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Water for life and livelihoods

River Basin Management Plan
Anglian River Basin District

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The Environment Agency website holds the river basin management plans for England and Wales, and a range of other information about the environment, river basin management planning and the Water Framework Directive. www.environment-agency.gov.uk/wfd

You can search maps for information related to this plan by using 'What's In Your Backyard'. http://www.environment-agency.gov.uk/maps.

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Contents

List of figures

List of tables

List of Case Studies

This plan at a glance

This plan is about the pressures facing the water environment in the Anglian River Basin District, and the actions that will address them. It has been prepared under the Water Framework Directive, and is the first of a series of six-year planning cycles.

By 2015, 16 per cent of surface waters (rivers, lakes, estuaries and coastal waters) in this river basin district are going to improve for at least one biological, chemical or physical element, measured as part of an assessment of good status according to the Water Framework Directive. This includes an improvement of **1,700 km** of the river network in relation to fish, phosphate, specific pollutants and other elements.

By 2015 19 per cent of surface waters will be at good ecological status/potential and 45 per cent of groundwater bodies will be at good status. In combination 20 per cent of all water bodies will be at good status by 2015. The Environment Agency wants to go further and achieve an additional two per cent improvement to surface waters across England and Wales by 2015.

The biological parts of how the water environment is assessed – the plant and animal communities – are key indicators. **At least 30 per cent of assessed surface waters will be at good or better biological status by 2015.**

The Anglian River Basin District is a unique environment; the landscape ranges from gentle chalk and limestone ridges to the extensive lowlands of the Fens and East Anglian coastal estuaries and marshes. Water is essential to the maintenance of the rivers, lakes, estuaries, coasts and groundwater that underpins these landscapes and their wildlife. And it is vital to the livelihoods of those who live and work here.

In the past there has been considerable progress in protecting the natural assets of the river basin district and in resolving many of the problems for the water environment.

However, a range of challenges remain, which will need to be addressed to secure the predicted improvements. They include:

- point source pollution from sewage treatment works;
- the physical modification of water bodies;
- diffuse pollution from agricultural activities;
- water abstraction;
- diffuse pollution from urban sources.

At present, because of these pressures and the higher environmental standards required by the Water Framework Directive only 18 per cent of surface waters are currently classified as good ecological status or potential. 33 per cent of assessed surface water bodies are at good or better biological status now, although we expect this to change to 27 per cent when we have assessed all water bodies.

In order to meet these targets, it is important for everyone to play their part now and in the future. River basin management is an opportunity for this generation – for people and organisations to work together to improve the quality of every aspect of the water environment – to create an environment we are all proud of and can enjoy.

1 About this plan

This plan focuses on the protection, improvement and sustainable use of the water environment. Many organisations and individuals help to protect and improve the water environment for the benefit of people and wildlife. River basin management is the approach the Environment Agency is using to ensure our combined efforts achieve the improvement needed in the Anglian River Basin District.

River basin management is a continuous process of planning and delivery. The Water Framework Directive introduces a formal series of 6 year cycles. The first cycle will end in 2015 when, following further planning and consultation, this plan will be updated and reissued.

The Anglian River Basin District Liaison Panel has been central to helping us manage this process. The panel includes representatives of businesses, planning authorities, environmental organisations, consumers, navigation, fishing and recreation bodies and central, regional and local government, all with key roles to play in implementing this plan. The Environment Agency has also worked extensively with local stakeholders to identify the actions needed to address the main pressures on the water environment.

This plan has been prepared under the Water Framework Directive, which requires all countries throughout the European Union to manage the water environment to consistent standards. Each country has to:

- prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- aim to achieve at least good status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027;
- meet the requirements of Water Framework Directive Protected Areas;
- promote sustainable use of water as a natural resource;
- conserve habitats and species that depend directly on water;
- progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants;
- contribute to mitigating the effects of floods and droughts.

The plan describes the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment, and what actions will be taken to address the pressures. It sets out what improvements are possible by 2015 and how the actions will make a difference to the local environment – the catchments, the estuaries and coasts, and the groundwater.

Looking towards implementation, the plan highlights the programme of investigations to be undertaken. This will identify more actions, particularly those associated with diffuse pollution, for delivery during the first cycle. New national measures, made available by government, will also lead to additional improvements. At local level, the Environment Agency will be working closely with a wide variety of organisations and individuals, not only to deliver the commitments contained in the plan, but wherever possible to expand upon them for the benefit of the water environment.

Strategic Environmental Assessment

A Strategic Environmental Assessment of the draft plan was completed to review the effects of the proposals on the wider environment. The assessment enabled us to make sure that this plan represents the most sustainable way of managing the water environment.

The Post Adoption Statement and accompanying Statement of Environmental Particulars is available at www.environment-agency.gov.uk/wfd.

Habitats Regulations Assessment

A Habitats Regulations Assessment of this plan has been carried out to consider whether it is likely to have a significant effect on any Natura 2000 sites. The assessment was undertaken by the Environment Agency, in consultation with Natural England.

The assessment concluded that the River Basin Management Plan is unlikely to have any significant negative effects on any Natura 2000 sites. The Plan itself does not require further assessment under the Habitats Regulations. This conclusion is reliant on the fact that before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations. Any plans, project or permissions required to implement the measures must undergo an appropriate assessment if they are likely to a have a significant effect.

A copy of the Habitats Regulations Assessment of this plan is available at www.environment-agency.gov.uk/wfd.

Impact Assessment

An impact assessment of this plan has been completed. It looks at the costs of a reference case, which includes existing actions and new actions required by existing obligations, and the incremental costs and benefits of implementing the additional new actions required by this plan. The impact assessment also provides a forward look to the costs and benefits of potential action in future cycles (2015 to 2021 and 2021 to 2027).

A copy of the impact assessment is available at www.environment-agency.gov.uk/wfd.

2 About the Anglian River Basin District

The river basin district covers 27,890 km^2 from Lincolnshire in the north to Essex in the south, and Northamptonshire in the west to the East Anglian coast. The landscape ranges from gentle chalk and limestone ridges to the extensive lowlands of the Fens and East Anglian coastal estuaries and marshes. In total over 5.2 million people live and work in small or medium sized towns and cities within the district which has no extensive metropolitan areas.

Figure 1 **Map of the Anglian River Basin District**

The river basin district is predominantly rural, with more than half of its land surface (approximately 1.5 million hectares) used for agriculture and horticulture. From the fertile

Fens – which cover 388,500 hectares of Lincolnshire, Cambridgeshire and Norfolk – to the extensively grazed grasslands in the Waveney Valley, Anglian River Basin District has one of the most productive agricultural landscapes in the world. Best known for its cereal crops, more than a quarter of England's wheat and barley are produced here. But the river basin district is also a major horticultural region cultivating everything from peas and beans to potatoes and carrots, apples, strawberries, salad crops, flowers and shrubs. Farmers also harvest over half of the nation's sugar beet – mainly in Cambridgeshire, Lincolnshire, Norfolk and Suffolk. Also Britain's pig and poultry farms are mostly located here. The second largest pig herd in England is located here. Sheep flocks, beef and dairy herds may be small compared with other regions, but they are important to the farming 'balance' of the region and grazing livestock makes a major contribution to our prized landscape.

One of the most striking parts of the river basin district are the Lincolnshire and Cambridgeshire Fens. This artificial, man-made landscape has been forged from coastal and estuarine wetlands over many centuries. These marshes, which are at or below sea level have been artificially drained and continue to be protected from floods by drainage banks and pumps. With the support of this drainage system, the Fens have become the most important arable agricultural area in Britain for grains and vegetables. These drainage systems also provide flood protection to a large number of settlements and properties and to the infrastructure (gas, water, electricity, telephones, etc.) which serves those communities.

The river basin district is the richest region in the UK for wetland wildlife. The Broads, in particular, is Britain's largest nationally protected wetland and provides a habitat for a myriad of rare plants and animals. Freshwater habitats within the river basin district are very important for wintering wildfowl, and reservoirs and watercourses support some important fisheries. Many invertebrate populations and populations of rare birds depend upon these freshwater wetlands. Approximately 80 per cent of England's resource of lowland fen occurs here, including the largest expanse of lime-rich fens. Other internationally important fens occur in the heads of valleys, fed by groundwater springs. A rich mix of other habitats are found in the region, including swamp, reedbeds and carr woodland.

Much of the extensive and varied coast of the region is internationally designated. This includes 33 per cent of the UK's extensive areas of saltmarsh, which reflects the presence of large estuaries and wide intertidal areas along the coast.

Pressures on the water environment

A great deal is already being done to protect and improve the water environment. However, it will take more time, effort and resources to deal with the pressures that have significantly altered and damaged the environment over the last few hundred years. There are a number of major challenges.

Transport networks, cities, towns and villages put pressure on the water environment. **Discharges from the sewage system can impact on quality** or the enjoyment of it and water companies will implement a major programme of work to address this issue.

Many of the towns are within one of the two Growth Areas or are one of the five Growth Points identified by the Government's Sustainable Communities Plan. Before 2026 spatial plans propose an additional 600,000 homes along with the jobs and services for the people in them. Managed well, this **growth and regeneration will be an opportunity** to make improvements to the water environment in a way that enhances people's quality of life.

The way land is managed has given rise to complex pollution issues. This **diffuse pollution is a major pressure** on the water environment and can come from both urban and rural areas. Further improvements are needed to land management practices to protect water quality and allow wildlife to thrive.

Physical modification is a key issue. Modified water bodies account for nearly 70 per cent of rivers and 77 per cent of both lakes and estuaries. The negative impacts of these centuries-old changes need to be mitigated, so as to provide the best habitat for wildlife possible, whilst recognising the ongoing need for those modifications to continue to exist. One of the biggest challenges facing the river basin district is **water management**. Parts are extremely dry, receiving only two-thirds of the UK's average rainfall. Many of our most important wildlife sites are dependent on a good supply of water and it is obviously of vital importance to public water supplies, agriculture and industry. At the other extreme, flooding is also a key feature of the river basin district. About one-fifth of the region is susceptible and therefore, coastal and inland flooding is a major concern for many communities. Natural forces such as sea level rise, coupled with climate change, can pose an increasing threat to people, property and coastal habitats.

All these challenges relate to a range of specific pressures that need to be dealt with in this river basin district. These are:

- **abstraction and other artificial flow regulation** – problems related to taking water from rivers, lakes and groundwater.
- **non-native species** - invasive non-native species are plants and animals that have deliberately or accidentally been introduced outside their natural range, and by spreading quickly threaten native wildlife and can cause economic damage.
- **nitrate** – a nutrient found in fertilisers used in agriculture, and in sewage effluent.
- **organic pollution** – an excess of organic matter such as manure or sewage which depletes the oxygen available for wildlife.
- **pesticides** – chemical and biological products used to kill or control pests.
- **phosphate** – a nutrient in sewage and fertiliser that can cause too much algae in rivers when in excess quantities.
- **physical modification** – changes to the structure of water bodies, such as for flood defence.
- **sediment** – un-dissolved particles floating on top of or suspended within water, for example those caused by increased rates of soil erosion from land based activities. Sedimentation can smother river life and spread pollutants from the land into the water environment.
- **urban and transport pollution** – a range of pollutants related to urban areas and the transport network.

3 Water bodies and how they are classified

In the context of the Water Framework Directive, the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile. For the purposes of river basin management, these waters are divided into units called water bodies, as summarised in Table 1. In addition, this plan aims to protect wetlands that depend on groundwater.

The total length of the rivers covered by the Water Framework Directive in the Anglian River Basin District is 6,968km.

Table 1 **Water body numbers in the Anglian River Basin District**

	Water body types					
	River and canal*	Lakes and reservoirs **	Estuaries (transitional)	Coastal	Ground water	**Total**
Natural water bodies	232	11	4	4	31	**282**
Artificial water bodies	130	24	0	0	n/a	**154**
Heavily modified water bodies	396	14	14	7	n/a	**431**
Total	**758**	**49**	**18**	**11**	**31**	**867**

** The river and canal category also includes surface water transfers (SWTs)*

*** The lake and reservoir category includes ditches that are in Sites of Special Scientific Interest (SSSI)*

The Water Framework Directive sets an objective of aiming to achieve at least 'good status' in all water bodies by 2015 or, provided that certain conditions are satisfied, seek to achieve the objective by 2021 or 2027.

Surface waters

For surface waters, good status is a statement of 'overall status', and has an ecological and a chemical component. Good ecological status is measured on the scale high, good, moderate, poor and bad. Chemical status is measured as good or fail.

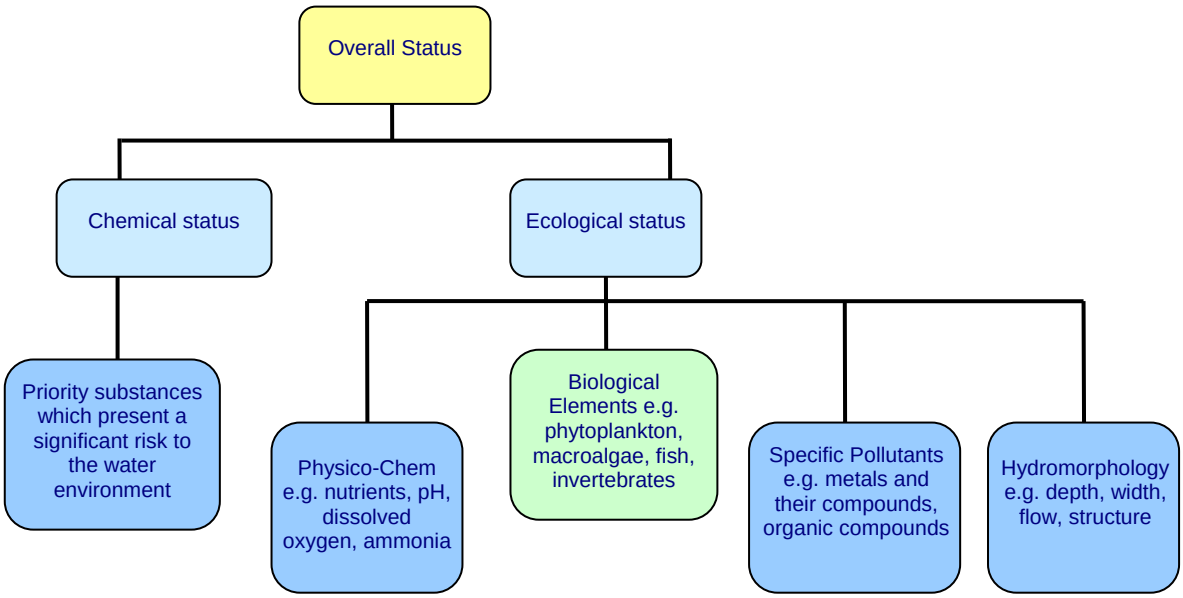
Good ecological status applies to natural water bodies, and is defined as a slight variation from undisturbed natural conditions. Figure 3 below shows how status is determined for surface waters. Each component has several different elements. These are measured against specific standards and targets developed by the Water Framework Directive UK Technical Advisory Group (UKTAG) and the European Union.

To understand the underlying reasons for water body status it is helpful to break down the results. Ecological status could be driven by the presence of a single chemical substance slightly exceeding the required standard. As well as ecological status this plan highlights the results of biological assessments (referred to as biological status) as these are the main indicators of the health of the environment for surface waters.

Monitoring and components of overall status

The monitoring programme for river basin management is based on a far wider range of assessments than were carried out in the past. A range of elements are measured in each water body, and a classification is produced based on a 'one out, all out' principle. This uses the poorest individual element result to set the overall classification.

Figure 2 **The components of overall status for surface water bodies**



The classification of water bodies will improve as new monitoring data are collected and better methods of assessment are developed. Future monitoring will help show where environmental objectives are already being met and where more needs to be done to improve the water environment. Monitoring will also give us some information on the spread of invasive non-native species.

The Water Framework Directive recognises the key role that water resources and habitats play in supporting healthy aquatic ecosystems. It requires that water bodies are managed to protect or improve hydromorphological conditions. Hydromorphology is a term that covers the flow of water in a water body and its physical form. The term encompasses both hydrological and geomorphological characteristics that help support a healthy ecology in rivers, lakes, estuaries and coastal waters.

Artificial and heavily modified waters

Nearly 70 per cent of surface water bodies in the river basin district are designated as 'artificial' or 'heavily modified'. This is because they may have been created or modified for a particular use such as water supply, flood protection, navigation or urban infrastructure.

By definition, artificial and heavily modified water bodies are not able to achieve natural conditions. Instead the classification and objectives for these water bodies, and the biology they represent, are measured against 'ecological potential' rather than status.

For an artificial or heavily modified water body to achieve good ecological potential, its chemistry must be good. In addition, any modifications to the structural or physical nature of the water body that harm biology must only be those essential for its valid use. All other such modifications must have been altered or managed to reduce or remove their adverse impact, so that there is the potential for biology to be as close as possible to that of a similar natural

water body. Often though, the biology will still be impacted and biological status of the water body may be less than good.

Groundwater

For groundwater, good status has a quantitative and a chemical component. Together these provide a single final classification: good or poor status.

A ground water body will be classified as having poor quantitative status in the following circumstances; where low ground water levels are responsible for an adverse impact on rivers and wetlands normally reliant on ground water; where abstraction of ground water has lead to saline intrusion; where it is possible that the amount of groundwater abstracted will not be replaced each year by rainfall.

Poor chemical status occurs if there is widespread diffuse pollution within the groundwater body, the quality of the groundwater is having an adverse impact on wetlands or surface waters, there is saline intrusion due to over abstraction, or the quality of water used for potable supply is deteriorating significantly. There are other objectives for groundwater quality in addition to meeting good status. These are the requirements to prevent or limit the input of pollutants to groundwater and to implement measures to reverse significant and sustained rising trends in pollutants in groundwater.

Protected areas

Some areas require special protection under European legislation.

The Water Framework Directive brings together the planning processes of a range of other European Directives. These Directives, listed in Table 2, establish protected areas to manage water, nutrients, chemicals, economically significant species, and wildlife – and have been brought in line with the planning timescales of the Water Framework Directive. Meeting their requirements will also help achieve Water Framework Directive objectives.

Table 2 **Other Directives and their Water Framework Directive protected areas**

Directive	Protected area
Bathing Waters	Recreational waters
Birds	Natura 2000 sites (water dependent special protection areas)
Drinking Water	Drinking water protected areas
Environmental Impact Assessment	-
Freshwater Fish Shellfish Waters	Waters for the protection of economically significant aquatic species
Groundwater	-
Habitats	Natura 2000 sites (water dependent special areas of conservation)
Integrated Pollution Prevention and Control	-
Major Accidents	-
Nitrates	Nitrate Vulnerable Zones
Plant Protection Products	-
Sewage Sludge	-
Urban Waste Water Treatment	Sensitive areas

Achieving the objectives of these protected areas is a priority for action in this plan. Annex D sets out their objectives and the actions required for Natura 2000 sites and the new Drinking Water Protected Areas required under the Directive. Annex C describes the actions required for all protected areas. In addition, there are two new daughter Directives (Groundwater and Environmental Quality Standards) that will be used to implement specific parts of the Water Framework Directive.

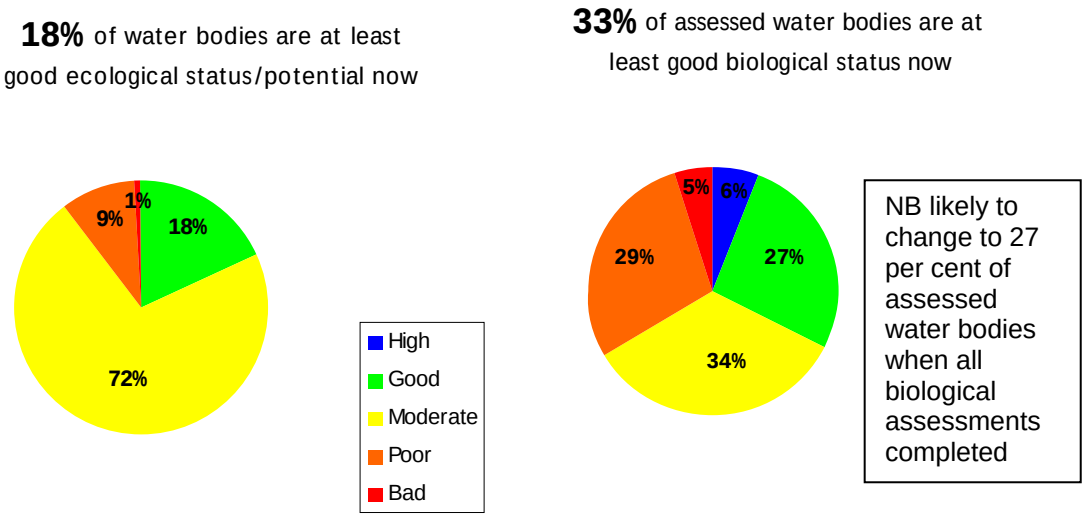
4 The state of the water environment now

The current status classification is the baseline from which improvements and the 'no deterioration in status' objective of the Water Framework Directive is measured. The current status classification has been updated since the draft plan. It is different to that presented in the draft plan because:

- the quality of assessments has been improved by refining classification methods;
- the accuracy of individual assessment tools has improved, especially for fish;
- a number of water bodies that were identified as potentially being heavily modified have not been designated as such in this plan because monitoring shows that they currently achieve good status;
- improvements from the water companies' Periodic Review 2004 have now been factored in;
- an additional 202 rivers have been classified that were previously unassessed.

Over 18 per cent of surface waters are at good or better ecological status/potential. However, 33 per cent of assessed surface waters are at good or better biological status now. This is shown in Figure 3.

Figure 3 **Ecological status/potential and biological status of surface water bodies now**



Statistics for both good ecological status or potential and biological status are influenced by the relative number of artificial and heavily modified waters and their classification. In the Anglian River Basin District, 16 per cent of 584 artificial and heavily modified water bodies are currently classified as at good or better ecological potential, compared to 23 per cent of the 251 natural surface water bodies having good or better ecological status. As discussed in the previous section the higher percentage of poor and bad water bodies assessed for biological status compared to ecological status/potential reflects the fact that even where all mitigation measures are in place to allow an artificial/heavily modified water body to be classified as good, the use of the water body may mean that biology is still impacted.

As biological monitoring continues it is likely that the percentage of surface water bodies at good or better biological status will change from 33 to 27 per cent. This is explained further in the section on "Biological status and monitoring".

For groundwater bodies, currently 65 per cent are at good quantitative status. A similar percentage are also at good chemical status.

Reasons for not achieving good status or potential

This section takes a closer look at rivers. The majority of management actions in the first river basin management cycle will be applied to rivers. Reasons for not achieving good status or potential in other surface waters are being developed. The first course of action for lakes, coasts and estuaries is to develop a better understanding of the issues.

To identify what needs to be done to improve the environment, the reasons for not achieving good status need to be understood. The main reasons most frequently identified by Environment Agency staff using monitoring data, their knowledge and their experience of individual water bodies are shown in Table 3. Each relates to one or more pressures, which in turn impact on elements of the classification.

The reasons for failure include point source discharges from water industry sewage works, diffuse source pollution from agriculture, abstraction and a range of reasons due to physical modifications. The actions in this plan will increase the number of waters achieving good status or potential, for example through significant investment in improving discharges from sewage works and changes to land management practices. Even if good status is not completely achieved, the actions will also lead to improvements to the key elements impacted.

Table 3 **Main reasons (where known) for not achieving good ecological status or potential**

Reason for failure	Key elements impacted
Diffuse source agricultural	ammonia, dissolved oxygen, diatoms, fish, invertebrates, macrophytes, phosphate
Point source water industry sewage works	ammonia, dissolved oxygen, diatoms, invertebrates, phosphate
Physical modification flood protection	fish, invertebrates, mitigation measures for morphology
Physical modification land drainage	fish, invertebrates, mitigation measures for morphology
Abstraction	dissolved oxygen, fish, hydrology
Diffuse source mixed urban run – off	ammonia, dissolved oxygen, fish, invertebrates, phosphate
Point source trade industry - non water industry	ammonia , invertebrates, phosphate
Physical modification barriers to fish migration	fish
Physical modification urbanisation	mitigation measures for morphology
Physical modification water storage and supply (including for power generation)	fish, invertebrates, mitigation measures for morphology

It is important to note that because classification involves a wider range of elements than previous monitoring schemes, and many of the key pressures are complex and occur in combination, we often do not know the reason for a failure. For many water bodies either the reasons for failure are unknown, or it is uncertain whether there is a failure or whether pressures really are causing an impact. In these cases we will need to investigate, as discussed in **"**Investigations – improving outcomes for 2015**"** in Section 6.

For groundwater quality, the main reasons for poor status are high or rising nitrate concentrations, with some failures for pesticides and other chemicals. The main reason for poor quantitative status is that abstraction levels – mainly for drinking water – exceed the

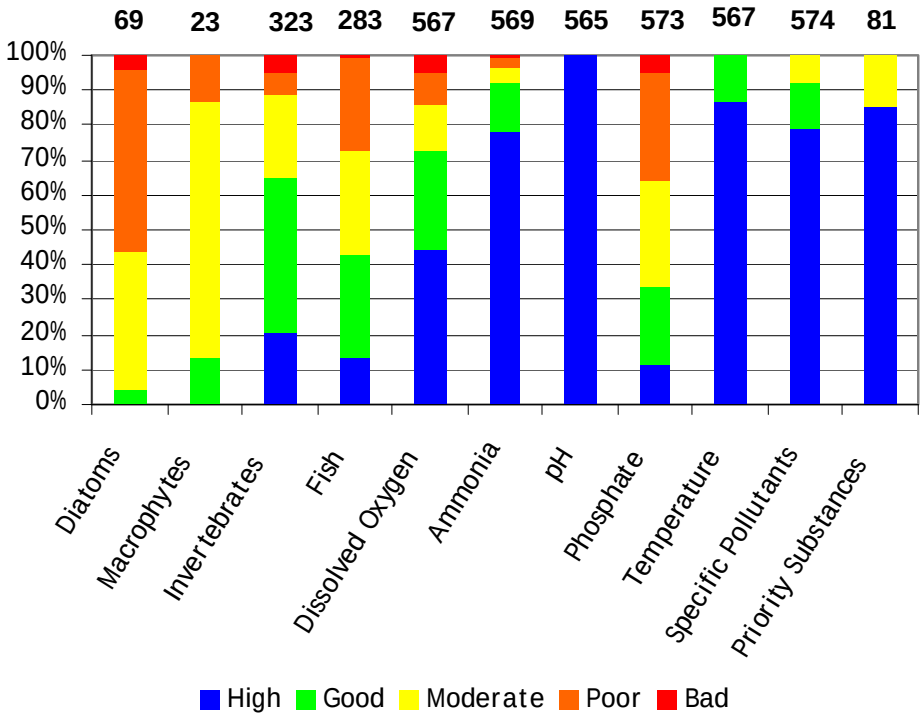
rate at which aquifers recharge. The plan identifies a range of actions to prevent deterioration and improve groundwater elements, as well as investigations to improve the confidence in groundwater classification.

Classification of individual elements

For rivers, which comprise the majority of water bodies in the river basin district, the main elements indicating that the standards for good ecological status are not being achieved are fish, phosphate and invertebrates. This is shown in Figure 4.

The results for macrophytes (aquatic plants) and diatoms (microscopic algae) are from relatively fewer water body assessments based on a new (2007) risk based monitoring programme. However, as would be expected, the results for these elements confirm the presence of pressures on biology in many of the assessed water bodies.

Figure 4 **Proportion of river water bodies in each status class, by element** (numbers above bars indicate total number of water bodies assessed for each element).



Excessive sediment is a possible cause for biology not being good in a number of water bodies. At present however, standards are not available to identify clearly where sedimentation is excessive. The Environment Agency will be developing techniques to access the impact of sedimentation as one of the actions in this plan.

Case Study 1: **Making room for fish**

Barriers to fish passage are one of the big issues affecting the ecology of rivers. This plan's fish pass programme will make more room by addressing ten priority structures, such as gauging stations, flood gates and privately owned structures like mills. In addition we are planning 50 eel passes across the region. Together they will contribute to the ecological health of several hundred kilometres of river in the Anglian River Basin District. In 2009/10 about £150k was received from Defra to progress the programme.

A recent success has been the creation of Bures Mill bypass channel which will enable coarse fish and eels to migrate freely up the river Stour for the first time in years improving the fish and eel stocks in 52km of river.

Biological status and monitoring

New monitoring programmes for the Water Framework Directive since 2007 focus on locations where the Environment Agency suspects there may be a problem caused by pressures on the water environment. The Environment Agency does not yet have biological assessments for all relevant water bodies. In this river basin district 54 percent of water bodies have an assessment for at least one biological element. The number of water bodies covered by biological monitoring is set to increase over the next three years. As new information becomes available it is likely that some water bodies currently labelled as good biological status will be shown to have a lower quality.

For instance, from the chemical monitoring the Environment Agency is now clear that there is a link between high levels of phosphate in surface waters and biological failures in the main river type (lowland alkaline rivers). The assessment of reasons for failure that we have started to undertake shows that across England and Wales 22 per cent of river water bodies are failing to achieve good status/potential because of excessive levels of phosphate. In this river basin district phosphate results show that it is likely that the percentage of water bodies at good or better biological status will reduce from 33 to 27 per cent when additional water bodies are assessed for diatoms and/or macrophytes. This same analysis points to discharges from sewage treatment works and releases from agriculture being responsible for the majority of this. Rather than wait for the results of more biological assessments, we need to ensure corrective action is started in the first plan cycle.

Through The Water Services Regulation Authority's (Ofwat's) determination of the water industry periodic review of investment, the water industry will continue their investment programme targeted at addressing their contribution to phosphate pollution. It is important that agriculture also makes a contribution in the first cycle improvements.

The Environment Agency is now working with the main farming groups to understand better the main ways in which phosphate from land enters and is transported in water bodies. Farming groups have agreed to use this information to encourage individual farmers to take action to reduce their contribution to water pollution. We will trial this new approach in the Anglian River Basin District and through the Campaign for Farmed Environment. We will also look at what the advice and incentives available through agri-environment schemes and the England Catchment Sensitive Farming Delivery Initiative can do to reduce phosphate pollution of water and wetlands.

In parallel with this approach, the Environment Agency will continue to develop work on regulatory measures, such as piloting Water Protection Zones (WPZs) so that if voluntary approaches are shown not to work in a particular area, or where higher environmental standards are needed in for example protected areas, we are ready and able to ensure progress is made before 2015. The work to identify the ways in which phosphate enters water bodies and the means of reducing this will inform the measures that might be applied in WPZs. WPZs will only be effective if the means of control have been clearly identified.

5 Actions to improve the water environment by 2015

The following gives an overview of the key contributions from sectors and organisations that the Environment Agency will work with to implement this plan.

These actions are summarised versions of the full programme of actions (programme of measures) that can be found in Annex C.

The lead organisation for each action is given in brackets. Note that many actions will involve more than one sector and need to be implemented in partnership. Actions in Annex C are therefore duplicated across the relevant sectors. Sectors are encouraged to put further actions forward during the implementation of this plan.

After the action tables there are sections on:

All sectors

All sectors must comply with the range of existing regulations, codes of practice and controls on use of certain substances.

Investigations will be carried out by the Environment Agency and partner organisations where appropriate, to establish the extent and source of pressures and to identify any further actions that are technically feasible and proportionate in cost. These actions will be carried out during this or future management cycles.

Investigations and actions as noted above will be carried out in drinking water protected areas (where necessary focused in safeguard zones) to reduce the risk of deterioration in raw water quality and therefore reduce the need for additional treatment to meet drinking water standards.

A small number of candidate Water Protection Zones (WPZ) will be promoted nationally early in the first plan cycle, where there is clear evidence that voluntary mechanisms such as the England Catchment Sensitive Farming Delivery Initiative and pollution prevention campaigns are not sufficient by themselves to achieve the required environmental objectives. The candidate WPZs will be used to establish the usefulness of the concept, but as we have said earlier in describing the results of the biological monitoring, this in turn relies on a clear understanding of the practices causing problems and the techniques to avoid them.

Agriculture and rural land management

Agriculture accounts for more than half of the land area in the Anglian River Basin District. The sector, therefore, has a big role in looking after and improving the quality of the rural environment.

A combination of incentive, advisory and regulatory measures have been in place for a number of years to help farmers and other land managers protect the environment. For instance the Code of Good Agricultural Practice and agri-environment schemes, such as Entry Level Stewardship and Higher Level Stewardship. Wise stewardship of resources such as soil, nutrients, water and energy helps to cut costs while maintaining or improving the productivity of land and livestock.

Nevertheless, the way in which land is managed is still having a negative impact on natural resources and further action is needed to address diffuse pollution and other key pressures in rural areas. Government will consider the introduction of further restrictions of activities and restrictions on chemicals where there is evidence that voluntary actions failed to deliver.

Example actions
Cross-Compliance – to help farmers comply with a range of Directives to reduce pollution from agriculture at farms receiving subsidies (all land managers) • Across the river basin district
Establish and enforce **Nitrate Vulnerable Zones** in catchments at high risk from nitrate pollution (Environment Agency) to reduce the amount of nitrate and other pollutants entering water from farmland • Across the river basin district
Pesticides statutory code of practice – advice for operators on control of plant protection products to prevent and limit pollution of waters (all operators) • Across the river basin district
Maintain a nationally funded advice-led partnership under the England **Catchment Sensitive Farming** Delivery Initiative (Natural England, Environment Agency) to reduce diffuse water pollution from agriculture in priority areas • Bure, Ant and Muckfleet; Deben, Alde and Ore catchments; Lincolnshire Coast Rivers; Little Ouse (Thetford area); North Northfolk Rivers; Gipping and Orwell; River Nar; River Wensum; Yare and Waveney; Rivers Stour and Colne; River Blyth and surrounding SSSIs.
Form **Strategic Partnerships** with the England Catchment Sensitive Farming Delivery Initiative and other advice led partnership work (Natural England, Environment Agency, River Nene Regional Park, Essex & Suffolk Water) to provide further funding to reduce diffuse water pollution from agriculture • River Nene, River Great Ouse and the Blackwater and Chelmer rivers
Work with Natural England to target **agri-environment** schemes (Natural England, Environment Agency) to ensure adoption of best practice farming and reduce diffuse pollution from agriculture.
Establish a demonstrations catchment project in the river basin district to test and look at the effect of agricultural diffuse pollution control measures in a representative range of catchment types
Comply with new EC Sustainable Use of Pesticides Directive to control use of Plant Protection Products
Specialist workshops to address pressures in areas identified via Environment Agency's Agricultural Evidence Base, WFD classification.
Encourage farmers to build storage reservoirs to support summer irrigation and promote water efficiency on farms
Voluntary initiative in pesticides, including MOTs on sprayers, crop protection management plans, training for sprayer operators

Angling & conservation

The angling and conservation sector has a large role to play in delivering local 'on the ground' improvements to the water environment as well as lobbying for new mechanisms. It engages communities and individuals, building on their skills and experience and actively involves them in making these improvements. Angling is a popular past time that brings people closer to nature and provides local intelligence on environmental quality – over 218,000 rod licences were sold in 2007/08.

Many environmental organisations can influence environmental quality through the land they own or manage. Riparian owners have specific responsibility for the management of their watercourses so their support, involvement and investment in implementing the actions are crucial.

Example actions
Anglian River Sea Trout Project. Identification and prioritisation of barriers to breeding brown trout populations in several Anglian Rivers including North Norfolk chalk rivers: the Glaven, Stiffkey, Burn and Nar.
Creation of backwaters, bankside scrapes, reed beds and marginal vegetation, to improve habitat provision, in river.
Floating Pennywort control throughout the river basin district.
Sediment Management Strategy - catchment approach to sediment management to reduce inputs and balance with dredging to achieve waterways specification for users. Production of Management Plans and actions
Norfolk Non Native Forum. Appointment of a dedicated coordinator to raise awareness and a network of surveillance and eradication officers. Work with aquatic centres to raise awareness and encourage not to sell invasive plants. Planning guidance and conditions to eradicate through the consent process. Training for partner organisations / issue guidance notes. Encouraging non - returns of angling catch invasive species. Angling guidance regarding live baiting, crayfish plague. Dredging standard operating procedure/guidance to clean down equipment etc. Stocking policies to remove risk.
Great Ouse Wetland Vision - river restoration on a catchment scale. Some projects are small scale (rod licence funded) £10 - 30K, but others are landscape scale: Bedford River Valley Park, Milton Keynes Floodplain Forest.
Sediment Management Strategy - catchment approach to sediment management to reduce inputs and balance with dredging to achieve waterways specification for users. Production of Management Plans and actions

Central government

Government will continue to influence the development of EU legislation to help bring forward initiatives that protect and improve the water environment, and that are proportionate in cost and technically feasible. The Department for Environment, Food and Rural Affairs (Defra) will be considering further policy options within the first cycle of River Basin Management Planning that could help further improve the number of water bodies achieving good status by 2015. These include controls on phosphate in detergents, tackling misconnections, general binding rules, a code of practice on septic tanks and options to increase the use of sustainable drainage systems to reduce risks of flooding and pollution of surface waters during periods of high rainfall.

The Environment Agency, Forestry Commission, Natural England and the Marine and Fisheries Agency (to become the Marine Management Organisation) are the key government agencies for this plan. The agencies will work together on relevant actions.

Example actions
Enhanced capital allowance scheme is a government incentive giving tax relief for the purchase of water efficient plant and machinery to business that pay income or corporation tax. See www.eca-water.gov.uk (Defra/government) • National
Implement the water related actions of the **Invasive Non-native Species Framework** Action Plan for Great Britain (Defra, Environment Agency) . • Nationally
Disseminate and develop **species identification guides** and train key groups, to improve early detection of invasive non-native species (Natural England) • Nationally

Environment Agency

The Environment Agency is the Government's lead agency for implementing the Water Framework Directive. We will continue to monitor, provide advice on and manage improvements to the water environment. We regulate discharges to and abstraction from the water environment by issuing and enforcing environmental permits and licences. Where necessary we will take enforcement action against those who act illegally and damage or put at risk the water environment. We also have responsibility to make sure there is enough water to meet the needs of industry, agriculture and wider society in the future.

We will work closely with all sectors to learn from them, build on existing knowledge and to develop a shared commitment to implementing environmental improvements.

Example actions
Continue and develop a **monitoring programme**, to maintain our understanding of the state of the water environment (Environment Agency). • Across the river basin district
Run local pollution prevention campaigns (Environment Agency) to raise awareness of the need for responsible handling and disposal of chemicals, oil and other pollutants. • Specified water bodies identified at risk, such as safeguard zones
Action to **reduce the physical impacts of flood risk management** activities in artificial or heavily modified water bodies (Environment Agency). • Waters specified in Annex C
Action through the **Restoring Sustainable Abstraction programme** to investigate sites at risk due to abstraction pressures.
Work with planners to ensure that new and existing homes and buildings are more water efficient.
Anglian River Sea Trout Project. Identification and prioritisation of barriers to breeding brown trout populations in several Anglian
Eel Management Plan for the Anglian River Basin District. Produced to improve migration. Identification of barriers.
Installation of riffles and flow deflectors to provide habitat improvement in river channel, project will be delivered in a number of priority catchments (see Annex C).
Priority Barriers Project to identify barriers in need of removal or fish passes to benefit coarse fish and eels
Distribution of Chinese Mitten Crab identification leaflet. Gives species characteristics and current distribution in the Great Ouse catchment
Leaflets sent to each package treatment plants owner on the Broads raising awareness of problem of phosphates being discharged from small private and promoting reduced detergent use
River Nar restoration - production of management and sediment strategies.

Industry, manufacturing & other business

Business services, retailing and health services are three of the most significant employment sectors for the Anglian River Basin District. Sectors that provide significantly above average levels of employment in the river basin include: wholesale and distribution; transport; food and drink; and agriculture. The activities of these businesses can directly or indirectly affect the water environment.

Most relevant actions in this plan are already underway or are part of the existing regulatory system. However, some actions are new, and will help the river basin district reduce nutrients such as phosphate and will help meet tighter standards on ammonia and 40 other priority substances and pollutants. Where appropriate, industry will participate in pollution prevention campaigns and in investigations to establish the extent and source of pressures to define any further actions required for this and future cycles.

Example actions
Comply with regulations such as Environmental Permitting, Environmental Damage and Groundwater, to limit environmental damage and help prevent land contamination, pollution and deterioration of waters (industry). • Nationally
Industry support to **investigate emissions from sites and pollution** from contaminated land (Industry), to reduce uncertainty and provide additional information • Sites contributing to potential environmental quality standard failure
Pollution Prevention advice and campaigns to provide targeted advice and enforcement (Environment Agency) to reduce contaminants being released to groundwater from industrial estates, petrol stations and other sources • High risk areas such as safeguard zones
Sitewise - pilot (Environment Agency) project in Anglian river basin district to promote resource efficiency in the construction industry and to limit its impact on the environment
Implementation of the Remediation Strategy for the Helpston project (Environment Agency).

Local and regional government

Local and regional government have a major role in implementing this plan. The sector has a far reaching influence on businesses, local communities and leisure and tourism sectors. The river basin district's county councils, districts, cities and unitary authorities also have duties and powers in relation to planning, waste and minerals, regeneration, highways, transportation, emergency planning, countryside management and other activities. Town and parish councils exist at the local level across the whole of the river basin district.

Many of the actions identified in the plan form part of this sector's normal work. The Environment Agency and others will work with local authorities to ensure that all relevant actions are identified, prioritised, resourced and implemented.

Example actions
Produce **guidance for planning authorities** in partnership with Royal Town Planning Institute (Environment Agency), to support this plan. • Across the river basin district
Action to **reduce the physical impacts of urban development** in artificial or heavily modified waters, to help waters reach good ecological potential. • Artificial and heavily modified water bodies are specified in Annex C.

Example actions
Implement **surface water management plans**, increasing resilience to surface water flooding and ensuring water quality is considered on a catchment basis (Environment Agency, local authorities). • Across the river basin district
Promote the use of **sustainable drainage systems** in new urban and rural development where appropriate, and retrofit in priority areas including highways where possible (Environment Agency, local authorities). • Across the river basin district
Lincolnshire Coastal Country Park. Develop a network of high quality wildlife and visitor facilities, providing a focus for significant economic revival using the natural and historic heritage as a vehicle for change
Fire service Memorandum of Understanding (MoU) on implementing pollution control measures in emergencies
Contribute to achieving favourable condition on Swanholme Lakes SSSI by undertaking specific management works
Ensuring the Local Development Framework policies require water efficiency standards in new development that exceed extant Buildings Regulations. Standards should be linked to the Code for Sustainable Homes level 3 and above, and Building Research Establishment Environmental Assessment Method standards
River Nene Regional Park - part of the growth area agenda. Key aim is to deliver green infrastructure as an integral element of the proposed development of housing in the growth areas. Action through: Government funding - 10% top slice of all development monies of growth areas, developer contributions.
Waterwise East - has the remit to influence planners and developers to encourage water efficiency. Initially, a " no deterioration" measure - could lead to need for less abstraction in the longer term, less need to import water in the short term.

Mining and quarrying

There are no deep mines within the river basin district. Extractive industries however do include brick clay in Peterborough and Bedfordshire and extensive sand and gravel extraction across the river basin district. Water quality can be undermined by the silting of watercourses by discharges from these operations and by working below the water table.

Example actions
Investigate emissions from working sites and **appraise options of best practice controls** at mines and quarries to ensure environmental quality standards are met (Operators) • Sites contributing to potential environmental quality standard failure
A 50 Year Vision for Wetlands Action through: Awareness and education campaign and the delivery of Wetland Habitat Action Plan.
Assessment of extractive sites potential benefit to the water environment whilst operating and through restoration provisions i.e. flood storage, nature reserves (Wetland), recreation and the realisation of these benefits through partnership working with relevant bodies

Navigation

Ports, harbours and marinas are essential for economic prosperity. Many navigation and port authorities have already done a great deal to help improve ecology and water quality and some harbours are home to internationally important wildlife. Careful planning will be needed to ensure that waters remain navigable whilst at the same time water quality is protected and improved.

Proposals to build new ports or expand existing ones need to take sustainable water management goals into account. Physical changes are permitted to waters for navigation but only if certain conditions are met.

The Anglian coast is also popular with tourists and recreational boaters. We want to encourage recreation in the river basin district, whilst taking action to minimise any environmental impacts.

Example actions
Ban on Tributyltin (TBT) use on ship hulls unless there is a coating to prevent leaching of underlying TBT anti-foulants, to prevent or limit pollution in marine waters (Marine and Fisheries Agency, others) • Nationally
Develop a dredging and disposal framework (Ports sector), which will provide guidance to all those undertaking or permitting navigation dredging and dredged material disposal activities to assist in achieving the statutory objectives of the Water Framework Directive and related Environmental Quality Standards Directive (2008/105/EEC). • Nationally (England)
Education campaigns to increase awareness of boat wash, and its impacts. Publication of leaflet by Broads Authority and The Environment Agency/British Waterways Boaters Handbook.
Standard Operating Procedures to provide guidance and standards to be achieved when undertaking maintenance works on navigable channels.
Ouse Washes Technical Advisory Group looking into sedimentation from Earith to Ouse outfall into The Wash. Regime of control and maintenance measures to improve control of sedimentation.

Urban & transport

Development and regeneration is a major opportunity to improve the water environment. However, when poorly planned or designed, urban and transport infrastructure can adversely impact on water quality or water resources. The Environment Agency and others want to work with the urban and transport sector to achieve an urban water environment rich in wildlife that local communities can benefit from and enjoy.

A good quality water environment has the potential to help economic regeneration and to enhance the economic and social amenity value of developments, and improve the quality of life in cities, towns and villages.

Spatial planning and design for urban development and infrastructure should aim to reduce surface water run off; protect and restore habitats; improve the quality of rivers, coastal waters, and groundwater; and thus protect drinking water supplies and bathing areas. The release of toxic pollutants that harm the water environment also need to be reduced.

Example actions
Follow **pesticides statutory code of practice** advice for operators on control of plant protection products, to prevent or limit pollution of waters (all operators) • Across the river basin district
Support to **investigate emissions from sites and pollution** from contaminated land to reduce uncertainty and provide additional information (Industry) • Sites contributing to potential environmental quality standard failure

Example actions
Action to **reduce the physical impacts of urban development** in artificial or heavily modified water bodies, to help waters reach good ecological potential • Waters specified in Annex C.
Water Cycle Study/Strategy to address the impact of development on infrastructure capacity, water resources and receiving waters (Local Authorities).
Water Quality partnership for the Broads, providing partnership co-ordination for projects to address diffuse non-agricultural impacts (Broads Authority).

Water industry

Water companies are major partners in the management and protection of the water environment. The Environment Agency works with companies, consumers and Government to ensure that the sector's environmental work is planned and implemented in a way that is affordable for the public.

Improvement of continuous and intermittent sewage effluent discharges, and of water resources management will be carried out as part of the ongoing water industry asset management programme.

The companies' programme of work under the periodic review of water industry investment in 2009 will make a large contribution to meeting the objectives in this plan. This includes carrying out investigations, and specific improvement schemes to address water quality or water resources.

In addition, specific actions will be carried out in drinking water protected areas to help safeguard drinking water supplies.

Example actions
Reduce leakage through **active leakage control** and **customer supply pipe repair policies** to help ensure sufficient water for people and wildlife (water companies). • Across the river basin district
Complete the current round of **water company asset investment** to deliver water quality improvements and reduce the impact of abstraction (water companies). • Rivers, coasts and estuaries across the river basin district
Improvements to water company assets under the next round of company investment (PR09), to deliver water quality improvements and continue to reduce the impact of abstraction under a range of environmental Directives (water companies). • Rivers, coasts and estuaries across the river basin district
Examine the role of effluent re-use, through the Anglian Region Water Efficiency Group and Waterwise East.

Individuals and communities

Everyone can help protect and improve the water environment. Actions people can take include the following.

To save water

in houses or offices

- Turn off the tap when brushing your teeth, and take short showers rather than baths.
- Wash fruit and vegetables in a bowl rather than under the running tap - and use the remainder on your plants.
- Install a 'hippo' or 'save-a-flush' in your toilet cistern.

- Run your dishwasher or washing machine with a full load on economy setting, and boil the minimum amount of water needed in kettles or saucepans.
- Ask your water company to fit a meter. On average, this could reduce your household water bill.
- Install a low-flush toilet, put flow regulators on your taps and showers, and install waterless urinals at work.
- Consider installing a grey-water recycling system in your home, block or workplace. This can save one third of domestic mains water usage.

in gardens

- Choose plants that tolerate dry conditions for your house, balcony or garden. To help lawns through dry periods, don't cut them too short.
- To save water in your garden, collect rain in a water-butt, water at the beginning or end of the day, mulch plants, and avoid sprinklers or hosepipes without trigger nozzles.
- Fix dripping taps, and lag pipes to avoid them bursting in freezing weather.

To prevent pollution

- Use kitchen, bathroom and car cleaning products that don't harm the environment, such as phosphate-free laundry detergents, and use as little as possible. This helps prevent pollution.
- Take waste oil and chemicals such as white spirit to your municipal recycling facility: don't pour them down the sink or outside drains.
- Check that your household appliances connect to the foul sewer, not the surface water drain.
- Ensure your septic tank or private sewage treatment plant is well maintained and working effectively.
- Ensure your household oil storage is in good condition, with an up-to-date inspection record.
- When you see pollution or fly-tipping, phone us on 0800 807060.

To protect water dependent wildlife

- Put cotton buds and other litter in the bin, not down the toilet. It may end up in the sea where it can harm wildlife
- Eat fish from sustainable sources, caught using fishing methods that don't cause damage to marine wildlife and habitats
- Eliminate invasive non-native species from your garden.
- Adopt-a-beach to help keep beaches clean of litter than can harm wildlife and cause pollution..
- Join a river group to spot pollution, invasive non-native species, and take part in practical tasks.

Actions to protect drinking water

Drinking water supplied to households by water companies is of high quality and complies with strict standards enforced by the Drinking Water Inspectorate. Where water is abstracted from a water body for human consumption, the water body is designated as a Drinking Water Protected Area (DrWPA) – additional objectives apply and where necessary, additional action is put in place to protect the quality of the raw water abstracted.

Where we are reasonably confident that the DrWPA objective is at high risk of not being complied with, a Safeguard Zone has been identified. In the Safeguard Zone additional actions will take place. These may include voluntary agreements, pollution prevention

campaigns and targeted enforcement action of existing legislation. Additional monitoring is taking place to assess whether those DrWPAs currently not assessed at high risk, need a Safeguard Zone and additional action taken.

In parallel with this approach, the Environment Agency will continue to develop work on regulatory measures, such as piloting Water Protection Zones in England. If voluntary approaches are shown not to work in a Safeguard Zone, we are ready and able to ensure progress is made before 2015.

The costs of action in this plan

Overall the Environment Agency estimate that the cost for implementing the actions in the Anglian River Basin Management Plan will be £114 million annually. A significant proportion of this cost relates to existing measures. The existing measures are mainly required to fulfil the requirements of earlier EC Directives and are defined as the Reference Case in the Impact Assessment

There are new measures in the plan which we estimate to cost £64 million with a benefit of £10 million. In addition, investigations will be carried out that will help to identify the additional measures necessary in future planning cycles. The new measures are defined as the Policy Option in the Impact Assessment.

Further information on the approach used to assess the costs and benefits is contained in the Impact Assessment.

Taking action in a changing climate

The UK's Climate Projections (UKCP09) show that this region is likely to experience hotter drier summers, warmer wetter winters and rising sea levels. This is likely to have a significant effect on environmental conditions and will increase the impact of human activity on the water environment. Table 4 shows the likely effects of climate change on known pressures in the water environment.

It is essential that the actions in this plan take account of the likely effects of climate change. What is done now must not make it harder to deal with problems in the future.

Most actions in this plan will remain valid as the climate changes. Others can be adapted to accommodate climate change.

Table 4 **Qualitative assessment of likelihood that climate change may increase the risk from known pressures by 2050 and beyond**

Relative severity of impact of climate change on:	Level of Severity
Abstraction and other artificial flow regulation	Very high
Nutrients (nitrate and phosphate)	High
Physical modification	Medium
Sediment	High
Biological (invasive non-native species)	Medium
Microbiology (including faecal indicator organisms)	Medium
Organic pollution (sanitary determinands)	Medium
Biological (fisheries management)	Low/Medium
Acidification	Freshwater: Low Marine: Medium/High
Priority hazardous substances, priority substance and specific pollutants such as pesticides	Low
Salinity	Medium
Temperature of point source discharges	Low

It is important to assess the carbon implications of the plans to avoid, adding unnecessary carbon dioxide burdens that could increase the problem of climate change.

The carbon costs associated with actions in the water industry Periodic Review 2009 (PR09) have been quantified. This is where the most significant carbon impacts will occur as the actions include requirements for additional water treatment, construction of new works or upgrades to existing sites.

The approximate operational carbon implications of PR09 measures in England and Wales is approximately 4,722,000 tonnes per year at the start of the PR09 cycle (2009-10) and 4,564,200 tonnes per year at the end of the PR09 cycle (2014-2015). This does not include the carbon implications of constructing the schemes. These figures are from the water company plans and result from schemes to satisfy a number of existing drivers such as Urban Waste Water Directive, Bathing Waters Directive as well as the Water Framework Directive.

In this river basin district, the operational carbon component driven by the additional requirement to meet good status under the Water Framework Directive is estimated, at this time, to be 621 tonnes per year. In the majority of cases this will be balanced by reductions elsewhere as part of the CRC Energy Efficiency Scheme (formally known as the Carbon Reduction Commitment).

The CRC Energy Efficiency Scheme is a legally binding scheme, which covers large business and public sector organisations, and is intended to promote energy efficiency and help reduce carbon emissions. See www.decc.gov.uk for further information.

The majority of other actions are likely to have low impact as they are investigations, partnerships or encouraging best practice management. The potential impact of these can be assessed as the work is progressed.

No organisation has sole responsibility for ensuring that society adapts successfully to the effects of climate change on the water environment. Most will be achieved by working together and in partnership. This river basin management process provides an excellent framework to help focus and co-ordinate activities. In particular it will allow action to be taken on existing pressures at sites that are at risk and where appropriate restore the natural characteristics of catchments to protect water quality, maintain water resources and reduce the risks of floods and droughts thus building resilience to the further impacts of climate change.

Working with other plans and programmes

A wide range of planning processes help ensure more sustainable management of the water environment. They are briefly described here.

Development planning

Development planning plays a key role in sustainable development and we, the Environment Agency, will continue to work closely with planning authorities. We aim to ensure that planners understand the objectives of the Water Framework Directive and are able to translate them into planning policy.

There are many planning processes and provisions involved. They include:

- national guidance;
- Regional Spatial Strategies
- Local Development Documents;
- local guidance (e.g. Supplementary Planning Documents).

In the Anglian River Basin District, there are already spatial plans which set out proposed levels of growth and development up to 2026. The Region will see a substantial amount of new development in the next 15-20 years particularly in areas identified for growth or regeneration. The three largest Growth Areas include substantial areas within the region:

- Thames Gateway, a regeneration area of national importance which includes parts of South Essex (Essex Thames Gateway)
- London-Stansted-Cambridge-Peterborough
- Milton Keynes – South Midlands, which includes Luton, Bedfordshire and North Northamptonshire Housing Market Area

Good development planning requires a very clear understanding of:

- where to locate new development such as houses;
- the options for sewage treatment;
- the best ways to reduce nutrients from diffuse pollution.

The adopted regional plans that cover the Anglian River Basin District encourage local authorities to ensure that their plans, policies, programmes and proposals take account of the environmental consequences of river basin management plans.

In the Anglian Region, the Environment Agency is already working with Anglian Water to identify any potential constraints to growth associated with the environmental capacity of receiving watercourses at Waste Water Treatment Works throughout the region. The study looks at the environmental capacity from two perspectives; from a water quality point of view, and in terms of flood risk. It is hoped by this early warning and forward planning, possible future serious problems can be avoided.

It is acknowledged that any increase in discharge will inevitably result in an increase in flood risk and also deterioration in water quality if works are not upgraded. The aim of this study is to provide some clarity to the likely scale of that increased risk. The results of this work will inform the review of Regional Spatial Strategies, the new Single Regional Strategies and other planning policies for councils.

Flood risk and coastal erosion planning

There is a separate planning process for flood and coastal erosion risk management introduced by the new European Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks). This requires that the environmental objectives of the Water Framework Directive are taken into account in flood and coastal erosion plans. Implementation of the Floods Directive in England and Wales will be co-ordinated with the Water Framework Directive. The delivery plans and timescales for the two directives will be closely aligned.

Catchment Flood Management Plans (prepared by the Environment Agency) and Shoreline Management Plans (prepared by local coastal authorities and the Environment Agency) set out long term policies for flood risk management. The delivery of the policies from these long term plans will help to achieve the objectives of this and subsequent river basin management plans.

The Environment Agency plans its flood and coastal risk management capital investment through the ‘Medium Term Plan’, which is a rolling five-year investment plan. Using this, we have identified flood and coastal risk management activities that will deliver one or more restoration or mitigation measures included in this plan. Although these activities will be carried out for flood risk management purposes, they will be carried out in such a way to ensure any impacts are minimised and that the ecology is protected. Activities will not lower water body status unless fully justified under Article 4.7 of the Water Framework Directive.

Marine planning

The Marine Strategy Framework Directive is closely linked with the Water Framework

Directive and their application overlap in estuaries and coasts. The Environment Agency is working with Defra, Welsh Assembly Government and others to ensure that the implementation of both Directives is fully integrated.

Managing new physical modifications

In specific circumstances the Water Framework Directive provides a defence for when, as a result of a new physical modification, good ecological status or potential cannot be achieved or where deterioration in status occurs. This is covered under Article 4.7 of the Directive.

Although protecting the water environment is a priority, some new modifications may provide important benefits to human health, human safety and/or sustainable development.

Such benefits can include:

- public water supply;
- flood defence/alleviation;
- hydropower generation;
- navigation.

It is often impossible to undertake such activities without causing deterioration of status to the water body. The benefits that such developments can bring need to be balanced against the social and economic benefits gained by maintaining the status of the water environment in England and Wales.

The Environment Agency has developed a process for applying the tests and justifications required for such new modifications (Article 4.7) and will work with stakeholders to ensure these provisions are met during the first cycle of river basin management.

Other planning processes

The Environment Agency is also working to align planning processes in other areas. These include water resources and water quality, agriculture and rural development and natural heritage. Annex J provides further information about other planning processes.

6 The state of the water environment in 2015

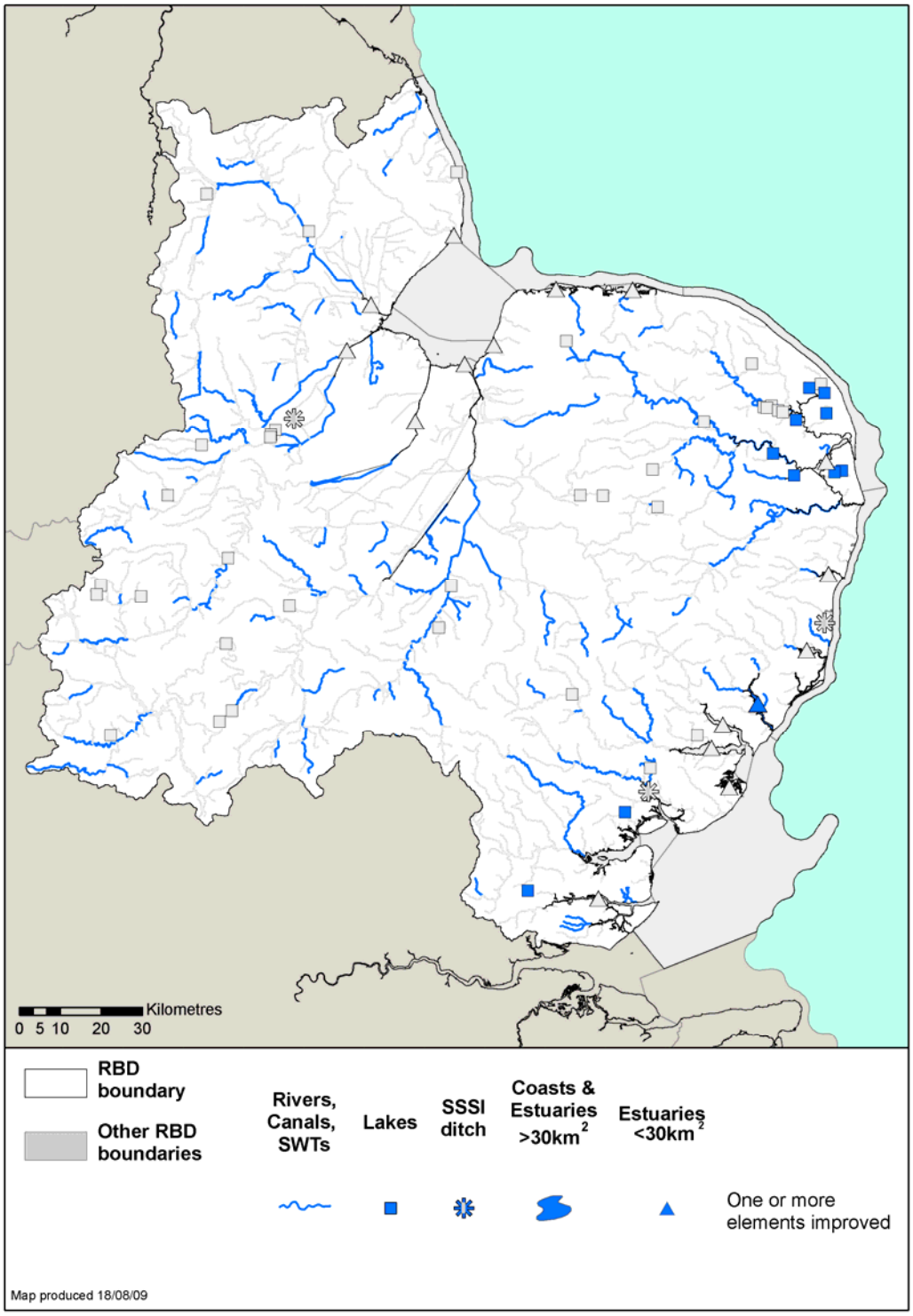
One of the objectives of the Water Framework Directive is to aim to achieve good status in all water bodies by 2015. For 80 per cent of water bodies these targets cannot be met by this date. Greater improvement in status is limited by the current understanding of pressures on the water environment, their sources, and the action required to tackle them.

By 2015, over 16 per cent of all surface waters in the Anglian River Basin District will show an improvement for one or more of the elements measured. For rivers and canals alone, this improvement is 16 per cent, which translates to over 1,700km of river improvement and is illustrated in Figure 5.

In the Anglian River Basin District these elemental improvements include the following:

- 772 km of rivers and 7 lakes will improve class for phosphate
- 96 km of rivers will improve class for ammonia
- 112 km of rivers will improve class for dissolved oxygen
- 602 km of rivers will improve class for fish
- 126 km of rivers will improve class for invertebrates
- 185 km of rivers will improve for diatoms
- 43 km of rivers and 2 lakes will improve for macrophytes
- 2 lakes will improve class for phytoplankton

Figure 5 **Surface water bodies showing an improvement for one or more elements**



Figures 6 and 7 show what ecological and biological status will be in 2015 compared to now. By 2015, 19 per cent will be in at least good ecological status/potential and 36 per cent of surface waters will be in at least good biological status. Figures 10 and 11 show the predicted quantitative status and chemical status for groundwater in 2015.

Figure 6 **Ecological status/potential of surface water bodies now and in 2015**

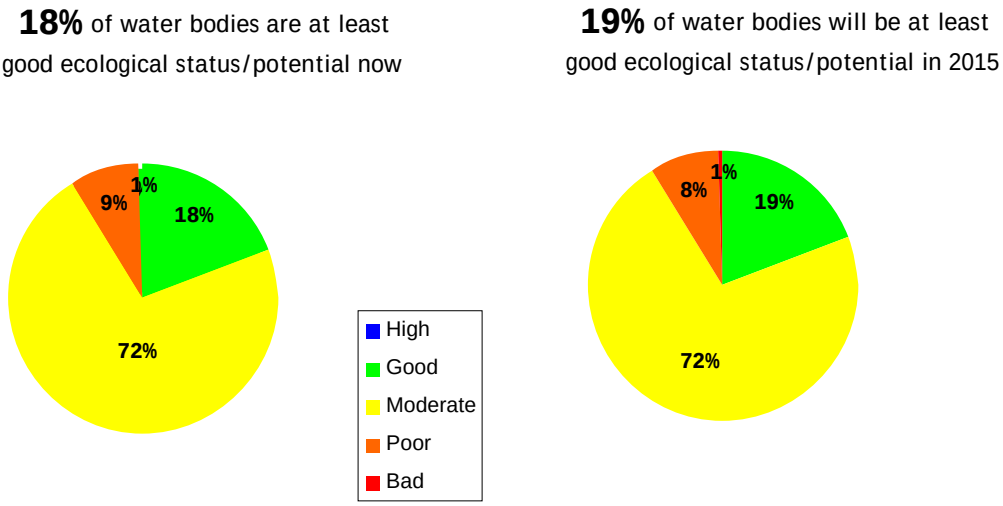
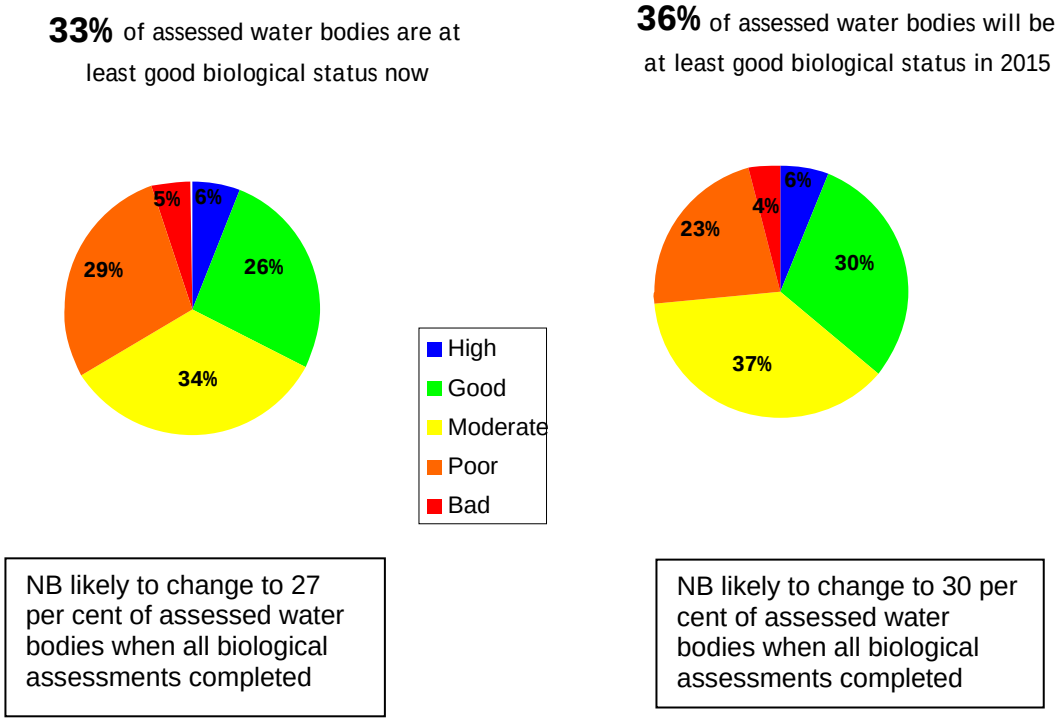


Figure 7 **Biological status of surface water bodies now and in 2015**



NB likely to change to 27 per cent of assessed water bodies when all biological assessments completed

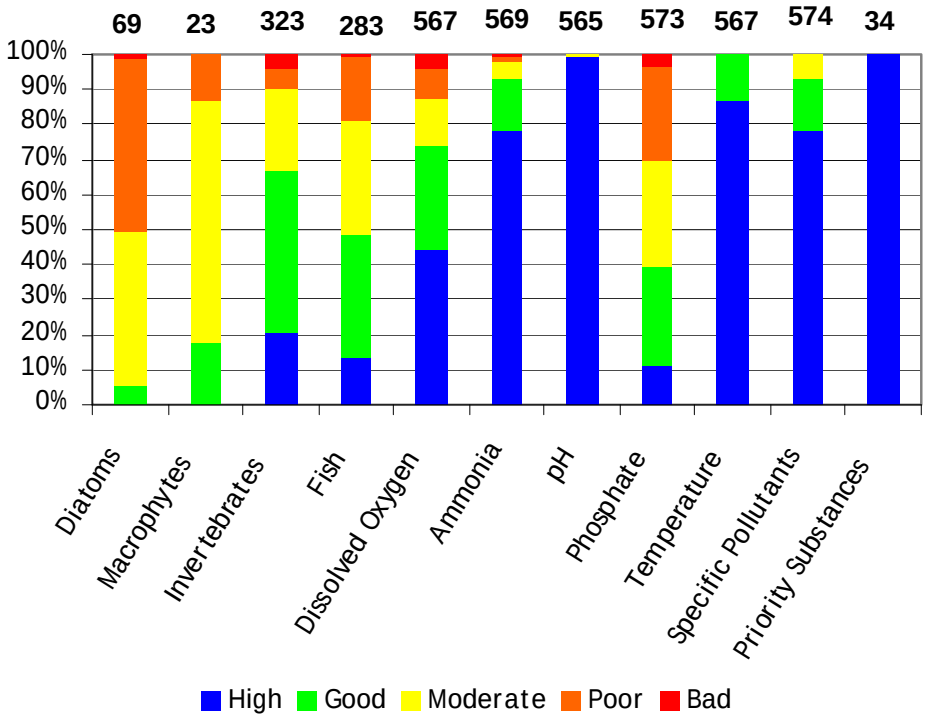
NB likely to change to 30 per cent of assessed water bodies when all biological assessments completed

For groundwater bodies, 65 per cent will be at good quantitative status by 2015 and 65 per cent will be at good chemical status.

For the 584 artificial and heavily modified water bodies, 17 per cent will be in at least good ecological potential in 2015, compared to 26 per cent of the 251 natural surface water bodies being at good or better ecological status.

Figure 8 **Predicted proportion of river water bodies in each status class, by element, for 2015**

(numbers above bars indicate total number of water bodies assessed)



For many estuaries, coasts and lakes it is unlikely that an improvement in the number of water bodies at 'good' status/potential can be achieved by 2015. The biological tools and monitoring data needed to classify these types of water bodies have only recently been developed. There is limited knowledge about the pressures that affect many of these water bodies and how their biology responds to changes in these pressures. It has therefore not been possible to identify many additional cost effective and proportionate measures. In many cases though there will be improvements to some key elements as the result of actions in this plan and there will be investigations to help find technically feasible actions that are not disproportionately costly. The Environment Agency wants these waters to achieve good overall status or potential by 2021 or 2027.

There will be no deterioration in groundwater status by 2015, but improvement will take place over longer timescales. Figures 10 and 11 show the predicted quantitative and chemical status of groundwater in 2015.

Looking at overall status, the combination of ecological status/potential and chemical status, 19 per cent of surface water bodies are expected to meet good overall status by 2015.

Investigations – improving outcomes for 2015

In many cases we, the Environment Agency, are not able to identify appropriate status actions for water bodies that are currently not achieving good ecological status. Sometimes this is because the cause of the problem and its sources are not yet known. Sometimes this

will involve gaining corroborative evidence of biological problems to justify expenditure where there is low confidence of failure of chemical standards. In other cases the most appropriate solution to the problem needs to be researched. Investigations into these types of issues will be an important measure during the first cycle.

Where possible, investigations will take place before 2013 so that the results are known in time for the formal review of this plan by 2015. The Environment Agency has identified a significant number of surface water bodies that require investigations in this plan. A proportion of these will lead to actions that should be straightforward to put in place before 2015. The outcome of our detailed planning work is that we have confidence that 19 per cent of surface waters will be in good or better ecological status/potential by 2015. This is our formal target for this plan.

Across England and Wales we have a formal target of achieving 31 per cent of surface waters in good ecological status or potential by 2015. Improvement to the water environment has to be managed as a continuum, not in isolated six year cycles. We are already confident in this river basin district that 16 per cent of surface waters will be improved by for at least one element by 2015. We are also confident that a proportion of investigations will lead to action that we can put in place before 2015. To ensure we capture these additional opportunities, we will be ensuring that the Anglian River Basin District makes its contribution to a goal of achieving up to 33 per cent of surface waters across England and Wales at good status or potential by 2015.

Figure 9 **Predicted status or potential of surface water bodies in 2015**

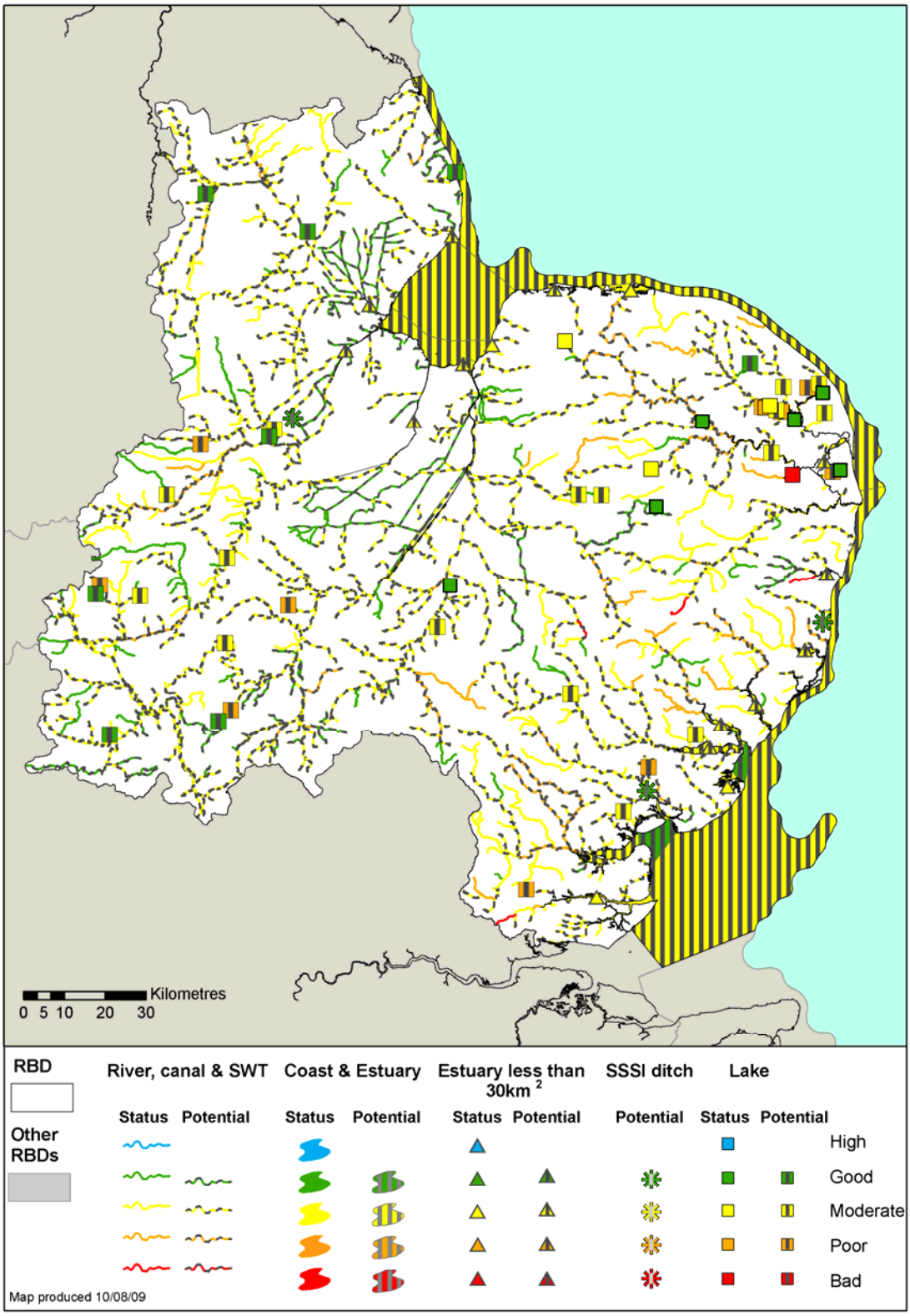


Figure 10 **Predicted quantitative status for groundwater in 2015**

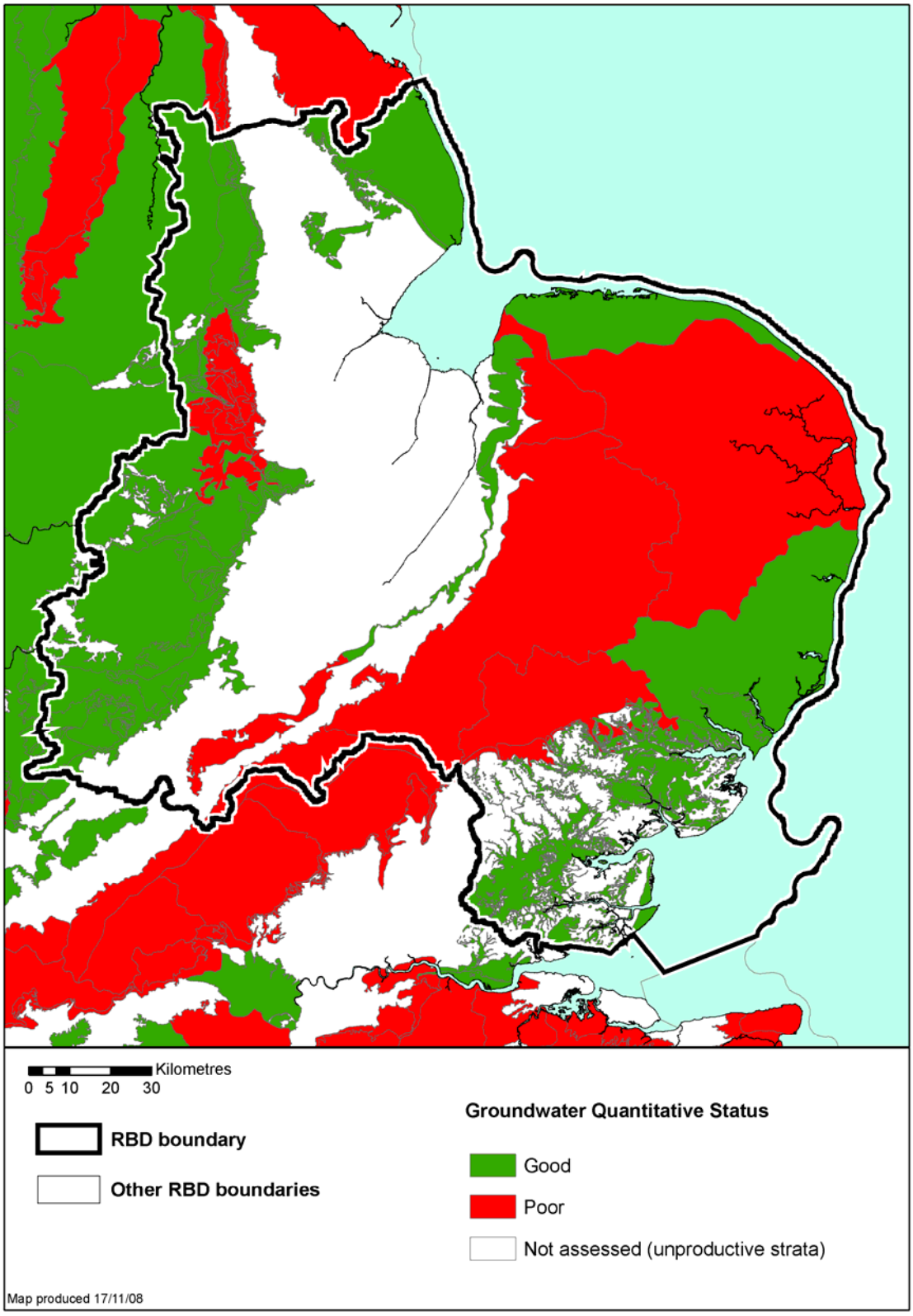
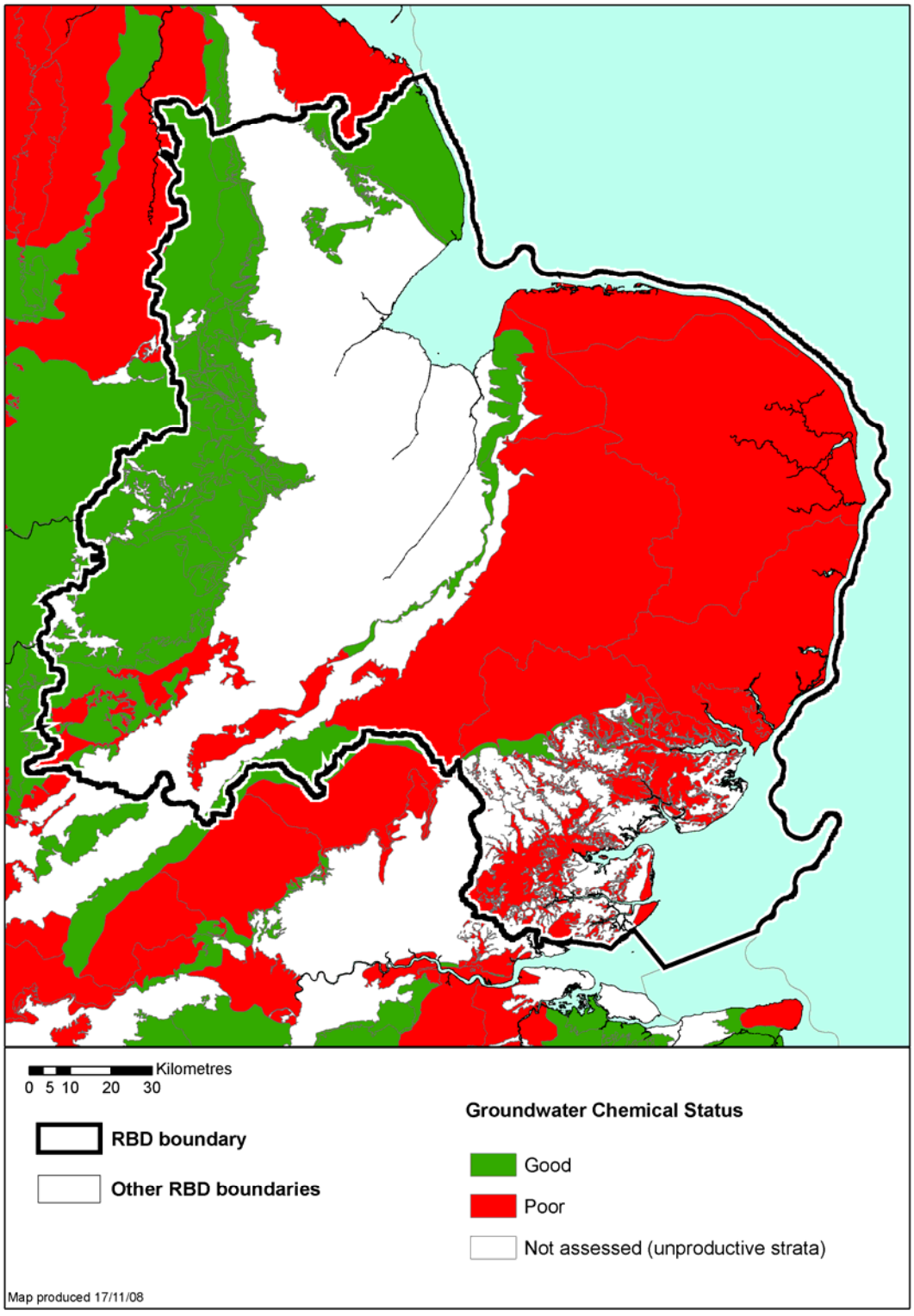


Figure 11 **Predicted chemical status for groundwater in 2015**



7 Targets for subsequent cycles

There are three river basin management cycles: 2009-2015, 2015-2021 and 2021-2027. Achieving good status in all water bodies by 2027 is a significant challenge.

The information gained from investigations during the first cycle will help to accelerate improvement to known issues using both traditional and novel techniques in both second and third cycles. New issues will arise though.

This plan sets out where good status cannot be achieved by 2015. This relates to 81 per cent of rivers, 65 per cent of lakes, 100 per cent of estuaries, 73 per cent of coastal waters and 55 per cent of groundwater.

In these cases an alternative objective of good status or potential by 2021 or 2027 is set (see Annex E).

Over the period to 2027, the pressures on the water environment will change, particularly because of climate change. It is not known in detail how the water environment will respond to this.

The population in the river basin district will continue to increase, with further urbanisation. Agriculture will respond to the changing climate both here and abroad, market conditions, financial incentives and regulatory pressures. Technology and other solutions to address the pressures will improve, but the rate at which some new solutions can be introduced will depend on the economic climate.

The Environment Agency believes that achieving good status in all water bodies by 2027 will not be possible using only current technologies. Even achieving 75 per cent good status will require marked changes in land use and water infrastructure, such as a major programme to separate foul and surface water sewers across most of the river basin district. By current standards, such changes are extremely unlikely to be economically or socially acceptable. For some waters therefore, achieving good status by 2027 may not be technically feasible or may be disproportionately costly.

The Environment Agency wants to work with others to find and implement additional actions to improve the environment, with the aspiration of achieving good status in at least 60 per cent of waters by 2021 and in as many waters as possible by 2027.

The water environment now and objectives for 2015 are described further in the section 'Anglian River Basin District catchments in 2015'. A summary of the key statistics for the river basin district is provided in Section 10.

8 Anglian River Basin District catchments

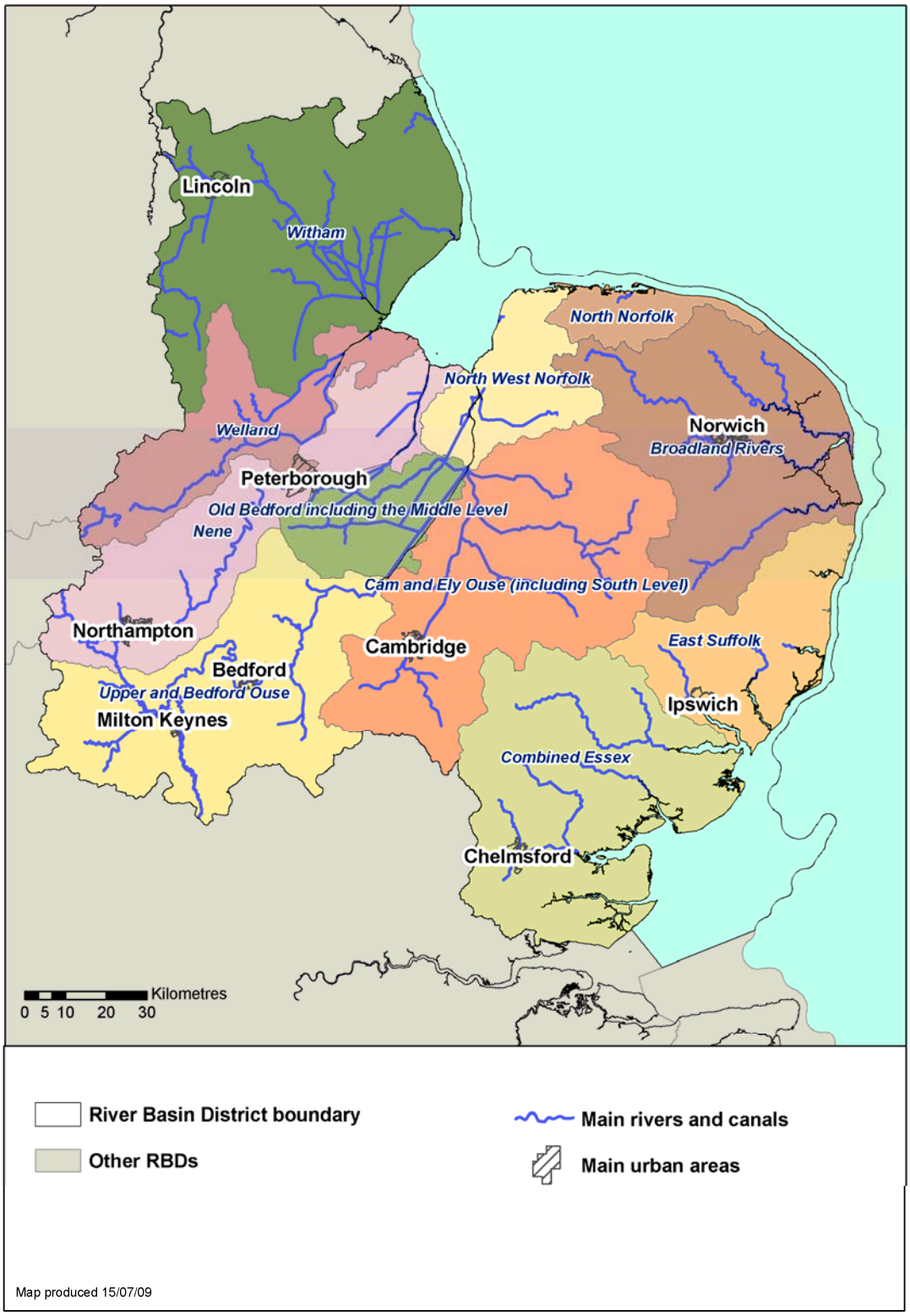
This section summarises information about the status of waters in the different parts of the Anglian River Basin District, their objectives and some of the actions for them.

Rivers and lakes are grouped by catchment. There are 11 catchments, presented here.

- **Broadland Rivers**
- **Cam and Ely Ouse (including South Level)**
- **Combined Essex**
- **East Suffolk**
- **Nene**
- **North Norfolk**
- **Northwest Norfolk**
- **Old Bedford including the Middle Level**
- **Upper Ouse and Bedford Ouse**
- **Welland**
- **Witham**

There are separate sections for **estuaries and coastal waters**, and **groundwater**.

Figure 12 **Map of the catchments in the Anglian River Basin District**



Broadland Rivers

This catchment covers a relatively flat area of approximately 3,188 km^2. The area is mostly rural, with a few larger urban areas including the City of Norwich, Great Yarmouth and Lowestoft. The main land use in the catchment is arable agriculture, although there are pockets of water-dependent industries around Norwich. Tourism and water-based recreational pursuits such as boating and angling, are vitally important to the Broadland Rivers economy. The tidal rivers in the Broadland Rivers area form the third largest inland navigation in Britain.

The Broadland Rivers area also encompasses the Broads Executive Area (status equivalent to a National Park Area) and has a high density of local and nationally important protected sites, including the Broads and River Wensum Special Areas of Conservation (SACs) and the Broadland Special Protection Area (SPA), both of which are protected under European law.

Several key centres of growth are planned in this catchment. By 2021, additional homes are planned around the growth point of Norwich (10,500), and also at Great Yarmouth (5,000) and Lowestoft (4,000) where significant development is planned on waterfront sites. In addition, a potential Ecotown has also been proposed at Rackheath in the Broadland Rivers catchment. Actions will be taken to ensure that these developments do not adversely impact on the water environment (refer to Annex C).

Table 5 **Key statistics at a glance for the Broadland rivers catchment**

	Rivers		Lakes	
	Now	2015	Now	2015
% at good ecological status or potential	8	9	17	28
% assessed at good or high biological status (59 water bodies assessed)	27	27	15	38
% assessed at good chemical status (7 water bodies assessed)	29	100	75	100
% at good status overall (chemical and ecological)	8	9	11	28
% improving for one or more element in rivers		25		56

There are 93 river water bodies in the catchment and 18 lakes. More than 27 per cent of rivers (132km of river length) and 15 per cent of lakes currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 33 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that 358 km, 25 per cent of rivers by length, in the Broadland Rivers catchment will improve for at least one element by 2015. For example in this catchment, 194 km of rivers will show class improvements for phosphate, 97 km for diatoms and 68 km for fish.

Some key actions for this catchment:

- Installation of a permanent eel pass and trap at Taverham on the River Wensum.
- The Bure Valley Living Landscape. The purpose of this initiative is to increase connectivity between the 6 Sites of Special Scientific Interest in the lower Bure valley. This will be achieved by re-naturalising the river and enhancing arable land to reduce diffuse pollution. An important element will be to develop new opportunities for people to enjoy wildlife.
- Pennywort control on River Waveney and Rockland Board.
- Partnership working in the Broads to deliver Wetland Opportunities, with wetland sites being enhanced that include South Fen in the Ant, Hickling in the Thurne and Upton in the Bure.

Cam and Ely Ouse (including South Level)

The Cam and Ely Ouse catchment comprises an area of approximately 3,600 km^2, encompassing Cambridge, Royston, Saffron Walden, Newmarket, Bury St Edmunds, Ely and Swaffham. This area contains a stretch of the Ely Ouse, from Earith to Denver, as well as the Wissey, the Little Ouse, the Lark and the Cam. It, also includes an area of Fenland, the South Level, which derives its water from the Ely Ouse.

The catchment supports a number of nationally and internationally important water-related sites that are of exceptional value.

Many of the rivers monitored within the area are naturally slow flowing, with the result that dissolved oxygen levels are significantly lower than those found in upland regions. High nutrient levels are a problem in many watercourses and can lead to prolific algae growth and associated dissolved oxygen problems. Duckweed cover can also be extensive.

Key centres of growth are planned in this catchment. By 2021, additional homes are planned at Cambridge (16,500), Thetford (6,000) and Bury St Edmunds (8,000). There will be considerable pressures from these developments to provide a water supply from an area where water resources are scarce and already allocated for abstraction or the environment. In addition, a potential Ecotown has been proposed at Hanley Grange. Development actions (refer to Annex C) will therefore be required to achieve good ecological status and prevent the deterioration of water bodies.

Table 6 **Key statistics at a glance for the Cam and Ely Ouse catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	17	18
% assessed at good or high biological status (61 water bodies assessed)	27	29
% assessed at good chemical status (17 water bodies assessed)	94	94
% at good status overall (chemical and ecological)	17	18
% improving for one or more element in rivers		22

There are 83 river water bodies and 5 lakes in the catchment. Over 27 per cent of rivers and lakes (in excess of 173km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 20 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that 236 km, 24 per cent of rivers by length, in the Cam and Ely Ouse catchment will improve for at least one element by 2015. For example, in this catchment 182 km of rivers will show class improvements for phosphate and 29 km for invertebrates.

Some key actions for this catchment:

- Loss of marshland at the coast, to be compensated for by 65ha of created wetland at Hilgay.
- Trialling of soft bank protection methods along the River Cam between Milton and Waterbeach to prevent bank erosion and protect towpath.
- Water Cycle Study/Strategy for Forest Heath and St Edmundsbury to address the impact of development on infrastructure capacity, water resources and receiving waters.
- Investigation into the effects of moored boats on sediment deposition on the River Cam.

Combined Essex

The Essex Rivers area lies within the counties of Essex and Suffolk as well as a small part of Cambridgeshire. It encompasses the rivers and tributaries of the Stour, Colne, Pant/Blackwater, Chelmer, Crouch and Roach, along with the smaller catchments of Sixpenny, Tenpenny, Holland and Asheldham Brook.

The Ely Ouse to Essex Transfer Scheme augments flows in the River Stour and River Pant/Blackwater to enable the public water supply abstractions to take place when natural flows in the rivers are not sufficient.

The water environment is used for a variety of activities including recreation, public water supply, fisheries and conservation. The area is rich in landscape and wildlife heritage and most of the coast is of international importance for conservation.

Key centres of growth are planned through the catchment. By 2021, additional homes are planned at Colchester (12,500), Chelmsford (12,500), Basildon (9,500) and Southend (4,000). These will place cumulative pressures on water resources and on estuaries into which they discharge treated effluent, and development actions (refer to Annex C) will be required to achieve good ecological status and prevent deterioration of water bodies. Flood alleviation schemes along the coast offer opportunities to create new coastal habitat, for example, salt marshes through the managed realignment of coastal flood defences.

Table 7 **Key statistics at a glance for the Combined Essex catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	7	7
% assessed at good or high biological status (68 water bodies assessed)	33	33
% assessed at good chemical status (7 water bodies assessed)	67	78
% at good status overall (chemical and ecological)	7	7
% improving for one or more element in rivers		8

There are 125 river water bodies and 5 lakes in the catchment. Over 33 per cent of rivers and lakes (in excess of 280km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 12 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that over 198 km, 19 per cent of rivers by length, in the Combined Essex catchment will improve for at least one element by 2015. For example, in this catchment 158 km of rivers will show class improvements for phosphate and 26 km for dissolved oxygen.

Some key actions for this catchment:

- Installation of elver passes to provide habitat improvement in river channel and eel migration. Schemes located at :Kings Mill, Stonham Back Cut, Cuton Back Cut, Barnes Mill, Broomfield Mill, Langleys Weir, Howe ST. Mill, Wickham Place, Blue Mills, Greys Mill, Easterford Mill, Blackwater Mill, Bradwell, Stisted Mill, Convent Lane Wiers, Cooks Mill, Ford ST. Mill, Chappel Mill, Chalkney Mill, Earls Colne Mill, Townsford Mill, Hulls Mill, Alderford Mill.
- In response to increasing pesticide concentrations in the Rivers Stour, Chelmer and Blackwater Essex & Suffolk Water has appointed two catchment Officers to work with farmers, growers, landowners and agronomists and other pesticide users in the catchments with the aim of reducing pesticides entering watercourses.
- Floating pennywort removal projects.

Case Study 2: **Bures Mill Fish Pass, River Stour**

A recent success story within the Stour catchment has been the creation of Bures Mill bypass channel as a natural fish pass. Bures Mill sluice is situated on the River Stour, a lowland river forming the Essex Suffolk border. The sluice provides essential water control allowing effective flood management of the river but this sluice also acts as an almost total obstruction for upstream passage of coarse fish and eels.

A bypass channel was created as a natural fish pass with riffles and pools along the dried bed of the original course of the river in 2009, making an additional 51.7km km of river and tributaries freely accessible to eels. It also allows other fish species present to undertake their natural migration patterns. The fish pass will enhance spawning habitat for a number of fish species and be beneficial to the water vole population, which is now only found at this location on the Stour. This project has been carried out in partnership with the Essex Wildlife Trust.

East Suffolk

The East Suffolk Rivers area encompasses the valleys, tributaries and estuaries of the Rivers Gipping, Deben, Alde, Thorpeness Hundred, Yox, Blyth and Lothingland Hundred. The area is mostly rural with a few towns: Ipswich, Felixstowe, Stowmarket, Woodbridge, Leiston, Halesworth and Needham Market.

Agriculture is the predominant land use within the area, though there are pockets of industry which include food processing, milling, malting and the manufacture of farm machinery and fertilizers.

The area has a rich landscape and includes the Suffolk Coasts and Heaths Area of Outstanding Natural Beauty (AONB) and the Suffolk Rivers Valleys Environmentally Sensitive Area. Areas of the coast are of international importance for conservation.

Many of the East Suffolk rivers are impacted by drought and periods of low flows, which is reflected in the dissolved oxygen levels measured in some of the these rivers dropping to low levels. Despite this, some are still able to support a reasonable cyprinid population dominated by roach, bream, dace and chub.

The key centre of growth planned in this catchment is Ipswich, where 20,000 additional homes are planned for 2021. Development actions (refer to Annex C) will be required to achieve good ecological status and prevent deterioration of water bodies.

Major infrastructure expansion is expected at the port at Felixstowe. In addition, there is the nuclear power generation site on the coast at Sizewell, which may undergo expansion. Again, actions will be necessary to mitigate any negative impacts and ensure good ecological status is achieved.

Table 8 **Key statistics at a glance for the East Suffolk catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	17	17
% assessed at good or high biological status (34 water bodies assessed)	15	15
% assessed at good chemical status (2 water bodies assessed)	100	100
% at good status overall (chemical and ecological)	17	17
% improving for one or more element in rivers		11

There are 65 river water bodies in the catchment and no lakes. Over 15 per cent of rivers (28km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 9 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that over 48 km, 10 per cent of rivers by length, in the East Suffolk catchment will improve for at least one element by 2015. For example in this catchment, 43 km of rivers will show class improvements for phosphate and 11 km for dissolved oxygen.

Some key actions for this catchment:

- The Blyth-Alde landscape partnership vision will encourage a re-emergence of the natural landscape between the two estuaries creating a large sustainable area of unique beauty whose evolution whilst founded on the past will be of benefit to both people and wildlife in the future.
- The Valley Fens Living Landscape Project seeks to preserve the integrity of some of the most diverse and richest wetland habitats in Suffolk through buffering and linking the best remaining sites.
- The National Trust has carried out a Coastal Risk Assessment on its properties to evaluate land and buildings in relation to future flood and erosion risks on the coast. A Coastal Adaption Strategy has been completed for Orford Ness.
- Establishment of the agricultural water abstractor group ESWAG (East Suffolk Water Abstractor Group)

Nene

The River Nene rises in Northamptonshire and flows through Northampton, Peterborough, Wisbech and Sutton Bridge before discharging into The Wash. To the east of Peterborough the catchment is typical low lying fen. Internal Drainage Boards maintain a network of drains and control water levels in this area. West of Peterborough much of the landscape is undulating, dissected by the valley of the River Nene and its tributaries.

The River Nene is an important source of raw water to fill both Pitsford and Rutland Water reservoirs for public water supply. It is also important for navigation and recreational uses. The navigation connects with the Grand Union Canal in Northampton and with the Middle Level River System at Stanground. There is no significant groundwater abstraction in the catchment, due to the absence of major aquifers. The Nene Washes, which lie downstream of Peterborough, have been classified as a Special Protection Area (SPA) and Ramsar site. The area floods seasonally providing an important flooded grassland habitat for a wide range of bird species.

A number of large discharges are made to the Nene. These include treated effluent from sewage treatment works (STWs) and industrial sources and are one of the major influences on the quality of the surface water within the catchment.

The catchment contains a diverse and in many cases, prolific fish community. The main pressures affecting fisheries are low flows and associated problems such as poor dilution of treated effluent, barriers to fish movement and habitat degradation through flood defence and navigation works.

Key centres of growth are planned for 2026 at Peterborough (24,000), Daventry (13,500), Wellingborough (16,225), Kettering (16,250) and Corby (22,100). There are, therefore, pressures from the cumulative impacts of planned development in the Nene catchment; and development actions (refer to Annex C) will be required so that there is good ecological status and no deterioration of its water bodies.

Table 9 **Key statistics at a glance for the Nene catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	21	22
% assessed at good or high biological status (31 water bodies assessed)	47	56
% assessed at good chemical status (11 water bodies assessed)	82	91
% at good status overall (chemical and ecological)	21	22
% improving for one or more element in rivers		9

There are 69 river water bodies in the catchment and 4 lakes. Over 47 per cent of rivers and lakes (183km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 6 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that over 98 km, 16 per cent of rivers by length, in the Nene catchment will improve for at least one element by 2015. For example in this catchment, 44 km of rivers will show class improvements for invertebrates and 55 km for fish.

Some key actions for this catchment:

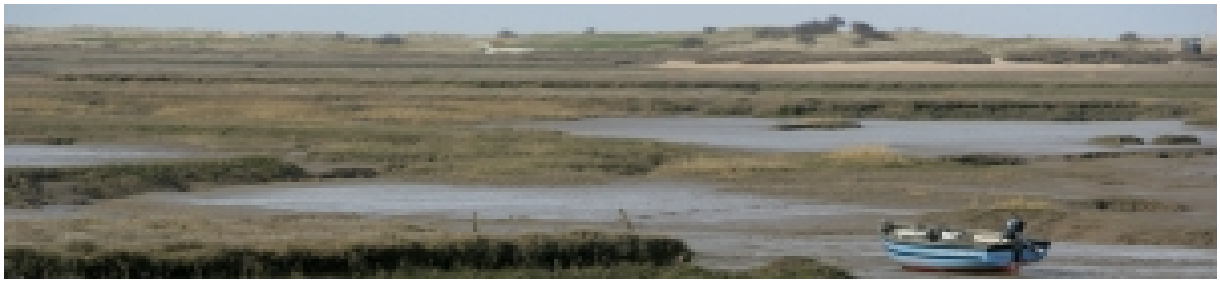
- The Revital-ISE project. This will endeavour to implement improvements along the length of the Ise valley with the aims of enhancing the biodiversity, providing increased access, increasing leisure and recreational activities, improving the landscape value and restoring the natural floodplain where possible.
- Stanwick Lake Higher Level Stewardship to restore wet grassland and reed bed areas in Stanwick Country Park.
- Nene Park Fisheries Project. Working with Nene Park Trust to improve angling, fisheries and biodiversity.
- Floating Pennywort Control on the River Nene. Rolling programme targeting floating pennywort on the Upper Nene.

Case Study 3: **River Nene England Catchment Sensitive Farming Delivery Initiative Strategic partnership.**

Diffuse pollutions is one of the most significant pressure in the Anglian River Basin District. We are working in Partnership with Natural England and River Nene Regional Park to deliver England Catchment Sensitive Farming Delivery Initiative advice in the River Nene catchment. This will help deliver benefits for water quality and will benefit the quality of water for drinking, reducing the burden of treatment. This partnership project will run until

April 2011 and will deliver over £100,000 worth of advice to Farmers, Land manager and others with an interest in diffuse pollution.

North Norfolk



The North Norfolk area is geographically small and comprises of a relatively narrow strip of land along the North Norfolk coast. The catchment is predominantly rural, with the largest towns being Mundesley, Cromer, Sheringham, Holt and Wells-next-the-Sea.

The main watercourses are the Rivers Hun, Burn, Glaven, Stiffkey, Mun, all of these are relatively small in terms of both flow and length but are important in terms of the biodiversity they support.

The area supports a variety of land uses, although most is agricultural land used for the production of cereals and root crops, there is also some animal husbandry and horticulture. The landscape value of North Norfolk is recognised in its designation as part of the Norfolk Coast Area of Outstanding Natural Beauty (AONB).

Fisheries in the Rivers Burn, Glaven and Stiffkey are diverse, though populations are limited in some parts of the watercourses by degraded habitats and barriers to migration. There are, however, thriving brown trout populations and the rivers may have potential for sea trout if access and spawning habitat is improved.

There is no key centre for growth in the North Norfolk catchment which is planned as part of the East of England region, though small scale development is expected throughout the area and development actions (refer to Annex C) will be required to ensure achievement of good ecological status and prevent the deterioration of water bodies.

Table 10 **Key statistics at a glance for the North Norfolk catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	0	0
% assessed at good or high biological status (6 water bodies assessed)	17	17
% assessed at good chemical status (0 water bodies assessed)	0	0
% at good status overall (chemical and ecological)	0	0
% improving for one or more element in rivers		50

There are 6 river water bodies in the catchment and no lakes. Over 17 per cent of rivers (10km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 3 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that nearly 30 km, 36 per cent of rivers, by length, in the North Norfolk catchment will improve for at least one element by 2015. For example in this catchment, 10 km of rivers will show class improvements for dissolved oxygen and 19 km for fish.

Some key actions for this catchment:

- Anglian River Sea Trout Project. Identification and prioritisation of barriers to breeding brown trout populations in several Anglian Rivers including North Norfolk chalk rivers: the Glaven, Stiffkey, Burn and Nar.
- Installation of riffles and flow deflectors to provide habitat improvement in river channel of the River Stiffkey.
- Norfolk Non Native Forum. Appointment of a dedicated coordinator to raise awareness and a network of surveillance and eradication programme. Work with aquatic centres to raise awareness and encourage not to sell invasive plants.
- The River Glaven Conservation Group are restoring sections of the river with riffles, reconnecting the flood plain etc.

North West Norfolk

The North West Norfolk catchment comprises an area of approximately 1,000 km^2 which stretches from Denver to Hunstanton, with major urban areas including Kings Lynn, Downham Market and Hunstanton. This area contains the River Great Ouse (north of the Denver Sluice); the Rivers Heacham, Ingol, Babingley and Nar which originate as springs from the chalk uplands in the east of the area and flow into The Wash; and the lowlands to the west of the Ouse as far as the River Nene. The Fenland region to the west is crossed by numerous man-made. The catchment drains to the tidal River Great Ouse, which outfalls to The Wash.

The North West Norfolk catchment is predominantly rural with a population of 109,000. Most of the population depends, in different ways and degrees, upon the catchment for a living. The countryside is predominantly agricultural in character, gently undulating in form and containing many areas of diverse landscapes. The quality of the agricultural land is indicated by the fact that about a quarter of its land is classified as ‘high quality’ land and is an important national and local resource.

The catchment supports a balanced ecosystem and contains sites of exceptional environmental value which include the River Nar, Roydon Common and Dersingham Bog. Rivers in the low-lying fenland areas are slow flowing, with the result that dissolved oxygen levels are low. Nutrient enrichment is a significant problem in parts of the catchment. Almost all of the catchment to the east of the Great Ouse has been designated a Nitrate Vulnerable Zone (NVZ) under the EC Nitrates Directive.

The key centre of growth planned for this catchment is Kings Lynn where an additional 9,460 homes are planned to be built by 2021. Development actions (refer to Annex C) will be required to achieve good ecological status and prevent deterioration.

Table 11 **Key statistics at a glance for the Northwest Norfolk catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	15	15
% assessed at good or high biological status (11 water bodies assessed)	27	36
% assessed at good chemical status (0 water bodies assessed)	0	0
% at good status overall (chemical and ecological)	15	15
% improving for one or more element in rivers		16

There are 19 river water bodies in the catchment and a single lake. Over 27 per cent of rivers and lakes (49km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 3 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that over 59 km, 27 per cent of rivers by length, in the Northwest Norfolk catchment will improve for at least one element by 2015. For example in this catchment, 3 km of rivers will show class improvements for phosphate and 56 km for fish.

Some key actions for this catchment:

- River Nar restoration - production of management and sediment strategies.
- Gaywood Flood Alleviation Scheme - Reconnection of the Gaywood River to its former flood plain. Within the project there is the opportunity to create new wildlife habitats in the Gaywood Valley that will enhance the amenity of the area.
- Econet - Norfolk Wildlife Trust and the Norfolk Biodiversity Partnership have prepared an ecological network map for Norfolk identifying core areas for biodiversity where protection, enhancement and expansion of the existing resource will be a priority.
- Giant Hogweed control measures on the River Nar SSSI. The aim is to prevent expansion from lower reaches to the Upper Nar.

Case Study 4: **The River Nar Restoration Strategy**

The River Nar SSSI in Norfolk is one of England's premier chalk rivers with transitions to fenland river. A partnership involving the Environment Agency, the Water Management Alliance, Natural England, Norfolk County Council and Anglian Water are working towards Defra's bringing the River Nar SSSI into favorable condition by 2010.

The key issues in achieving favourable condition are river form and function, water quantity and quality.

- The form and function of the river is sub-optimal. Studies on the impacts of structures, barriers and obstructions have contributed to the development of the River Nar Restoration Strategy.
- Work is also ongoing to improve river water quantity by the Environment Agency, through the Restoring Sustainable Abstraction programme.
- Work is also ongoing to improve water quality by the Environment Agency, Norfolk county council and Anglian Water. Phosphate stripping at Litcham has resulted in profound benefits in terms of water quality, and further investigations are proposed to ensure long term improvements.

Old Bedford including the Middle Level

The Old Bedford, including Middle Level catchment comprises an area of approximately 921 km^2, with major urban areas including Whittlesey, March, Ramsey and Chatteris. The local area comprises the Ouse Washes and the Middle Level River Systems.

The Ouse Washes (32 km from Earith to Denver) were created in the 17th century to provide storage of floodwater from the Bedford Ouse catchment. As one of the few remaining areas of Washland, the seasonally flooded Washes support important numbers of wintering and breeding wetland birds. The site is also important for aquatic plants and invertebrates. Another important protected area is Woodwalton Fen.

The Middle Level, 80 per cent of which is fenland and below sea level, is administered by the Middle Level Commissioners. The economy of this rural area is dependent on agriculture due to the creation of some of the most productive soils for arable farming in the UK by historic draining of the Fens.

The very nature of the watercourses in this fenland area, being predominantly man-made pumped drains and low-lying, result in very low dissolved oxygen levels. Nutrient enrichment arising from agricultural run-off and sewage treatment works can encourage excessive weed and algal growth that can also affect water quality. Both the Middle Level River System and the freshwater section of the Hundred Foot River have been designated as Sensitive Areas (Eutrophic) under the Urban Waste Water Treatment Directive. Large parts of the catchment have also been designated a Nitrate Vulnerable Zone (NVZ) under the EC Nitrates Directive. There is no key centre for growth in the Old Bedford catchment. However, existing towns such as March and Chatteris will have significant development (8,000 homes). Development actions (refer to Annex C) will be required to achieve good ecological status and prevent deterioration.

Table 12 **Key statistics at a glance for the Old Bedford catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	25	25
% assessed at good or high biological status (11 water bodies assessed)	64	64
% assessed at good chemical status (1 water bodies assessed)	100	100
% at good status overall (chemical and ecological)	25	25
% improving for one or more element in rivers		25

There are 12 river water bodies in the catchment and no lakes. Over 64 per cent of rivers (96km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 3 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that nearly 23 km, 17 per cent of rivers by length, in the Old Bedford, including Middle level catchment will improve for at least one

element by 2015. For example in this catchment, 14 km of rivers will show class improvements for phosphate and 8 km for dissolved oxygen.

Some key actions for this catchment:

- The Ouse Valley Living Landscape project aims to create a network of species-rich flood meadows, floodplain grazing marsh and wet woodland along the Ouse Valley from St Neots to the Ouse Washes.
- Great Fen Project - to restore over 3,700ha of wildlife habitat in Cambridgeshire, connecting Woodwalton Fen and Holme Fen NNRs.
- Maintenance manuals have been developed by the Middle level Commissions. These are linked to local Biodiversity Action Plans.
- Development of tidal river strategy to address evacuation of water from the Ouse Washes in spring.

Upper Ouse and Bedford Ouse

The Upper Ouse and Bedford Ouse catchment covers an area of approximately 3,000 km^2. The River Great Ouse dominates the area, from its source north of Brackley, all the way to Earith. The Grand Union Canal also bisects the upper catchment.

The catchment supports a wide range of recreational activities, an important navigation and abstraction for a number of uses, including agriculture, public water supply and industry. The major aquifers are the Chalk, Lower Greensand and the Bedford Oolite. The Environment Agency also operates, in partnership with Three Valleys Water, the River Hiz Support Scheme, whereby groundwater can be pumped into the rivers Hiz and Oughton to support it in times of low flow.

Nutrient enrichment is the main water quality problem in the catchment. Both the River Great Ouse and River Ouzel have been designated as Sensitive Areas (Eutrophic) under the Urban Waste Water Treatment Directive (UWWTD) and the majority of the catchment is designated a Nitrate Vulnerable Zone (NVZ).

The character of the land varies from gently rolling in the upper catchment, moving to more extensive river valley flood plains and flood meadows downstream. These areas support a number of wetland sites, including the Special Area of Conservation (SAC) Portholme Meadow. Land use is predominantly agricultural with the major urban areas including Milton Keynes, Leighton Buzzard, Bedford, Hitchin and Huntingdon.

Key centres of growth are planned by 2021 at Milton Keynes (41,000), Bedford & Marston Vale (17,000), Luton and Dunstable (22,000) and Huntingdon (8,000). Pressures from the cumulative impacts of planned development, especially those on water resources and water quality mean that actions (refer to Annex C) will be required to achieve good ecological status and ensure that there is no deterioration.

Table 13 **Key statistics at a glance for the Upper Ouse catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	26	29
% assessed at good or high biological status (46 water bodies assessed)	39	39
% assessed at good chemical status (21 water bodies assessed)	100	100
% at good status overall (chemical and ecological)	26	29
% improving for one or more element in rivers		17

There are 94 river water bodies in the catchment and 5 lakes. Over 39 per cent of rivers (347km of river length) currently achieve at least good biological status.

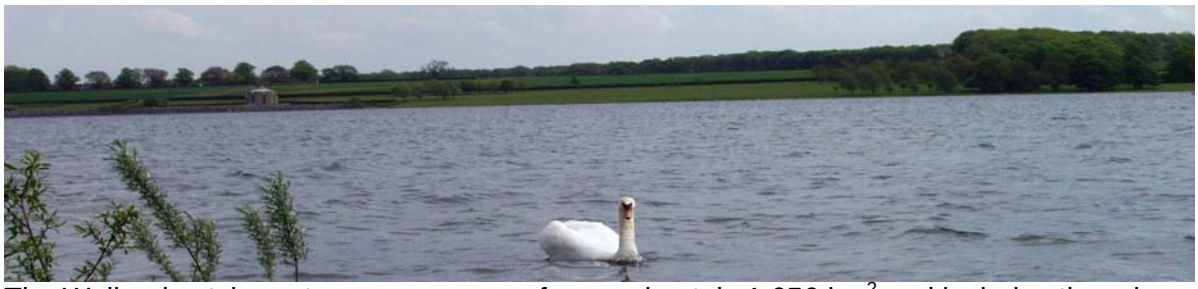
The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 16 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that over 201 km, 20 per cent of rivers by length, in the Upper Ouse catchment will improve for at least one element by 2015. For example in this catchment, 179 km of rivers will show class improvements for phosphate and 28 km for fish.

Some key actions for this catchment:

- Implement eel passage solutions at Hemingford Sluice, Houghton Mill on the River Ivel and at Brownshill all in the Great Ouse system.
- River Ouse Strategic Partnership. This will provide the opportunity to: deliver farm advice through on-farm visits and workshops; channel experiences from the CSF to more farmers; create a farm-scale appraisal of catchment risk and to target solutions; put farmers on a higher priority basis for their application for ELS/HLS; build 'accession partners'.
- Giant Hogweed control measures on the Upper Ouse at Brackley.

Welland



The Welland catchment covers an area of approximately 1,656 km^2 and includes the urban areas of Market Harborough, Uppingham, Oakham, Stamford, northern fringe of Peterborough, Market Deeping and Spalding.

From the headwaters of the River Welland to Stamford a series of small tributaries flow to the north bank of the river. These have steep valley slopes, whilst the Welland itself meanders across a wide floodplain. To the east, the Fenland area predominates and is characterised by low-lying terrain. Here, local Internal Drainage Boards maintain a network of drains, which control water levels.

The major aquifer in the catchment is the Southern Lincolnshire Limestone which is an important source of raw water for public water supply. The River Welland is an important source of raw water for both public water supply to Rutland Water and industrial supply to Eyebrook Reservoir. The river is also important for navigation and recreation; in particular

Rutland Water and the river corridor through Stamford are heavily used, particularly during summer months.

There are a number of areas within the catchment which are of important nature conservation value. Along the higher ground of the Welland Valley there are surviving remnants of ancient woodland. These form important habitats for invertebrates, plants, birds and mammals. Another important site is Rutland Water, created by impoundment of the Gwash valley. This reservoir has been designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site as it is a major wetland area.
Key centres of growth are planned for the catchment by the East Midlands Region. By 2026, additional homes are planned focussing on Market Harborough and Spalding**.** Development actions (refer to Annex C) will be required to achieve good ecological status and prevent deterioration of water bodies.

Table 14 **Key statistics at a glance for the Welland catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	24	24
% assessed at good or high biological status (26 water bodies assessed)	24	41
% assessed at good chemical status (5 water bodies assessed)	100	100
% at good status overall (chemical and ecological)	24	24
% improving for one or more element in rivers		37

There are 46 river water bodies in the catchment and 5 lakes. Over 24 per cent of rivers (123km of river length) currently achieve at least good biological status.

The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 17 surface water bodies by 2015. Those waters in the worst state will be prioritised.

Good status has several components. It is estimated that over 224 km, 40 per cent of rivers by length, in the Welland catchment will improve for at least one element by 2015. For example in this catchment, 43 km of rivers will show class improvements for macrophytes and 164 km for fish.

Some key actions for this catchment:

- Installation of riffles and flow deflectors to provide habitat improvement in river channel of the River Welland.
- Welland Sea Trout Project. To re-establish a viable sea trout population in the Welland by enabling natural re-colonisation.
- Welland Rivers Trust Scheme. River enhancements through HLS and working with the Mayfly Fishers, Grantham Fly Fishers, and Gwash Fly Fishers.
- South Lincolnshire Fenland Restoration Project centred on Baston and Thurlby fens (SSSI and nature reserve). Expansion of last remnants of fenland in Lincolnshire to landscape scale through land management, including restoration of gravel workings and measures to secure long-term security of water supply.

Witham

The Witham catchment lies within the county of Lincolnshire. The River Witham rises south of Grantham, passes through Lincoln and drains to The Wash at Boston. Other significant rivers include the Rivers Brant, Till, Bain, Slea and the extensive network of drainage systems in the East and West Fens north of Boston.

There are several urban areas supporting engineering and service-based industries within the catchment. The remainder of the area is extensively rural with good agricultural land. Drainage has historically had a significant effect on the catchment; much of the Fen areas are below sea level. Here, local Internal Drainage Boards maintain a network of drains, which control water levels.

The catchment benefits from the Trent Witham Ancholme River Transfer Scheme. This is a key infrastructure link for managing water resources, maintaining summer water levels and meeting agricultural, public water supply and industrial needs.

The catchment includes over 150 Sites of Special Scientific Interest (SSSIs) in addition to the southern tip of the Lincolnshire Wolds; an Area of Outstanding Natural Beauty (AONB) which has important conservation value. The catchment contains a diverse and prolific fish community. However, a number of barriers to fish movement also exist throughout the catchment which can add to problems of flow stress and reduced oxygenation during the summer months.

Key centres of growth are planned, particularly at Lincoln with 40,600 new homes. Development actions (refer to Annex C) will be required to achieve good ecological status and prevent deterioration of water bodies.

Proposed flood alleviation schemes offer opportunities to create new habitat, such as salt marshes, through managed realignment of coastal flood defences.

Table 15 **Key statistics at a glance for the Witham catchment**

River and lake water bodies	Now	2015
% at good ecological status or potential	23	24
% assessed at good or high biological status (53 water bodies assessed)	38	43
% assessed at good chemical status (9 water bodies assessed)	89	89
% at good status overall (chemical and ecological)	23	24
% improving for one or more element in rivers		12

There are 125 river water bodies in the catchment and 3 lakes. Over 38 per cent of rivers (248km of river length) currently achieve at least good biological status.

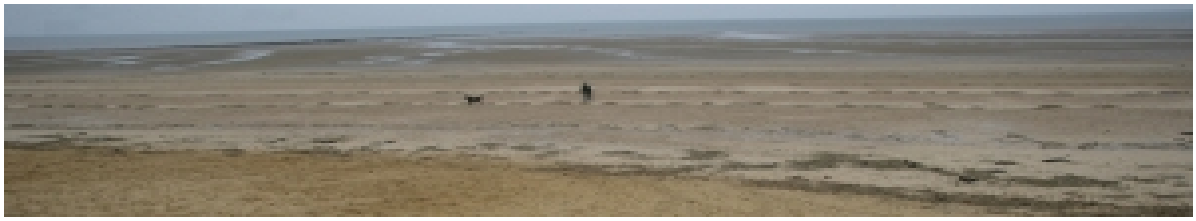
The implementation of actions will improve the status of water bodies throughout the catchment and we predict that they will be enough to improve the status of 15 surface water bodies by 2015. Those waters in the worst state will be prioritised.
Good status has several components. It is estimated that over 226 km, 22 per cent of rivers by length, in the Witham catchment will improve for at least one element by 2015. For

example in this catchment, 39 km of rivers will show class improvements for invertebrates, 35 km for diatoms and 179 km for fish.

Some key actions for this catchment:

- Lincolnshire Marsh Water Vole Project. Establishing a network of land managers that can monitor and trap mink.
- Lincolnshire Coastal Grazing Marsh to retain and increase traditional cattle grazing. Aims to provide incentives for farmers to continue or return to livestock farming with networks of ditches used again as wet fences. Restoration of traditional livestock management in areas that are now predominantly arable.
- A 94ha site at Frampton has been changed from intensive arable production to freshwater wetland grazing marsh. The land replaces habitat being affected by coastal change elsewhere in the river basin district.
- Habitat enhancement work at Great Ponton and Syston. Installation of faggots to reinforce banks and help deflect the flow of water and scour silt from the river bed to benefit white-clawed crayfish as well as brown trout and water vole.

Estuaries and coastal water bodies



The Anglian coasts and estuaries stretch for over 1,800 km from Mablethorpe, on the Lincolnshire coastline, to Canvey Island in the Outer Thames. Several large estuaries including the Wash Embayment, Orwell, Colne and Blackwater discharge to this coastal zone, which also extends inland to include the tidal waters of the Broadland Rivers – Waveney, Bure and Yare.

Much of the coastline is afforded national and international protection for the important habitats and species present, or the landscape and heritage value. The estuaries support internationally important numbers of birds visiting the wetland habitats such as saltmarsh and intertidal mudflats. The designation of a new marine Special Area of Conservation (SAC) off the North Norfolk coastline is currently under consideration.

Large numbers of people visit the coast for the natural attractions navigable waterways, and the 38 recognised bathing beaches. The ‘Blue Flag’ status of several of these beaches highlights the good water quality alongside beach amenities. The estuaries in particular are also very popular areas for recreational sailing and other watersports.

Ports at Felixstowe and Harwich provide nationally significant facilities for container and general cargo handling other ports include Great Yarmouth and Lowestoft which also provide support for the North Sea offshore oil and gas industries. There are also major port developments at Harwich, Ipswich and the redevelopment of Shellhaven (in the adjacent Thames River Basin District) that could have ecological implications, for example, on estuary fisheries.

There are commercial shellfisheries in several estuaries for mussels, cockles and oysters. In the Wash there are also significant fisheries for brown and pink shrimp, whelks and flatfish, and eels are still caught on a commercial basis in the tributary estuaries, although eel populations have declined significantly.

The estuaries have diverse fish communities and are important nursery areas for many estuarine and marine species, including bass.

Continuation of nuclear energy generation is currently under consideration at Sizewell Power Station. In addition, the east coast has become important for offshore wind power, most notably at windfarms off Lowestoft and Great Yarmouth, with others under construction off Skegness and Clacton. These may influence the fixed bed fauna and fish and bird migration routes.

Large areas of hinterland lie below sea level, currently being defended by a combination of natural defences, old sea walls and newer sea defences. There are several areas becoming susceptible to flooding, and long-term strategies to manage the flood defences are currently being developed in conjunction with Shoreline Management Plans. Flood alleviation schemes offer opportunities to create new coastal habitat, as exemplified by the creation of salt marsh in the Blackwater Estuary through managed realignment of coastal flood defences.

Urban and agricultural diffuse inputs are increasingly being highlighted as possible sources of contamination, particularly nutrients and faecal indicator organisms. Actions (refer to Annex C) are being proposed to address these issues and ensure that good ecological status is achieved.

Table 16 **Key statistics at a glance for estuaries and coasts**

	Estuaries		Coastal	
	Now	2015	Now	2015
% at good ecological status or potential	0	0	27	27
% assessed at good or high biological status (16 water bodies assessed)	33	33	86	86
% assessed at good chemical status (13 water bodies assessed)	82	82	100	100
% at good status overall (chemical and ecological)	0	0	27	27
% improving for one or more element		6		0

There are 18 estuarine water bodies in the river basin district. 33 per cent of estuaries currently achieve at least good biological status.

The river basin district also includes 11 coastal water bodies. 86 per cent of coastal waters currently achieve at least good biological status.

No further water bodies are predicted to achieve good status by 2015.

Some key actions:

- Improvements to a number of sewage treatment works will reduce the impact of nutrient and faecal indicator organisms.
- England catchment sensitive farming delivery initiative projects provide advice on reducing rural diffuse pollution entering marine waters.
- Development of habitat creation to offset losses of important coastal habitats through coastal squeeze for example, creation of salt marsh in the Blackwater Estuary through managed realignment of coastal flood defences.
- Ports and Harbours will apply national guidance frameworks on dredging and disposal of dredgings where appropriate locally, and sign up to Defra's maintenance dredging protocol;
- Sea fisheries committees will produce code of conduct for commercial fisheries and sea anglers and help to establish marine protected areas.
- Managed realignment of coast near Boston. Three gaps made in sea wall and restoration of salt marsh and lagoons.

Groundwater

The Anglian River Basin District contains 31 groundwater bodies. In some instances the groundwater bodies are an amalgamation of aquifers because they are connected and groundwater is exchanged between them.

The main aquifers in the Anglian Basin are the Chalk and Lincolnshire Limestones. The Chalk runs from the north Norfolk coast towards London and the limestone runs down the spine of Lincolnshire. Significant groundwater is also obtained locally from some sandy aquifers such as the Crag in Norfolk and Suffolk, the Woburn Sands in Bedfordshire and Sandringham Sands in north west Norfolk.

Groundwater is used for public water supply, industry and agriculture across the river basin and is under significant pressure from diffuse pollution. This is manifest principally as nitrate, phosphates, herbicides and pesticides.

The potential impact of diffuse pollution on groundwater is dependent on whether the aquifers are protected by overlying rocks such as boulder clay, and whether the water table is close to the surface. The manner in which groundwater flows is also a factor and where cracks and fissures contribute to flow, the impacts of diffuse pollution can be spread widely.

Areas where the groundwater may rapidly be affected by diffuse pollution are the Lincolnshire limestone or the Cambridgeshire Bedfordshire Ouse Chalk. Here, the aquifers are exposed at the surface and rising nitrate trends in the groundwater are generally evident. This has significant implications for public water supply as it increases the need for blending and, over time, the cost of water treatment for supply is likely to increase.

Key centres of urban growth are planned throughout the river basin district by 2021. These will place cumulative pressures on groundwater abstraction in areas where resources are fully committed and result in greater discharge and treatment of effluents.

Table 17 **Key statistics at a glance for groundwater**

Groundwater	Now	2015
% at good quantitative status	65	65
% assessed at good chemical status (31 water bodies assessed)	65	65
% at good status overall	45	45

There are a total of 31 groundwater bodies in the river basin district. 65 per cent are currently at good quantitative status and 65 per cent at good for chemical status. These are not expected to change by 2015.

Some key actions:

- Implementation of the Remediation Strategy for the Helpston Project. In the 1980s two landfill sites at Helpston, near Peterborough, were used for the disposal of the agricultural pesticide mecoprop. This has since leaked into the local groundwater aquifer, polluting public and private water supplies. The project optimises the existing pump and treat system in order to prevent the eastwards migration of mecoprop

contamination. It also assesses the feasibility of accelerating the remediation of mecoprop at source within the landfill waste and leachate.

9 Next steps – implementing this plan

Diffuse pollution investigation and action

In developing the River Basin Management Plans approximately 8,500 investigations have been identified for England and Wales, including further monitoring. The vast majority of these will be undertaken by the Environment Agency and all of these will be completed by the end of 2012. The investigations will focus on resolving what is causing the problem and what the best method to tackle it is. As a result of the evidence they will provide, we will be able to take further action in the first cycle where practicable.

The remainder of the investigations – including over 100 water company catchment management investigations – will be carried out by co-deliverers across England and Wales during the course of the first delivery cycle. Working with the river basin district liaison panels, the Environment Agency will welcome the input of local data and knowledge from other parties to help drive action at catchment level.

We are confident the investigation programme will lead to actions enabling a further reduction in diffuse pollution and more environmental improvement before 2015. As we have said earlier, the Environment Agency is already committed to delivering, through its own work or through working with others, an additional two per cent improvement towards good status or potential by 2015 across England and Wales

Additional national measures

In addition to commitments already provided, the UK Government and Welsh Assembly Government will continue to demonstrate their commitment and bring forward significant work starting with;

- banning phosphates in household laundry detergents;
- a new requirement contained within the Flood and Water Management Bill making the right to connect to surface water sewers contingent on Sustainable Drainage Systems (SuDS) being included in new developments. Local authorities will be responsible for adopting and maintaining SuDS that serve multiple properties and the highways authorities will maintain them in all adopted roads;
- general binding rules to tackle diffuse water pollution by targeting abuse of drainage systems, potentially including industrial estates, car washes and construction by 2012;
- transferring the responsibility for misconnections to water companies by 2012;
- the Water Protection Zones Statutory Instrument which will enter into force on 22 December 2009 and will be used to tackle diffuse pollution where voluntary measures are not sufficient;
- more funding for the Catchment Sensitive Farming Delivery Initiative in England from 2010 – a 50% increase in capital grant spend, and evaluation of the initiative to ensure it is achieving maximum effectiveness;
- better targeting of agri-environment schemes for water protection. In Wales, this includes aligning the forthcoming “Glastir” agri-environment scheme to contribute towards meeting Water Framework Directive requirements;
- supporting the farming industry in the Campaign for the Farmed Environment, which has reducing impacts on water quality as one of its priorities;
- encouraging farmers to use buffer strips to reduce diffuse pollution through guidance and advice provided under cross compliance;
- better understanding of the impact of sediment and measures to tackle it as a result of the additional funding announced in June 2009;
- further consideration of the impact of cross compliance and good agricultural and environmental conditions (GAEC) on water quality;

- implementation of the Sustainable Use of Pesticides Directive;
- Environmental Permitting Regulations guidance setting essential standards of location, operation and maintenance for septic tanks.

These and the other actions in the plans will lead towards a greater achievement of good status and improvement within class, with more than a quarter of the length of all rivers improving.

Implementing the plans at catchment level

The Environment Agency has found river basin liaison panels extremely valuable, and will continue to work with them throughout the plan delivery period. The panels will help to encourage river basin district-wide action through their sectors, monitor overall progress and prepare for the second cycle of River Basin Management Planning.

Given that implementation requires activity 'on the ground', it is essential that there is the maximum involvement and action from locally based organisations and people. Innovative ways of working together need to be identified that will deliver more for the environment than has been captured in this plan.

The Environment Agency will adopt a catchment-based approach to implementation that is efficient and cost-effective. This will support the liaison panels, complement existing networks and relationships, and enable better dialogue and more joined up approaches to action.

In some places there will be added value from adopting more detailed catchment plans to help deliver the River Basin Management Plan objectives during the planning cycles. The River Kennet is a case in point where we have set up a pilot group with a range of stakeholders. We will share the knowledge gained with the liaison panels, to help identify other catchments that could benefit from a similar approach.

Working with co-deliverers

This plan sets out in detail the actions required to improve the water environment. All organisations involved must play their part, record their progress and make the information available.

Where the work of a public body affects a river basin district, that body has a general duty to have regard to the River Basin Management Plan. Ministerial guidance states that the Environment Agency should:

- 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 such as the Local Development Plans and Wales Spatial Plan;
- encourage public bodies to include Water Framework Directive considerations in their plans, policies, guidance, appraisal systems and casework decisions.

For some, the actions in this plan may be voluntary and for others they will be required under existing legislation. We want to work with you to make these actions happen, and identify new action to create a better place.

Reporting on progress

The Environment Agency will use its environmental monitoring programme and, where appropriate, information from other monitoring programmes, to review whether work on the ground is achieving the environmental objectives. We will update the classification status of water bodies accordingly and review progress annually. At the end of 2012 a formal interim report will be published. This will:

- describe progress in implementing the actions set out in this plan;
- set out any additional actions established since the publication of this plan;

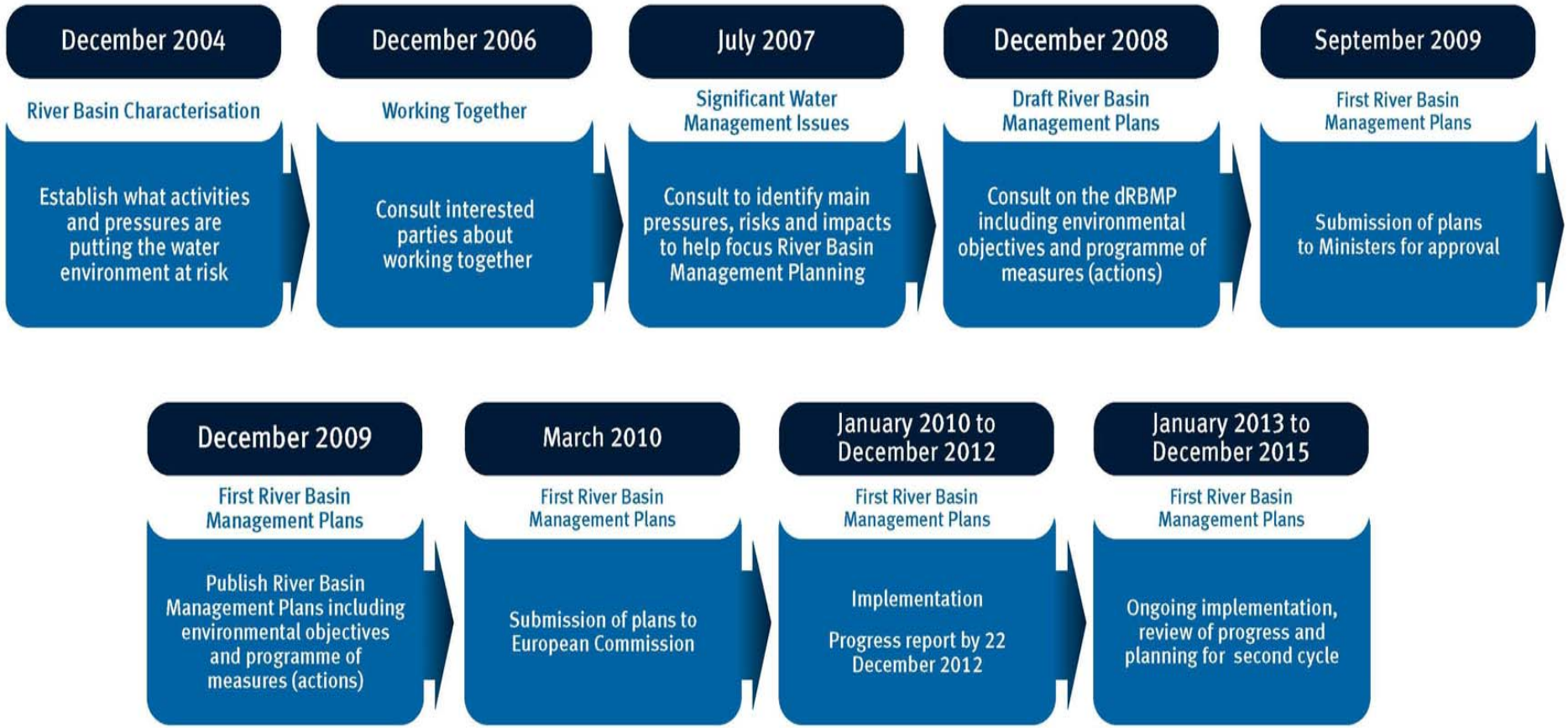
- assess the progress made towards the achievement of the environmental objectives.

Preparations have already begun for the next cycle period 2015 to 2021 and for the subsequent cycle to 2027. If you have proposals for actions that can be included in these future cycles please contact us.

River basin management milestones

The plan builds on a number of other documents and milestones required by the Water Framework Directive. The work to date has ensured a strong evidence base, and a framework for dialogue with interested organisations and individuals. In terms of taking this plan forwards, it helps to understand the major milestones remaining. These future milestones are summarised in the figure below.

Figure 13 **River basin management planning milestones to date and to 2015**



10 Summary statistics for the Anglian River Basin District

Table 18 **Summary statistics for the Anglian River Basin District**

	Rivers, Canals and SWT's	Lakes and SSSI ditches	Estuaries	Coastal	Surface Waters Combined	Groundwater
% of water bodies with improvement in any status of any element by 2015	16	24	6	0	16	0
% of water bodies at good ecological status/potential or better now For groundwater: % of water bodies at good or better quantitative status now	18	31	0	27	18	65
% of natural water bodies at good ecological status or better now	23	36	0	0	23	65
% of artificial and heavily modified water bodies at good ecological potential or better now	15	29	0	43	16	N/A
% of water bodies at good ecological status/potential or better by 2015. For groundwater: % of water bodies at good or better quantitative status 2015	19	35	0	27	19	65
% of natural water bodies at good ecological status or better by 2015	25	55	0	0	26	65
% of artificial and heavily modified water bodies at good ecological potential or better by 2015	16	29	0	43	17	N/A
% of water bodies at good chemical status now	85	83	82	100	85	65
% of water bodies at good chemical status 2015	94	100	82	100	93	65
% of water bodies at good biological status or better now	33	11	33	86	33	N/A
% of water bodies at good biological status or better by 2015	36	22	33	86	36	N/A
% of water bodies with alternative objectives (good status 2021 or 2027)	81	65	100	73	81	55
% of waterbodies deteriorated under Article 4.7	0	0	0	0	0	0

% of all water bodies (surface waters and groundwaters) at good status now	19
% of all water bodies (surface waters and groundwaters) at good status by 2015	20

11 Further information – the annexes

Annex A **Current state of waters in the Anglian River Basin District**
What the waters are like now. Information on our network of monitoring stations, the classification status of water bodies and the reference conditions for each of the water body types in the river basin district.

Annex B **Water body status objectives for the Anglian River Basin District**
Information on water body status and objectives

Annex C **Actions to deliver objectives**
Details of the actions planned (programmes of measures) for each sector to manage the pressures on the water environment and achieve the objectives of this plan.

Annex D **Protected area objectives**
Details of the location of protected areas, the monitoring network, environmental objectives and the actions required to meet Natura 2000 sites and Drinking Water Protected Area objectives.

Annex E **Actions appraisal and justifying objectives**
Information about how he water body objectives have been set and the actions selected. It also includes justifications for alternative objectives.

Annex F **Mechanisms for action**
More detail about the mechanisms (i.e. policy, legal, financial tools) that are use to drive actions.

Annex G **Pressures and risks**
Information about the significant pressures and risks resulting from human activities on the status of surface water and groundwater.

Annex H **Adapting to climate change**
Information on how climate change may affect the pressures on the water environment and the ability to meet the objectives.

Annex I **Designating artificial and heavily modified water bodies**
Information about the criteria used to designate waters as artificial or heavily modified water bodies.

Annex J **Aligning other key processes to River Basin Management**
Aligning planning processes to deliver multiple benefits and sustainable outcomes

Annex K **Economic analysis of water use**
Information about the costs of water services within the river basin district

Annex L **Record of consultation and engagement**
Details of how we have worked with interested parties to develop this plan

Annex M **Competent authorities**
List of the competent authorities responsible for river basin management planning.

Annex N **Glossary**
Explanation of technical terms and abbreviations.

The 'Guide to the River Basin Management Plan' explains where in the annexes you can find the information that is required by the Water Framework Directive.

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