organisations and land managers at the NFU, Newmarket.
	8 November 2007	DW, DF and Lynsey Craig gave a presentation to farmers at the NFU, Newmarket.
	12 February 2008	DF gave a WFD presentation and update at a soils workshop.
	25 February 2008	DF attended ECSFDI project group with AWS & CSF officers to discuss ways of working.
	11 March 2008	Meeting between DW & Steve Scott (Forestry Commission): WFD update and local measures discussion.
	18 March 2008	DF attended ECSFDI steering group & gave a presentation on the PoMs.
	23 May 2008	Environment Agency (DW & DF) and ECSFDI officers meeting to discuss links between WFD/ PR09 and CSF.
	8 July 2008	Agriculture and Land Management sector meeting - discussion of Measures and Annex 12. DW, DF and JP present; NFU, Natural England, CLA and IDBs represented.
	1 October 2008	Meeting with NFU and CLA to discuss the draft Plan.
	26 November 2008	WFD presentation at "Water Works" event organised by The CLA, Bury St Edmunds.
	5 March 2009	Country Land Owners - County Chairmen's meeting, Newmarket
	24 April 2009	NFU Norfolk WFD Presentation
Natural England	15 November 2006	Fran Sykes attended CSF management group meeting.
	28 November 2006	Environment Agency and Natural England dinner.
	19 April 2007	Meeting between DW & Fran Sykes (Environment Agency) and Peter Grimble & David Witherington (Natural England) to review sector communications and explain SWMI process.

**Sectors, Groups  
and networks**

**Activity**

	22 August 2007	DW & Fran Sykes discussed Hydromorphology Review with Peter Grimble (Natural England).
	23 January 2008	Meeting with David Withrington & Peter Grimble (Natural England) to give a WFD update. DW & JP attended.
	23 September 2008	Meeting with Natural England to discuss draft Plan.
	22 September 2006	Local Authority seminars: 'Working Together to create a better place' presentation.
	3 October 2006	Local Authority seminars: 'Working Together to create a better place' presentation.
	17 November 2006	DW attended East of England Biodiversity Forum workshop, involving Local Authorities, Broads Authority & NGOs.
	21 November 2006	Meeting between DW and Richard Belfield (Local Government) to discuss sector linkages and communication routes.
	20 March 2007	DW and Fran Sykes attended meetings with Graham Nelson (EERA), John Brien (Ports) and Peter Holloway (Recreation).
	17 April 2007	DW attended Water UK Diffuse Urban Pollution Think Tank in London, involving planning authorities & water companies.
Local Government/ Planning Authorities	17 September 2007	Presentation by DW, to Mott MacDonald Ltd, focussing on links between the WFD and planning processes.
	20 September 2007	WFD update given by DW to Richard Belfield (Local Government).
	4 October 2007	Presentation given by DW to East of England Environment Forum at GO EAST.
	19 October 2007	DW provided WFD update for Graham Nelson (EERA).
	13 December 2007	DW provided WFD presentation to St Neots Town Initiative.
	20 February 2008	Meeting with Alan Wheeler (new EERA representative).
	28 March 2008	DW delivered WFD presentation to Lincolnshire County Council Policy Development Group (planners & politicians).
	2 June 2008	DW attended Peterborough City Council Water Cycle Strategy meeting and explained links with WFD.

## Sectors, Groups and networks

### Activity

	3 June 2008	DW attended County Surveyors Society Environment Committee: WFD presentation and ways of working with Local Authorities.
	23 June 2008	Urban and Local Government sector meeting – discussion of measures and Annex 12. DW, Richard Whittaker (Planning/ Local Government Advisor), Richard Belfield (Local Government), and Alan Wheeler (EERA) attended.
	22 July 2008	Meeting between DW and Johnathan Reynolds to update EEDA on RBMP progress.
	6 August 2008	DW meeting with Rowena Limb to update GO-EM on RBMP progress.
	9 October 2008	Meeting with EERA to discuss the draft Plan.
	15 October 2008	Meeting with EEDA to discuss the draft Plan.
	15 December 2008	WFD presentation to Luton and South Bedfordshire Water Cycle Strategy group
	28 January 2009	Jonathan Reynolds - EEDA update
	18 March 2009	GO East WFD Presentation
	12 May 2006	Technical teams attended SWMI workshops.
	13 June 2006	DW meeting with WFD pilot - Ribble Valley and site visits.
	15 June 2006	DW attended Environment Agency Statement of Steps workshop.
	30 June 2006	DW attended Anglian/ Humber RBD liaison meeting: discussion of liaison and cross-border issues.
	26 July 2006	DW attended meeting to discuss development of AWB & HMWBs.
Catchment groups	17 August 2006	DW attended marine monitoring co-ordination group.
	6 September 2006	DW attended Weight of Evidence workshop involving development of methodology for SWMI process.
	5 October 2006	Presentation given by DW on WFD to Eastern Area staff.
	12 October 2006	Presentation given by DW on WFD to Central Area staff.
	13 October 2006	Presentation given by DW on WFD to Northern Area staff.

7 November 2006	WFD National Roadshow: presentation on regional impact, and workshop on development of significant issues.
10 January 2007	DW and Fran Sykes attended workshop on development of SWMI (Northern Area): use of national criteria and local knowledge to determine significant issues.
15 January 2007	DW and Fran Sykes attended workshop on development of SWMI (Eastern Area): use of national criteria and local knowledge to determine significant issues.
18 January 2007	DW and Fran Sykes attended workshop on development of SWMI (Central Area): use of national criteria and local knowledge to determine significant issues.
29 March 2007	DW attended workshop in Northern Area to identify measures and specific examples of issues.
2 April 2007	DW attended workshop in Central Area to identify measures and specific examples of issues.
3 April 2007	DW attended workshop in Eastern Area to identify measures and specific examples of issues.
27 April 2007	DW provided SWMI update to Regional Flood Defence Committee - RFDC (Northern) meeting.
30 April 2007	DW provided SWMI update to Regional Flood Defence Committee - RFDC (Central) meeting.
24 May 2007	DW attended Hydromorphology 'rapid designation' feedback meeting.
7 June 2007	DW attended Eastern Area Management Team (AMT): presentation of WFD developments and resource decisions.
24 September 2007	DW delivered WFD update for Regional Management Team (RMT).
5 November 2007	DW and Fran Sykes attended meeting discussing development of AWB & HMWBs in Central Area.
6 November 2007	DW and Fran Sykes attended meeting discussing development of AWB & HMWBs in Northern Area.
9 November 2007	DW and Fran Sykes attended meeting discussing development of AWB & HMWBs in Eastern Area.
26 November 2007	Workshop to develop programme of measures for Northern Area/ Fens and coastal areas. 31 stakeholders from all sectors attended.

Sectors, Groups and networks	Activity
	28 November 2007 Workshop to develop programme of measures for Eastern Area/ Broads and coastal areas. 60 stakeholders from all sectors attended.
	30 November 2007 Workshop to develop programme of measures for Central Area/ Fens and coastal areas. 32 stakeholders from all sectors attended.
	22 January 2008 DW attended meeting to agree designations of AWB & HMWBs in Northern Area.
	19 February 2008 DW present at cross-border meeting with Humber RBD.
	18 April 2008 Invasive Non-native Species workshop to capture local measures. 11 attendees, mainly Environment Agency staff.
	8 May 2008 Broads Authority GEP classification training. Environment Agency staff and 4 Broads Authority members attended.
	9 May 2008 IDB GEP classification training. 25 IDB representatives.
Academia	24 April 2007 Liaison Panel meeting held at Silsoe College, Cranfield University.
	2 March 2007 DW attended meeting to discuss climate change and the WFD.
	14 July 2008 Universities of Antwerp (Belgium) and Nijmegen (Holland) 'interview' to discuss UK process, with special reference to the River Wensum. DW, DF, JP and Ruth Williams (Chemical monitoring & Data, Eastern Area) attended.
Influencing that took place outside the Panel	8 June 2006 DW attended CIWEM conference on WFD.
	18 July 2006 DW attended National CIWEM Catchment Management Conference: presentation on WFD regional implementation.
	11 October 2006 DW gave WFD presentation to officers from Andhra Pradesh, India.
	30 October 2007 WFD presentation and display of activities by DW to East of England MEPs.
	6 May 2008 DW attended European Conference of the Joint Research Council and Commission Pilot River Basin Project. Discussion of diffuse pollution, ECSFDI and PoMs in the Anglian RBD.
	3 June 2008 DW gave a WFD presentation to the County Surveyor's Society Environment Committee, including Local Authority engagement and spatial planning.
	Principles of WFD included in RSS 14 East of England plan.

Sectors, Groups and networks	Activity
<b>National and European level</b>	
Department for Environment, Food and Rural Affairs Water Framework Stakeholder Group	<p>Chaired by the Department for Environment, Food and Rural Affairs. This group was established to promote stakeholder participation in the implementation of the Water Framework Directive. Members of the group are able to raise issues of concern and provide input. The Environment Agency lead on items and provide a detailed Water Framework Directive Programme update for each. Examples of members of the Stakeholder Group are given below. Members include people representing the water industry, land management, environmental Non-Governmental Organizations and government organizations.</p> <ul style="list-style-type: none"> <li>• Water United Kingdom</li> <li>• Natural England</li> <li>• Office of Water Trading</li> <li>• British Waterways</li> <li>• Forestry Commission</li> <li>• National Trust</li> <li>• Country Landowners Association</li> <li>• National Farmers Union</li> <li>• Royal Society for the Protection of Birds</li> </ul>
National Liaison Panel for England	<p>Chaired by the Environment Agency. The National Liaison Panel for England has been set up to complement the River Basin District Liaison Panels. The panel consists of around 20 members based around the key co-deliverers, that is, organisations that are responsible for carrying out actions and others who can both represent the public and help drive changes in behaviour. The panel works on a representational system. This means the panel members are expected to represent the views of the whole of their sector and act as a two-way channel between the panel and their sector.</p> <p>Five meetings of the Liaison Panel were held between July 2007 and June 2009. Meeting papers and minutes are available on the website <a href="http://www.environment-agency.gov.uk/research/planning/33106.aspx">http://www.environment-agency.gov.uk/research/planning/33106.aspx</a>. Members of the public are welcome to attend meetings as observers, by appointment with the Chair.</p>
Wales Stakeholder Group	<p>Chaired by the Welsh Assembly Government. The Environment Strategy for Wales contains a commitment from Welsh Assembly Government to establish a Water Framework Directive Stakeholder Group for Wales. The aim of the group is to provide a focus for communication and consultation on a broad range of Water Framework related issues.</p> <p>The first meeting of the Stakeholder Group took place in Cardiff on 5<sup>th</sup> March, 2007, and it convenes approximately every 6 months. It brings together a wide-ranging group of Welsh stakeholders: local</p>

## Sectors, Groups and networks

### Activity

government, business, agricultural and fisheries interests, land managers, statutory bodies, consumer representatives and the Assembly Government.

The group provides strategic support to Welsh Assembly Government for implementation of the Water Framework Directive in Wales. It focuses on national-level policy and planning issues.

The group will continue as long as necessary, at least up to the completion of the first River Basin Management Plans in 2009.

Minutes and presentations from these meetings are hosted at [http://www.euwfd.com/html/england\\_and\\_the\\_wfd.html](http://www.euwfd.com/html/england_and_the_wfd.html)

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### Collaborative research programme on economics (CRP)

The Collaborative Research Programme provided a consistent UK-wide basis for the environmental economics assessments for Water Framework Directive implementation. It was managed by the Department for Environment, Food and Rural Affairs and included participation from key interested groups:

- Department for Environment, Food and Rural Affairs, Welsh Assembly Government, Scottish Executive, Department of the Environment for Northern Ireland and other Government Departments
- Environment Agency, Scottish Environment Protection Agency, Environment and Heritage Service
- Natural England (previously English Nature), Office of Water Trading
- Industry
- Non-governmental organisations

The project considered assessment of measures and their benefits, in particular:

- a methodology to assess both the cost and effectiveness of measures aimed at protecting water resources;
- guidance on deciding when costs are likely to be disproportionate to benefits;
- a methodology for assessing the benefits - environmental, social and economic - from measures.

Other supporting material was produced, including a database of typical cost ranges for specific measures.

The Collaborative Research Programme provided a consistent UK-wide basis for the environmental economics assessments for Water Framework Directive implementation. It was managed by the Department for Environment, Food and Rural Affairs and included participation from key interested groups:

**Sectors, Groups  
and networks**

**Activity**

- Department for Environment, Food and Rural Affairs, Welsh Assembly Government, Scottish Executive, Department of the Environment for Northern Ireland and other Government Departments
- Environment Agency, Scottish Environment Protection Agency, Environment and Heritage Service
- Natural England (previously English Nature), Office of Water Trading
- Industry
- Non-governmental organisations

The project considered assessment of measures and their benefits, in particular:

- a methodology to assess both the cost and effectiveness of measures aimed at protecting water resources;
- guidance on deciding when costs are likely to be disproportionate to benefits;
- a methodology for assessing the benefits - environmental, social and economic - from measures.

Other supporting material was produced, including a database of typical cost ranges for specific measures.

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Tripartite meetings

The Environment Agency meet regularly with Natural England, Countryside Council for Wales and the Joint Nature Conservancy Council. Discussions are held about key policy and legal issues in the implementation of the Water Framework Directive, as well as nature conservation sub-plans, protected areas and monitoring.

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Sectors, Groups and networks	Activity
Department for Environment, Food and Rural Affairs Economic Advisory Stakeholder Group (EASG)	<p>The Water Framework Directive Economic Advisory Stakeholder Group in England and Wales met for the first time in December 2003. Established to support the implementation of the Water Framework Directive across in England and Wales. The Economic Advisory Stakeholder Group leads on issues defined as specific to England and Wales. Includes both government, agencies and stakeholders, and complements separate Water Framework Directive arrangements in the devolved administrations. The Economic Advisory Stakeholder Group in England and Wales includes all members of the ESG (government and regulators). Additional non-ESG members are listed below:</p> <p>Aluminium Foundation; Association of Electricity Producers; British Hydropower Association; British Marine Federation; British Water; British Waterways; Chemical Industries Association; The Chartered Institution of Water and Environmental Management; Confederation of British Industry; Confederation of British Wool Textiles; Confederation of Paper Industries; Country Land and Business Association; Crop Protection Association; Department for Environment, Food and Rural Affairs, Communications Directorate; Department for Environment, Food and Rural Affairs, Flood Management; Department for Environment, Food and Rural Affairs, Policy and Corporate Strategy Unit; Department for Environment, Food and Rural Affairs, Regulation Review Team; Department of Business and Regulatory Reform; Environmental Education Forum (EEF); Environmental Campaigns (ENCAMS); Environmental Industries Commission</p> <p>Highways Agency; International Navigation Association (PIANC); Kaolin &amp; Ball Clay Association</p> <p>National Farmers' Union; Royal Society for the Protection of Birds; Royal Yachting Association</p> <p>Salmon and Trout Association; Society of British Water and Wastewater Industries;</p> <p>Surface Engineering Association; Surfers Against Sewage; United Kingdom Centre for Economic and Environmental Development; United Kingdom Major Ports; Water UK; Watervoice; The World Wide Fund for Nature (WWF)</p> <p>Key outputs from group and subgroups have been</p> <ul style="list-style-type: none"> <li>• Preliminary cost-effectiveness analysis</li> </ul>
European Union Common Implementation Strategy	<p>Involvement of European Stakeholder groups in development of common European implementation guidance, including European Environment Bureau, WWF, PIANC (ports and navigation), Eureau and other stakeholder groups.</p>
Conferences and seminars	<p>Numerous conferences and seminars including:</p> <ul style="list-style-type: none"> <li>• The Chartered Institution of Water and Environmental Management series</li> <li>• Water UK Water Framework Directive conference 2009</li> </ul>

Sectors, Groups and networks	Activity
	<ul style="list-style-type: none"> <li>• Specific conference for liaison panel members on economics March 2009</li> <li>• Defra Ministerial event 19 March 2009</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Periodic Review in 2009, Catchment Sensitive Farming</li> </ul>



# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex M: Competent authorities

# Contents

<b>M1</b>	<a href="#"><u>Introduction</u></a>	<b>2</b>
<b>M2</b>	<a href="#"><u>Names and addresses of competent authorities</u></a>	<b>2</b>
<b>M3</b>	<a href="#"><u>Geographical coverage of river basin district</u></a>	<b>3</b>
<b>M4</b>	<a href="#"><u>Legal status of competent authorities</u></a>	<b>4</b>
<b>M5</b>	<a href="#"><u>Responsibilities of competent authorities</u></a>	<b>4</b>
<b>M6</b>	<a href="#"><u>Membership</u></a>	<b>5</b>
<b>M7</b>	<a href="#"><u>Contact points and procedures</u></a>	<b>5</b>

## M1 Introduction

This annex sets out the names and addresses of competent authorities for river basin planning within the river basin district and a note of their legal status and responsibilities. The annex also gives, for external enquirers, our contact points and procedures for obtaining background documentation and information.

## M2 Names and addresses of competent authorities

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

Environment Agency  
Rio House, Waterside Drive, Aztec West,  
Almondsbury, Bristol, UK BS32 4UD



## **M4 Legal status of competent authorities**

Secretary of State:

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

Environment Agency:

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

[http://www.opsi.gov.uk/acts/acts1995/Ukpga\\_19950025\\_en\\_1.htm](http://www.opsi.gov.uk/acts/acts1995/Ukpga_19950025_en_1.htm)

## **M5 Responsibilities of competent authorities**

In England, there are two competent authority roles – the “appropriate authority” role undertaken by the Secretary of State and the “Agency” role undertaken by the Environment Agency Protection Agency.

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

The “Agency” is responsible for carrying out the analysis required for characterisation, monitoring, identifying waters used for the abstraction of drinking water, and establishing a register of those waters and other protected areas. It has to prepare proposals for environmental objectives and programmes of measures for each river basin district, and prepare draft river basin management plans. The Agency must also ensure public participation in preparation of the River Basin Management Plan and make certain information required under the Water Framework Directive accessible to the public.

The competent authorities for Anglian river basin district are the Secretary of State and the Environment Agency. The Secretary of State has the “appropriate authority” responsibilities and the Environment Agency has the “Agency” responsibilities.

## **M6 Membership**

Not applicable.

(The Water Framework Directive requires us to record if a competent authority acts as a coordinating body for other competent authorities and, if so, what is the membership of that group).

## **M7 Contact points and procedures**

The initial point of contact is the Anglian river basin district Programme Manager who will coordinate a response to queries:

David Whiles  
Anglian River Basin Programme Manager  
Environment Agency  
Kingfisher House  
Goldhay Way  
Orton Goldhay  
PETERBOROUGH  
PE2 5ZR



# Water for life and livelihoods

River Basin Management Plan  
Anglian River Basin District

Annex N: Glossary

# Contents

N1	<a href="#">Introduction</a>	2
N2	<a href="#">Technical terms</a>	2
N3	<a href="#">Abbreviations</a>	15

## N1 Introduction

This annex provides a list of technical terms and abbreviations used in the main document and annexes of the River Basin Management Plan

## N2 Technical terms

The following list aims to provide brief explanations of many of the words, phrases and acronyms to which particular meanings are attached in river basin management.

Term	Explanation
Agency	Environment Agency of England and Wales.
Agri-environment scheme	Land management schemes on farmland that are beneficial for example for the environment, natural resources, biodiversity, landscape.
Alien species	Non-native species. Many species of plants and animals have been introduced to this country since Roman times. Several of these non-native species are invasive and have been causing serious problems to the aquatic and riverine ecology and environment. Problems include detrimental effects on our native species, deoxygenation of water causing fish mortalities, blocking of rivers and drainage channels, predation and competition with our native species, and in some cases pose health risks to the public or livestock.
Alternative objectives	In certain circumstances (set out in Article 4.4 and 4.5 of the Water Framework Directive) Member States may deviate from achieving the default objectives (e.g. good status by 2015). Objectives which are different from the default objectives are referred to in this river basin management plan as alternative objectives. The types of alternative objective are: - an extended deadline, e.g. achieving good ecological status by 2027; - a less stringent objective, e.g. achieving moderate ecological status by 2015; - different objectives for heavily modified or artificial water bodies, e.g. good ecological potential.
Angiosperms	The flowering plants. In transitional and coastal waters they include sea grasses and the flowering plants found in salt marshes.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of

	groundwater or the abstraction of significant quantities of groundwater.
Artificial Water Body	A man-made surface water body, rather than a modified natural water body, which supports important aquatic ecosystems. It includes canals, some docks and some man-made reservoirs.
Asset Management Plan	See Periodic Review.
Bathing Waters Directive	European Community legislation – (76/160/EEC) which requires Member States to take all necessary actions to ensure identified bathing waters meet certain quality standards prescribed for the protection of the environment and public health. The new Bathing Waters Directive (2006/7/EC) will repeal the original Bathing Water Directive by end of 2014 at the latest.
Biodiversity Action Plan	National, local and sector-specific plans established under the United Kingdom Biodiversity Action Plan, with the intention of securing the conservation and sustainable use of biodiversity.
Biological element	A collective term for a particular characteristic group of animals or plants present in an aquatic ecosystem (for example phytoplankton; benthic invertebrates; phytobenthos; macrophytes; macroalgae; phytobenthos; angiosperms; fish).
Biological indicators	A parameter that can be monitored to estimate the value of a biological quality element. Indicators may include the presence or absence of a particularly sensitive species.
Biological quality element	A characteristic or property of a biological element that is specifically listed in Annex V of the Water Framework Directive for the definition of the ecological status of a water body (for example composition of invertebrates; abundance of angiosperms; age structure of fish).
Catchment	The area from which precipitation contributes to the flow from a borehole spring, river or lake. For rivers and lakes this includes tributaries and the areas they drain.
Catchment Abstraction Management Strategies	These are developed for the management of water resources at a local level. They provide information on water resources and licensing practice to allow the needs of abstractors, other water users and the aquatic environment to be considered in consultation with the local community and interested parties.
Catchment Flood Management Plans	These are strategic planning tools through which the Environment Agency seeks to work with other important decision-makers within a river catchment to identify and agree policies for sustainable flood risk management.
Catchment modelling techniques	Methods used to describe and/or predict characteristics of a catchment. Traditionally, these have focused on natural processes or movement of pollutants but they can also include other factors such as demographic, social and economic characteristics.
Characterisation (of water bodies)	A two-stage assessment of water bodies under the Water Framework Directive. Stage 1 identifies water bodies and describes their natural characteristics. Stage 2 assesses the pressures and impacts from human activities on the water environment. The assessment identifies those water bodies that are at risk of not achieving the environmental objectives set out in the Water Framework Directive. The results are used to prioritise both environmental monitoring and further investigations to identify those water bodies where improvement action is required.

Chemical Status	The classification status for the water body against the environmental standards for chemicals that are priority substances and priority hazardous substances. Chemical status is recorded as good or fail. The chemical status classification for the water body, and the confidence in this (high or low), is determined by the worst test result.
Chemical Status (surface waters)	The classification status for the surface water body. This is assessed by compliance with the environmental standards for chemicals that are listed in the Environmental Quality Standards Directive 2008/105/EC, which include priority substances, priority hazardous substances and eight other pollutants carried over from the Dangerous Substance Daughter Directives. Chemical status is recorded as good or fail. The chemical status classification for the water body, and the confidence in this (high or low), is determined by the worst test result.
Chemical Status (groundwater)	An expression of the overall quality of the groundwater body. The classification status for a groundwater body against the environmental criteria set out in the Water Framework Directive and the Groundwater Directive (2006/118/EC), as set out in Common Implementation Strategy (CIS) guidance document No 18. All five of the component tests for chemical status must be assessed as good or poor and the overall chemical status and the confidence in this (high or low) is determined by the worst test result.
Coastal Forums	Organisations formed to look at the long-term issues facing coastal areas to promote a sustainable approach to the management, use and development of the coastal zone.
Co-deliverer	Agencies and institutions with statutory powers or who have it in their power to deliver actions needed to implement River Basin Management Plans.
Common Agricultural Policy	A policy that regulates farming activities across the European Union, providing direct subsidies to farmers and land managers. A small part of these funds support rural development actions that mainly relate to agricultural activities, as well as forestry and environmental improvements on farmland.
Common Implementation Strategy (CIS)	This strategy was agreed by the European Commission, Member States and Norway in 2001. The aim of the strategy is to provide support in the implementation of the Water Framework Directive and its daughter directives, by developing a common understanding and guidance on key elements of the Directives.
Competent Authority	An authority or authorities identified under Article 3(2) or 3(3) of the Water Framework Directive. The Competent Authority will be responsible for the application of the rules of the Directive within each river basin district lying within its territory.
Cost effective	In the context of the Water Framework Directive, it describes the least cost option for meeting an objective. For example, where there are a number of potential actions that could be implemented to achieve Good Ecological Status for a water body, Cost Effectiveness Analysis is used to compare each of the options and identify which option delivers the objective for the least overall cost.
Countryside Council for Wales	The Countryside Council for Wales is the Welsh Assembly Government's statutory adviser on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment in Wales and its inshore waters. The Countryside Council for Wales is the national wildlife conservation authority for Wales.

Cross compliance	A form of conditionality by which, farmers in receipt of public subsidies are required to comply with all legislation affecting their businesses, including European Union environmental legislation. The requirements of Cross compliance are: i) an obligation to maintain agricultural land in Good Agricultural and Environmental Conditions and ii) an obligation to comply with specified Statutory Management Requirements according to European Union legislation, for example the Nitrates Directive, Groundwater Directive.
Delineation (of water bodies)	Identifying the type and defining the boundary of a water body for rivers, lakes, Transitional and Coastal waters and groundwater under the Water Framework Directive.
Diffuse pollution	Pollution resulting from scattering or dispersed sources that are collectively significant but to which effects are difficult to attribute individually.
Disproportionate cost	The determination of disproportionate cost requires a decision making procedure that assesses whether the benefits of meeting good status in a water body are outweighed by the costs.
Drinking Water Protected Areas	Bodies of water that are used or could be used in the future for the abstraction of water intended for human consumption.
Ecological continuum	The persistence of the ecological structure and functioning of aquatic ecosystems over time and space.
Ecological potential	The status of a heavily modified or artificial water body measured against the maximum ecological quality it could achieve given the constraints imposed upon it by those heavily modified or artificial characteristics necessary for its use. There are five ecological potential classes for Heavily Modified Water Bodies/Artificial Water Bodies (maximum, good, moderate, poor and bad).
Ecological status	Ecological status applies to surface water bodies and is based on the following quality elements: biological quality, general chemical and physico-chemical quality, water quality with respect to specific pollutants (synthetic and non synthetic), and hydromorphological quality. There are five classes of ecological status (high, good, moderate, poor or bad). Ecological status and chemical status together define the overall surface water status of a water
Economic Advisory Stakeholder Group	A group to coordinate the work going forward in England and Wales in relation to the economic analysis required by the Water Framework Directive.
Environment Agency	Environment Agency of England and Wales.
Estuarine	For our purposes by estuarine we mean transitional (see definition).
Eutrophication	The enrichment of waters by inorganic plant nutrients that results in increased production of algae and/or other aquatic plants, which can affect the quality of the water and disturb the balance of organisms present within it.

Exemptions	The environmental objectives of the Water Framework Directive are set out in Article 4. These include the general objective of aiming to achieve good status in all water bodies by 2015 and the principle of preventing any further deterioration in status. There are also a number of exemptions to the general objectives that allow for less stringent objectives, extension of deadline beyond 2015 or the implementation of new projects. Common to all these exemptions are strict conditions that must be met and a justification must be included in the river basin management plan. The conditions and process in which the exemptions can be applied are set out in Article 4.4, 4.5, 4.6 and 4.7.
Favourable Conservation Status	“Favourable Conservation Status (to protect and, where necessary, improve the water or water-dependent environment to the extent necessary to maintain at or restore to favourable conservation status the water-dependent habitats and species for which the Protected Area is designated”. Where this term is used in the River Basin Management Plans, the above definition applies.
Fisheries Action Plans	Fisheries Action Plans are local plans developed in partnership between the Environment Agency and local angling and fisheries groups, with input from conservation and other interest groups. Fisheries Action Plans cover canal and still water fisheries as well as rivers. They may cover a wide range of issues from fish habitat, through to angling promotion and land management. Each Fisheries Action Plan is different and reflects the concerns and priorities of local angling and fisheries interests.
Floods Directive	The purpose of the European Union Directive on flooding (2007/60/EC) is to establish a framework for the assessment and management of flood risks aiming at the reduction of the adverse consequences on human health, the environment, cultural heritage and economic activity associated with floods in the Community. It requires member states to undertake flood risk assessments, flood risk mapping and produce flood risk management plans. The Directive was published in early November 2007 and must be transposed into United Kingdom law by 26 November 2009.
Good chemical status (surface waters)	Means that concentrations of chemicals in the water body do not exceed the environmental standards specified in the Environmental Quality Standards Directive 2008/105/EC. These chemicals include Priority Substances, Priority Hazardous Substances and eight other pollutants carried over from the Dangerous Substance Daughter Directives.
Good chemical status (groundwater)	See chemical status (groundwater). Means the concentrations of pollutants in the groundwater body do not exceed the criteria set out in Article 3 of the Groundwater Daughter Directive (2006/118/EC).
Good ecological potential	Those surface waters which are identified as Heavily Modified Water Bodies and Artificial Water Bodies must achieve ‘good ecological potential’ (good potential is a recognition that changes to morphology may make good ecological status very difficult to meet). In the first cycle of river basin planning good potential may be defined in relation to the mitigation measures required to achieve it.
Good ecological status	The objective for a surface water body to have biological, structural and chemical characteristics similar to those expected under nearly undisturbed conditions.
Good quantitative status	See quantitative status (groundwater). Means the level of groundwater in the groundwater body meets the criteria set out in

(groundwater)	Annex V (2.1.2) of the Water Framework Directive.
Good status	Is a term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, when both its quantitative status and chemical status are at good status.
Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Habitat Action Plans	See “Biodiversity Action Plans” above.
Hazardous substances	Substances or groups of substances that are toxic, persistent and liable to bioaccumulate, and other substances or groups of substances which give rise to an equivalent level of concern.
Heavily Modified Water Body	A surface water body that does not achieve good ecological status because of substantial changes to its physical character resulting from physical alterations caused by human use, and which has been designated, in accordance with criteria specified in the Water Framework Directive, as ‘heavily modified’.
High ecological status	Is a state, in a surface water body, where the values of the hydromorphological, physico-chemical, and biological quality elements correspond to conditions undisturbed by anthropogenic activities.
Hydromorphology	Describes the hydrological and geomorphological processes and attributes of surface water bodies. For example for rivers, hydromorphology describes the form and function of the channel as well as its connectivity (up and downstream and with groundwater) and flow regime, which defines its ability to allow migration of aquatic organisms and maintain natural continuity of sediment transport through the fluvial system. The Water Framework Directive requires surface waters to be managed in such a way as to safeguard their hydrology and geomorphology so that ecology is protected.
Impact assessment	A tool to enable the Environment Agency to weigh and present the evidence on the positive and negative effects of a plan. For example information on the estimated cost and benefit of proposing actual measures.
Integrated Coastal Zone Management	A voluntary system to manage the complex range of activities in the coastal zone with sustainability and stakeholder involvement at its core. It is a process that brings together all those involved in the development, management and use of the coast within a framework that helps the integration of their interests and responsibilities. The objective is to establish sustainable levels of economic and social activity in coastal areas while protecting the coastal environment.
Integrated River Basin and Coastal Management	A process whereby all pressures in a catchment are assessed and action undertaken in an integrated, proportionate and efficient way. A range of stakeholders are involved in the setting of priorities and their ultimate delivery.
Liaison Panels	A panel consisting of around 15 representatives of strategic co-deliverers including bodies with statutory powers and others who will need to put measures into action for the River Basin District. The panel represents all key interests within the River Basin District and is the primary focus for engagement at the River Basin District level.
Local Development Frameworks and Plans	Under the Planning and Compulsory Purchase Act 2004, local plans and unitary development plans in England were replaced by Local Development Frameworks. These are made up of a number of

	statutory and non-statutory local development documents. In Wales, they are called Local Development Plans.
Macroalgae	Multicellular algae such as seaweed.
Macrophyte	Larger plants, typically including flowering plants, mosses and larger algae but not including single-celled phytoplankton or diatoms.
Marine Bill	A bill to ensure greater protection of marine resources and to deliver sustainable development in the marine and coastal environment by addressing both the use and protection of marine resources.
Marine Pollution Monitoring Management Group	Group comprising government departments, agencies and government research institutions. They co-ordinate a United Kingdom programme of estuarine and coastal monitoring designed to satisfy a number of requirements including trend monitoring for the Oslo and Paris Convention, compliance with European Commission Directives and international conventions, local needs and for research and development.
Measure	This term is used in the Water Framework Directive and domestic legislation. It means an action which will be taken on the ground to help achieve Water Framework Directive objectives.
Mechanisms	The policy, legal and financial tools which are used to bring about actions (measures). Mechanisms include for example: legislation, economic instruments; codes of good practice; negotiated agreements; promotion of water efficiency; educational projects; research; development and demonstration projects.
Misconnections	Misconnections of foul sewage into surface water drains are a significant source of urban diffuse pollution in those areas where a separate drainage system is used. Misconnections happen when domestic plumbing has been connected into surface water drains instead of the foul sewer. This means untreated dirty water goes directly into rivers/waterways without receiving treatment.
Morphology	Describes the physical form and condition of a surface water body, for example the width, depth and perimeter of a river channel, the structure and condition of the riverbed and bank.
National	This term refers, in this document, to England and Wales. The Environment Agency covers the whole of England and Wales and is the Competent Authority for the Water Framework Directive in both.
National Assembly for Wales	The National Assembly for Wales consists of 60 Members elected throughout Wales. The Assembly has delegated many of its powers to the First Minister, who leads the Welsh Assembly Government. The Assembly decides on its priorities and allocates the funds made available to it from the Treasury. Within its powers, the Assembly develops and implements policies that reflect the particular needs of the people of Wales.
Natura 2000 sites	Protected Areas established for the protection of habitats or species under the Birds Directive (79/409/European Economic Community) (Special Protection Areas) and the Habitats Directive (92/43/European Economic Community) (Special Areas of Conservation).
Natural England	The government-funded body whose purpose is to promote the conservation of England's wildlife and natural features. The previously existing organisations English Nature, the Countryside Agency and Rural Development Service were merged to form Natural England.
Nitrate Vulnerable Zone	The land draining to waters that contain, or are likely to contain, 50 mg/l of nitrate, or waters that are eutrophic or likely to become so. Within these zones an action programme under the Nitrates Directive

	is put in place which farmers have to observe to reduce nitrate pollution.
No deterioration (in water body status)	None of the quality elements used in the classification of water body status deteriorates to the extent that the overall status is reduced.
Non-hazardous pollutant	Any substance that is not a hazardous substance but is liable to cause pollution in significant quantities.
Non-native species	See Alien species.
Objective (surface waters)	<p>Three different status objectives for each water body. These are:</p> <ul style="list-style-type: none"> <li>• Overall status objective</li> <li>• Ecological status or potential objective; and</li> <li>• Chemical status objective</li> </ul> <p>These are always accompanied by a date by when the objective will be achieved.</p> <p><u>Ecological status (or potential) objectives</u> will be derived from the predicted outcomes for the biological elements and physico-chemical elements, plus any reasons for not achieving good ecological status (or potential) by 2015.</p> <p><u>Chemical status objectives</u> will be derived from the predicted outcomes for the chemical elements plus any reasons for not achieving good chemical status by 2015.</p> <p><u>Overall status objectives</u> will be derived from the ecological status and chemical status objectives.</p>
Objective (groundwater)	<p>There are three status objectives for each groundwater body:</p> <ul style="list-style-type: none"> <li>• Overall status objective;</li> <li>• Quantitative status objective; and</li> <li>• Chemical status objective.</li> </ul> <p>These are always accompanied by a date by when the objective will be achieved.</p> <p><u>Overall status objectives</u> will be derived from the quantitative status and chemical status objectives</p> <p>In addition to status objectives there are also additional environmental objectives: to prevent deterioration of status, to prevent or limit the inputs of pollutants to groundwater and to reverse any significant and sustained upward trends in pollutant concentrations.</p>
Office of Water Services	The economic regulator for the water and sewerage industry in England and Wales. Office of Water Services has been renamed the Water Services Regulation Authority.
Oslo and Paris Convention	<p>The 1992 Oslo and Paris Convention is the current instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. It combined and up-dated the 1972 Oslo Convention on dumping waste at sea and the 1974 Paris Convention on land-based sources of marine pollution.</p> <p>The work under the convention is managed by the Oslo and Paris Commission, made up of representatives from the Governments of the 15 Contracting Parties and the European Commission.</p>
Periodic Review	This is the process, carried out every five years by the Office of Water Services, to assess the strategic plans for water company spending and investment. The plans include environmental improvements. The investment will often affect water customer charges and incorporates company business plans (called Asset Management Plans).
Phytobenthos	Bottom-dwelling multi-cellular and unicellular aquatic plants such as some species of diatom.

Phytoplankton	Unicellular algae and cyanobacteria, both solitary and colonial that live, at least for part of their lifecycle, in the water column.
Planning Policy Statements	Planning Policy Statements set out the Government's national policies on different aspects of land use planning in England and are produced by the Department for Communities and Local Government (formerly Office of the Deputy Prime Minister).
Point source pollution	Pollution arising from an identifiable and localised area, structure or facility, such as a discharge pipe or landfill.
Pollutant	Any substance liable to cause pollution.
Pollution	The direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which: (i) may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems; (ii) result in damage to material property; or (iii) impair or interfere with amenities and other legitimate uses of the environment.
Predicted outcome	The future status of a quality element or water body based on groups of practical and justified measures and the date when this status will be achieved.
Pressures	Human activities such as abstraction, effluent discharges or engineering works that have the potential to have adverse effects on the water environment.
Priority substances	A pollutant, or group of pollutants, presenting a significant risk to or via the aquatic (surface water) environment that has been identified at Community level under Article 16 of the Water Framework Directive. They include 'priority hazardous substances'.
Programme of Measures	A Programme of Measures, as used in the Water Framework Directive, is a group of actions designed to improve the environment in a river basin district and meet the objectives of the Directive.
Protected Areas	Areas that have been designated as requiring special protection under Community legislation for the protection of their surface water and groundwater or for the protection of habitats and species directly depending on water.
Quality element	A feature of an aquatic (surface water) ecosystem that can be described as a number for the purposes of calculating an ecological quality ratio, such as the concentration of a pollutant; the number of species of a type of plant.
Quantitative status (groundwater)	An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions. The classification status for a groundwater body against the environmental criteria set out in the Water Framework Directive and as set out in Common Implementation Strategy Guidance Document No 18. All four of the component tests for quantitative status must be assessed as good or poor and the overall quantitative status and the confidence in this (high or low) is determined by the worst test result.
Ramsar site	A wetland area designated for its conservation value under The 1971 Convention on Wetlands of International Importance, especially as Waterfowl Habitat. The Ramsar Convention seeks to promote the conservation of listed wetlands and their wise use.
Reference conditions	The benchmark against which the effects on surface water ecosystems of human activities can be measured and reported in the relevant classification scheme. For waters not designated as heavily modified or artificial, the reference conditions are synonymous with the high ecological status class. For waters designated as heavily modified or artificial, they are synonymous with the maximum

	ecological potential class.
Regional Spatial Strategies	These are frameworks in England controlling development across an area or region (for example for tourism, planning, waste, minerals, energy).
Risk	The likelihood of an outcome (usually negative) to a water body or the environment, or the potential impact of a pressure on a water body.
Risk assessment	The analysis that predicts the likelihood that a water body is at significant risk of failing to achieve one or more of the Water Framework Directive objectives.
Risk category	The numerical or descriptive category assigned to water bodies that have been risk assessed, in order to make the risk-based prioritisation of water bodies for action under the Water Framework Directive more manageable.
River basin	A river basin is the area of land from which all surface run-off and spring water flows through a sequence of streams, lakes and rivers into the sea at a single river mouth, estuary or delta. It comprises one or more individual catchments.
River Basin District	A river basin or several river basins, together with associated coastal waters.
River Basin Management	The management and associated planning process that underpins implementation and operation of the Water Framework Directive. It is both an overarching process in terms of existing processes and also defines new sub-processes such as those for hydromorphology. The river basin management plans are plans for river basin management.
River Basin Management Plan	For each River Basin District, the Water Framework Directive requires a River Basin Management Plan to be published. These are plans that set out the environmental objectives for all the water bodies within the River Basin District and how they will be achieved. The plans will be based upon a detailed analysis of the pressures on the water bodies and an assessment of their impacts. The plans must be reviewed and updated every six years.
River Quality Objective	A River Quality Objective is an agreed strategic target, expressed in terms of River Ecosystem Standards, which is used as the planning base for all activities affecting the water quality of a stretch of water. A River Quality Objective is the level of water quality that a river should achieve in order to be suitable for its agreed uses.
Rivers Trusts	Charities and organisations set up to assist in the conservation, protection and improvement of rivers and associated environments.
Rural Development Programme	The England Rural Development Programme and the Rural Development Plan for Wales are schemes in the Government's Public Incentive Programme. These programmes are of major significance for rural land management as they provide substantial funding to land managers conditional on the implementation of environmental (and other) actions.
Safeguard zone	A catchment or other defined zone around a point where the water is abstracted for potable use and where actions may be taken to protect raw water quality and prevent deterioration, so minimising the need for purification treatment. For groundwater they are likely to be based on source protection zones under the Environment Agency's Groundwater Protection Policy.
Saturation zone	Subsurface rock or other geological strata within which the pore spaces between the particles of rock or other strata, and the cracks in those strata are filled with water and for which a water table may be determined.

Significant and sustained upward trend	A statistically significant trend in pollutant concentrations in groundwater that could lead to a future failure of one or more of the environmental objectives for groundwater unless it is reversed.
Site of Special Scientific Interest	An area of land notified under the Wildlife and Countryside Act 1981 by the appropriate nature conservation body (Scottish Natural Heritage in Scotland) as being of special interest by virtue of its flora and fauna, geological or physiogeographical features.
Source Protection Zone	A zone around a well, borehole or spring where groundwater is abstracted for human consumption (for example drinking water or food production), as defined under the Agency's Groundwater Protection Policy (GP3). Zone 1 (SPZ1) is the area closest to the abstraction, representing the highest risk to the source. Zones 2 and 3 are progressively larger. Risk-based Policies to prevent pollution are applied within these zones.
Spatial planning	Spatial planning is wider ranging than land-use planning based on regulation and control of land, and aims to ensure the best use of land by assessing competing demands. Social, economic and environmental factors are taken into account in producing a decision that is more conducive to sustainable development.
Special Area of Conservation	Natura 2000 sites that are designated under the Habitats Directive.
Special Protection Area	Natura 2000 sites that are designated under the Birds Directive.
Specific Pollutant	A substance considered as being discharged to the aquatic environment in significant quantities at the national level and for which Environmental Quality Standards have been established. As part of the ecological classification criteria, and in places where these pollutants are monitored, these standards must be met, in order for a surface water body to be classified as good ecological status.
Stakeholder	Individuals or groups that are or could become interested in, involved in or affected by our policies and activities. Our stakeholders include regulators, statutory bodies, professional organisations, local organisations and members of the public.
Stakeholder forum	A group of interested parties to guide and advice on river basin planning and management.
Strategic Environmental Assessment Directive (2001/42/EC)	European environmental legislation which requires an 'environmental assessment' to be carried out for certain plans and programmes whose formal preparation began after 21 July 2004 (or are prepared but not adopted or submitted by a legislative procedure by 21 July 2006), and which are considered likely to have significant effects on the environment. The term "Strategic Environmental Assessment" is used in United Kingdom guidance to mean an environmental assessment under this Directive.
Status	The physical, chemical, biological, or ecological quality of a water body.
Summary of Significant Water Management Issues	This is a report on each River Basin District that highlights significant water management issues in that River Basin District which will need to be addressed to achieve environmental objectives under the Water Framework Directive.
Supplementary Plans	Plans additional to the River Basin Management Plan which contain additional detail to that within the River Basin Management Plan but which fits wholly within its strategic principles and policies. Supplementary Plans do not cover issues outside the remit of the Water Framework Directive.

Sustainable Drainage Systems	A system of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.
Technical feasibility	Is determined through the assessment of whether the implementation of a measure or programme of measures, designed to achieve the Water Framework Directive objectives, is technically possible either at the national and local level and includes the consideration of uncertainty as well as environmental and socio economic feasibility.  Technical feasibility depends upon the availability of a technical solution and information on the cause of the problem and hence the identification of the solution.
Toolkit of Measures	A variety of measures which consist of actions that when implemented can help deliver Water Framework Directive objectives. These may include basic measures (the minimum set of measures that must be available) and supplementary measures.
Transitional water	A Water Framework Directive term for waters that are intermediate between fresh and marine water. Transitional waters include estuaries and saline lagoons.
Typology	The means by which the Water Framework Directive requires surface water bodies to be differentiated according to their physical and physico-chemical characteristics.
Water body	A manageable unit of surface water, being the whole (or part) of a stream, river or canal, lake or reservoir, transitional water (estuary) or stretch of coastal water. A 'body of groundwater' is a distinct volume of groundwater within an aquifer or aquifers.
Water Framework Directive	European Union legislation – Water Framework Directive (2000/60/EC) – establishing a framework for European Community action in the field of water policy.
Water Framework Directive management catchment	An amalgamation of a number of Water Framework Directive river water body catchments that provide a management unit at which level actions are applied.
Water Framework Directive objectives	The objectives set out in Article 4 of the Water Framework Directive together with objectives set out in paragraphs 2 and 3 of Article 7 of the Directive and which are required to be met.
Water Level Management Plans	Water Level Management Plans provide a means by which water level requirements for a range of activities including agriculture, flood defence and conservation can be balanced and integrated.
Water Protection Zones	Areas designated by the Secretary of State, within which activities polluting the water environment can be restricted or forbidden. Water Protection Zones can be designated at any scale (sub-catchment, catchment or a larger area) and restrictions are enforced to combat point and/or diffuse sources of water pollution, over and above other existing statutory powers.
Water Services	All services which provide, for households, public institutions or any economic activity: (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater; and (b) waste water collection and treatment facilities which subsequently discharge into surface water.
Water table	The upper limit of the saturation zone.

Water use	Water Services together with any other human activity identified as having a significant impact upon the status of water.
Weight of evidence	A weight of evidence approach integrates results or evidence from several data sources, weighted appropriately, to make risk based decisions.
Welsh Assembly Government	The devolved government in Wales.
Welsh Technical Advice Notes	<i>Planning Policy Wales</i> (2002) sets out the land use planning policies of the Welsh Assembly Government (the Assembly Government). It is supplemented by a series of topic based Technical Advice Notes (Wales). Technical Advice Notes may be material to decisions on individual planning applications and will be taken into account by the National Assembly for Wales and planning inspectors in the determination of called-in planning applications and appeals.

## N3 Abbreviations

AMP	Asset Management Plan
AWB	Artificial Water Bodies
BGS	British Geological Survey
BOD	Biological outcomes database
BPA	British Ports Association
CAMS	Catchment Abstraction Management Strategy
CAP	Common Agricultural Policy
CCW	Countryside Council for Wales
CEA	Cost Effective Analysis
CEFAS	Centre for the Environment, Fisheries and Aquaculture Science
CFMPs	Catchment Flood Management Plans
CIS	Common Implementation Strategy
CLA	Country Land and Business Association
CRP	Collaborative Research Project
CSFO	Catchment Sensitive Farming Officers
CSPs	Community Strategic Partnerships
DCLG	Department of Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DrWPA	Drinking Water Protected Area
EASG	Economic Advisory Stakeholder Group
EC	European Community/Commission
EU	European Union
FAPs	Fisheries Action Plans
FCRM	Flood and Coastal Risk Management
FRS	Fisheries Research Services
GAEC	Good Agricultural and Environmental Conditions
GEP	Good Ecological Potential
GP3	“Groundwater Protection: Policy and Practice” documents
GQA	General Quality Assessment
GWD	Groundwater Directive (2006/118/EC).
HMWB	Heavily Modified Water Bodies
IA	Impact assessment (formerly regulatory impact assessment)
ICZM	Integrated Coastal Zone Management
IRBCM	Integrated River Basin Catchment Management
JNCC	Joint Nature Conservation Committee
LDF	Local Development Framework
LDP	Local Development Plan
LEAP	Local Environment Action Plan
LPO	Local Planning Authority
LSPs	Local Strategic Partnerships
MMO	Marine Management Organisation
MPMMG	Marine Pollution Monitoring Management Group
N2K	Natura 2000 sites
NAW	National Assembly for Wales
NFU	National Farmers’ Union
NGO	Non-governmental organisation
NMMP	National Marine Monitoring Plan
NMP	National Marine Programme
NVZ	Nitrate Vulnerable Zone
ODPM	Office of the Deputy Prime Minister
Ofwat	Water Services Regulation Authority

OSPAR	Oslo and Paris Convention
PPS	Planning Policy Statement
pCEA	Preliminary cost effective analysis
PoMs	Programme of Measures
PR09	Periodic Review in 2009
PSA	Public Service Agreement
RBC	River Basin Characterisation
RBD	River Basin District
RBMP	River Basin Management Plan
RDR	Rural Development Regulation
RDS	Rural Development Service
RIA	Regulatory Impact Assessment
RQO	River Quality Objective
RRDF	Regional Rural Development Framework
RSPB	Royal Society for the Protection of Birds
RSS	Regional Spatial Strategies
RSU	Regional Strategy Units
SAC	Special Area of Conservation
SAPs	Salmon Action Plans
SEAD	Strategic Environmental Assessment Directive
SEPA	Scottish Environment Protection Agency
SFP	Single Farm Payment
SMP	Shoreline Management Plan
SMR	Statutory Management Requirements
SNH	Scottish Natural Heritage
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
SoS	Secretary of State
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SSWMI	Summary of Significant Water Management Issues
SUDS	Sustainable Drainage Systems
TANs	Technical Advice Notes
TRaC	Transitional and Coastal
UKCIP	United Kingdom Climate Impacts Programme
UKMPG	United Kingdom Major Ports Group
UKTAG	United Kingdom Technical Advisory Group
UKWIR	United Kingdom Water Industry Research
WFD	Water Framework Directive
WLMPs	Water Level Management Plans
WPZs	Water Protection Zones