Water for life and livelihoods

Anglian River Basin District: Challenges and choices

Summary of significant water management issues

A consultation

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

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

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

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

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This consultation has been produced to comply with the requirements of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, Regulation 12(1)(b) to "…not less than two years before the beginning of the plan period, publish a summary of the significant water management matters … for consideration in relation to the river basin district".

Foreword

A healthy water environment is important for wildlife and in supporting livelihoods. It is the role of the Environment Agency to work with others to make sure the water environment is protected and improved.

The Anglian River Basin District is home to approximately 7.1 million people, and a wide range of important animals and plants. The Environment Agency is aware of the many challenges that face the water environment in this region. These include the impacts of a growing population, changing climate and human interventions both now and in the past.

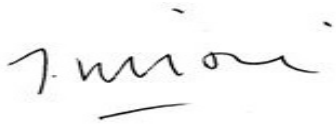
Our recently completed programme of investigations, the largest environmental assessment of its kind in England, means we now know more about the current pressures in the river basin district, including the main reasons some of the regions waters fail to achieve quality standards.

As we update the current river basin plan and continue to roll out the catchment based approach, we will work with others to find cost effective solutions that benefit the environment and growing communities.

We have already consulted on how you would like us to work with you through the recently ended *Working Together* consultation. We have taken on board your views and we would now like your views on:

- The significant issues that are limiting the benefits society gets from the water environment.
- The best way to solve these issues and what should be done first.

We hope that you will join us in developing, through this consultation, the next stage of the river basin planning process and ultimately improving the water environment in the Anglian River Basin District.



Toby Willison
Director, Anglian

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1 Your views count

The best way to protect and improve the water environment is by everyone being actively involved. This consultation is an important step in managing the water environment issues in the Anglian River Basin District and gives you the chance to influence the approach in your local area.

This is a public consultation and we, the Environment Agency, welcome everyone's views.

We'd like to find out your views on:

- The significant issues that are limiting the benefits society obtains from the water environment. (the challenges)
- The best way to address these issues and what should be done first (the choices).

This consultation describes the significant water issues in the Anglian River Basin District and then focuses on these issues in each of the catchments. This offers you the opportunity to respond to this consultation at the level most appropriate to your expertise or interest.

If you want to respond to this consultation on a specific issue, then you may wish to just answer the questions for that particular section. If your focus is more on your local area, you may prefer to respond to the questions at the beginning of the catchment section and apply them to the area of your interest and expertise. You are, of course, welcome to do both.

We would like you to respond to the following consultation questions:

The significant issues (pages 14 – 22)

1 What do **you** consider to be the biggest challenges facing waters in the Anglian River Basin District?

2 Do you agree with our description of how the significant issues are affecting the water environment and society? *Please specify which issue(s) your response refers to and provide relevant information to help explain your answer.*

3 How do you think these issues should be tackled, and what would you choose to do first? *Please specify which issue(s) your response refers to. Please consider any resource implications.*

The catchments (pages 23 – 35)

4 How are the significant issues in a catchment affecting the water environment and society? *Please specify which catchment(s) your response refers to and provide relevant information to help explain your answer.*

5 How do you think the challenges affecting each catchment should be tackled and what would you choose to do first? *Please specify which catchment(s) your response refers to. Please consider any resource implications.*

Figure 1 The Welland Valley Partnership

There are many ways to respond to this consultation (see page 37 for more details), but if you have any difficulties, please call the Anglian River Basin Programme Manager, Dave Freeman on 01733 464660, or email anglianRBD@environment-agency.gov.uk

This consultation runs from 22 June to 22 December 2013.

We will issue a response document by March 2014. This will summarise the comments we received and what will happen as a result.

2 Supporting information

This consultation document is a summary of the information the Environment Agency and others have collected and analysed. Throughout this document you will be directed to other, more detailed sources of information.

To help you respond to this consultation you might like to read the Facts and Statistics document. To view this, please visit: http://www.environment-agency.gov.uk/research/planning/140076.aspx

To find out further information about river basin districts, catchments, water bodies and the river basin management planning process please see our website at http://www.environment-agency.gov.uk/research/planning/33106.aspx

There is also a consultation on the nationally significant water management issues called *England's Waters: Challenges and Choices*, which is referred to throughout this document. To view this consultation, please visit: https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices.Please note the consultation on this national document closes on 22 September 2013.

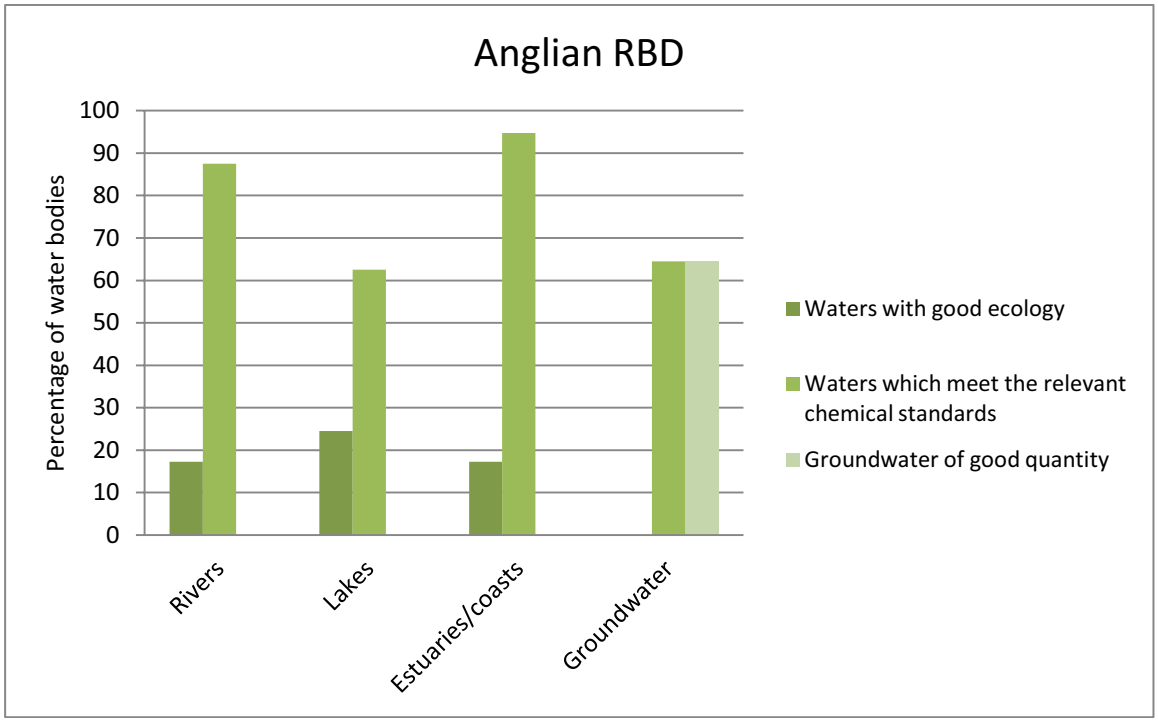
3 Water – a vital resource

Water is essential for life and livelihoods. The average person in the UK uses 150 litres of water every day in their home. If you include all the water used in growing and manufacturing the things used or consumed, each of us uses on average around 4,600 litres (over 1,000 gallons) of water per day, over 60% from sources in the UK.

Water allows the natural environment to flourish, and businesses, agriculture and the economy to grow and prosper. Rivers, lakes, estuaries, coastal areas, wetlands and water under the ground provide many different benefits to society – from supplying drinking water and supporting fisheries to providing an essential resource for business and agriculture, transport routes and a source of recreation that promotes wellbeing.

Healthy water environments also help protect the nation from floods and droughts and regulate the quality of the air and the climate. Everyone benefits from using water and enjoying the water environment, but it is essential that both are used and managed in a sustainable way. By doing this, the natural environment, business and economic growth will be protected and the long-term benefits to health and wellbeing improved.

Assessing the state of the water environment is now done in a comparable way across Europe, taking account of different natural conditions in each country's local geography. A target of good status is the long-term aim, which is defined as a slight deviation from natural conditions associated with limited impacts from human activity. In England, fewer than a quarter of surface waters currently have a good ecology, either as good status, or the slightly modified target of good potential, which applies to waters that have been extensively engineered



Graph 1 The proportion of waters in the Anglian RBD in good condition in 2012 (based on assessments of the ecology, chemicals and for groundwater, the amount of water.)

4 River basin management planning – the benefits

In December 2009, we, the Environment Agency published the current Anglian River Basin Management Plan. With our partners, we are now working to review and update it. We will publish the revised plan in December 2015, following Government approval and sign-off by the Secretary of State.

Understanding the benefits society obtains from protecting and improving the water environment is at the heart of river basin management planning. Understanding and capturing information on these benefits will help determine the quality of the water environment society wants and can afford to achieve.

The updated plan will explain how decisions affecting the water environment are made. The plan is important because it will show businesses and other water users what they need to do. It will not be a full, detailed list of actions. Instead, it will provide the basis for agreeing detailed work plans.

The updated plan will take into account the wider water issues such as flooding, a changing climate and drought, which are, in some cases, managed with the help of other, more detailed plans.

Significant water management issue	Sector responsible for the significant water management issue									
	Agriculture & rural land management	Angling & conservation	Environment Agency	Fisheries	Industry	Local government	Navigation	Urban & transport	Water industry	No relevant sector
Pollution from rural areas	342									1
Pollution from towns, cities & transport					21			87		2
Changes to level and flows	60		7		6				44	15
Invasive non native species										38
Physical modification	51	3	138	1	25	13	5	15	14	255
Pollution from waste water	5				39		1	46	321	27

Table 1 Summary of the sectors identified as contributing to the issues preventing Anglian RBD waters reaching good condition (based on 2013 information on reasons for failure collected during investigations carried out by the Environment Agency; numbers in table are the numbers of affected waters).

5 The catchment based approach

The Environment Agency is constantly exploring better ways of involving people, communities, organisations and businesses to make a difference to the health of waters and habitats.

Following your feedback that involving people at a 'catchment' level is often the most effective way of working together, we have included information on each catchment within the Anglian River Basin District.

A catchment is an area with several, often interconnected bodies of water, such as rivers, lakes, groundwater or coastal waters.

By working together across catchments we aim to:

- Understand the issues in the catchment and how they interact.
- Understand how the issues are affecting the current local benefits and future uses of water.
- Involve local people, communities, organisations and businesses in making decisions by sharing evidence.
- Work out what issues to tackle as a priority.
- Build towards a ‘catchment plan’, a simple statement of options to protect and improve the catchment.

To find out further information about river basin districts, catchments, water bodies and the river basin management planning process please see our website at http://www.environment-agency.gov.uk/research/planning/33106.aspx

6 The Anglian River Basin District

Overview

The Anglian 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 7.1 million people live and work within the district.

Many of the towns are proposing significant housing growth, along with the creation of jobs and services. We have to work with the planners, developers and communities affected by growth to maintain and improve our environment.

The river basin district is a predominantly rural catchment, with more than half of its land (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, the 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 East Anglia is also a major horticultural region, cultivating everything from peas and beans to potatoes and carrots, apples, strawberries, salad crops, flowers and shrubs. Farmers in East Anglia also harvest over half of the nation's sugar beet. Britain's pig and poultry farms are mostly located here and we have the second largest pig herd in England. Our 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.

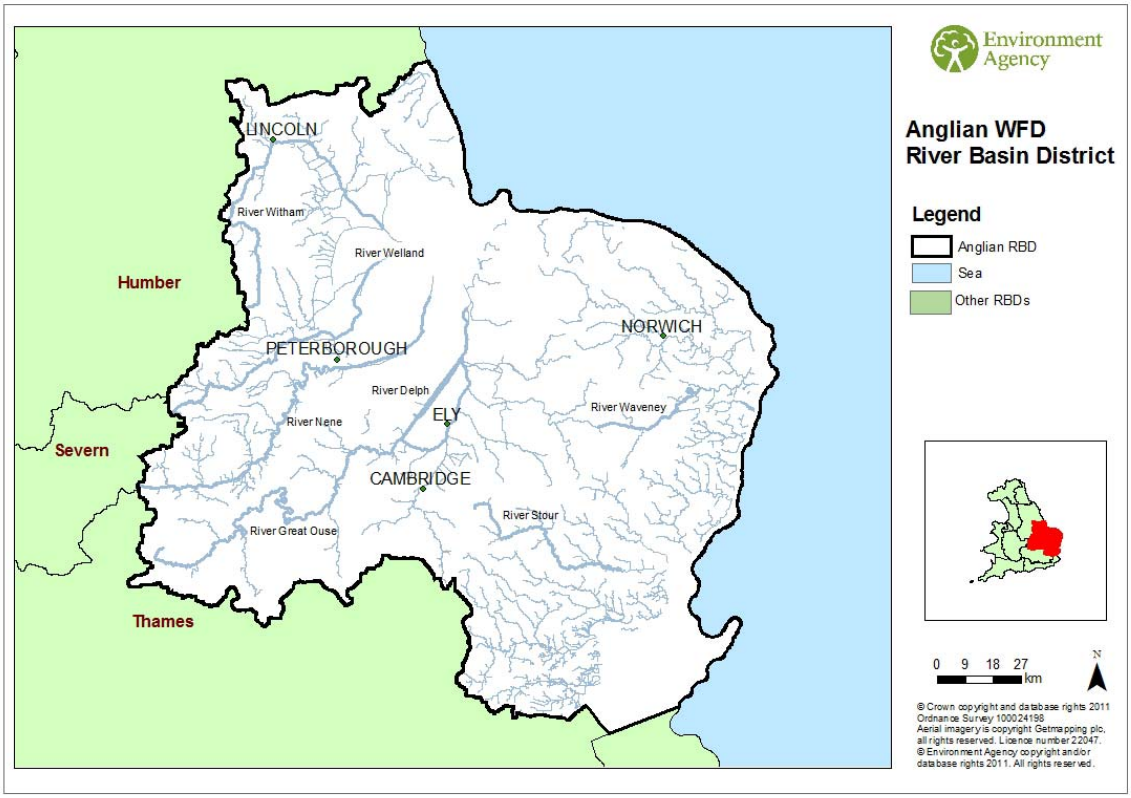


Figure 2 Map of the Anglian River Basin District

One of the most striking parts of the river basin district is 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 a major arable agricultural region 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.) that serves those communities.

The Anglian 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 countless rare plants and animals. Freshwater habitats within the river basin district are very important for wintering wildfowl and our reservoirs and watercourses support some important fisheries. Otters have made a welcome return to all catchments. Many invertebrate populations and populations of rare birds depend upon these freshwater wetlands. Approximately 80% of England's resource of lowland fen occurs here, including the largest expanse of lime-rich fens. However, less than 1% of the original wetland habitat now remains. With our partners, we are seeking to restore sustainable wetlands, and reconnecting habitats across the Fens to benefit people, our natural and historic heritage and the rural economy. Other internationally important fens occur in the heads of valleys, fed by groundwater springs. Rich mixes 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% of the UK's extensive areas of saltmarsh, which reflects the presence of large estuaries and wide intertidal areas along the coast. The Wash is a vital area for overwintering birds and has been designated as a Marine Protected Area.

Water management is one of the biggest challenges facing the river basin district. Parts of the district are extremely dry, receiving only two-thirds of the UK's average rainfall. Many of our most important wildlife sites depend on a good supply of water and it is vitally important for public water supplies, agriculture and industry. At the other extreme, flooding is also a key feature of the district. About one-fifth of the region is susceptible and therefore, coastal and inland flooding is a major concern for many communities.

There are many tourist destinations across the district, and water recreation is important, with a significant number of visits by boaters and anglers. The Broads as a destination has an estimated economic value of £200 million per year.

Current condition

The Environment Agency uses the term 'water bodies' to help understand and manage the water environment. A 'water body' is part, or the whole, of a river, lake, groundwater or coastal water. We assess the condition of these water bodies through a monitoring process, which produces an annual 'classification' or healthy water rating. The classification is based on the biological and chemical condition of the water body and assesses how close it is to its natural state.

There are many pressures that can affect the condition of a water body. Controlling these pressures to make sure that there is no deterioration from the water body's current condition, and the resulting benefits society gets from them, is the first priority of river basin management planning.

There are 866 water bodies in Anglian River Basin District, including rivers, lakes, groundwater, estuaries and coastal waters. Currently18% of water bodies are in a good condition, with 16% at poor and 2% at bad status. Healthy waters contribute to the economic value of the region. They help support a variety of industries from tourism to agriculture and it is essential that waters are protected and improved.

We have monitored and investigated water bodies that are not in good condition and identified the reasons why. The main reasons are the impacts of physical modifications, pollution from waste water and rural areas, changes to flow, pollution from towns and transport, and non-native species. These impacts are described fully in the significant water issues section on pages 14-22.

For information on the latest classification results and other key statistics see the *Anglian River Basin District: Facts and statistics* supporting document. To view, please visit: http://www.environment-agency.gov.uk/research/planning/140076.aspx

Protected areas

There are many areas in the Anglian River Basin District where the water environment is particularly important. Areas include rare wildlife habitats, bathing waters and areas where drinking water is abstracted. These areas are known as 'protected areas' and are given particular legal protection. Protected areas are a priority for action to make sure they meet their statutory conditions and can continue to provide their special uses. Table 2 shows the number of protected areas in the Anglian River Basin District.

Table 2 Protected areas in the Anglian River Basin District

Directive	Protected area	Number of protected areas
Bathing Waters	Recreational waters	37
Birds	Natura 2000 sites (water dependent Special Protection Areas)	22
Drinking Water	Drinking Water Protected Areas (both groundwater and surface water)	68
Freshwater Fish	Waters for the protection of economically significant aquatic species	447
Shellfish Waters	Waters for the protection of economically significant aquatic species	22
Habitats	Natura 2000 sites (water dependent Special Areas Of Conservation)	23
Nitrates	Nitrate Vulnerable Zones	96% of RBD area
Urban Waste Water Treatment	Sensitive areas	37 (33 eutrophic, 6 nitrate)
Note: Sites of Special Scientific Interest are not legally described as 'protected areas'.		

The natural environment means we must also be flexible with our priorities. For example, sensitive areas, such as bathing waters, are currently complying well with their required designations. However, excess rainfall such as that seen in the floods of 2012, could reduce compliance during the bathing water season and mean we have to focus on this issue again in the future. Compliance with shellfish water designations is also currently good. Again, this could become a priority in the future.

More information about the protected areas is available in the *Anglian River Basin District: Facts and Statistics* document. To view, please visit http://www.environment-agency.gov.uk/research/planning/140076.aspx

7 The significant water issues

Working together with members of the Anglian River Basin District Liaison Panel (a group of key partners), we have developed a list of the most important issues we believe threaten the current and potential future uses of the water environment.

To do this, we assessed the pressures or potential issues caused by people **now** (for example, rivers polluted by farming or urban activities); **in the past** (changes to natural river channels); or **in the future** (abstracting more water to meet rising demand). We have only focused on those issues where more action is needed.

We developed a number of issue headings and have grouped the issues/pressures under these (please note that these are not in order of priority):

- **Physical modifications** – changes made by people to rivers, lakes and estuaries, for example flood defences and weirs, and changes to the natural river channels for land drainage and navigation. These modifications alter natural flow levels, may cause excessive build up of sediment, and the loss of habitats.
- **Pollution from waste water** – waste water can contain large amounts of nutrients (such as phosphorus and nitrates), ammonia and other damaging substances.
- **Pollution from towns, cities and transport** – rainwater running over hard surfaces and carrying pollutants into waters, chemicals from contaminated land, and sewage from houses ‘misconnected’ to surface water drains rather than sewers.
- **Changes to the natural flow and level of water** – taking too much water from rivers, canals, lakes and groundwater, means less water flowing.
- **Invasive non-native species** – the effect on the health of the natural environment of plants and animals from outside the UK introduced to UK waters.
- **Pollution from rural areas** – the effects of poor agricultural practice and rural land management on the water environment (also known as 'diffuse rural pollution').

The next section looks at each of the significant issues in turn; explaining what it is, what's causing it and how it is limiting the benefits society gets from the water environment. We share what is currently being done, what more could be done and what the priorities for action might be.

We will work with interested parties to look at the costs of possible action and the benefits of improving the condition of the water environment. In summer 2014, we will consult on the results of this work and what it will mean for the long-term objective (or condition) for each water body. Ministers will ultimately decide what the long-term objectives should be and when, by considering how affordable the actions are.

More information about the main pressures is available in the *Anglian River Basin District: Facts and Statistics* document. To view, please visit http://www.environment-agency.gov.uk/research/planning/140076.aspx

As well as considering the current state of the water environment it is also important to look at the future risks (potential impacts). The Environment Agency has produced risk assessments for each pressure affecting the water environment. These risk assessments can be accessed from the ‘Further information on the significant issues’ section of this document. To view, please visit section 9.

We would like you to respond to the following questions on the significant issues in the Anglian River Basin District:

Consultation questions

1 What do **you** consider to be the biggest challenges facing waters in the Anglian River Basin District?

2 Do you agree with our description of how the significant issues are affecting the water environment and society? *Please specify which issue(s) your response refers to and provide relevant information to help explain your answer.*

3 How do you think these issues should be tackled, and what would you choose to do first? *Please specify which issue(s) your response refers to. Please consider any resource implications.*

Physical modifications

Why this is a significant issue

Our environment is a reflection of the changes that have been made to the rivers, lakes and estuaries over hundreds of years, many of which have benefited society.

Changes have been made to our rivers to improve drainage and reduce flooding, for urban development, water supply and to allow navigation and recreational boating. However, these changes have altered the habitats available for wildlife. For example, weirs can hinder the natural movement of fish, making it difficult for them to migrate. The straightening and deepening of rivers has reduced the diversity of habitats, limiting the variety of animals and plants present. Our coasts have been extensively reinforced to protect low-lying land and property and to prevent coastal erosion. These do, however, contribute to coastal squeeze and the loss of salt marsh and mudflats. Many of our estuaries have changed radically from their natural state through dredging, land reclamation and shoreline reinforcement to support the thriving ports and harbours we see today.

Figure 3: River Wissey fish pass siphon

Nearly 70% of rivers and 77% of both lakes and estuaries in the region have been significantly modified. The negative impacts of these centuries-old changes need to be tackled, while recognising the ongoing need for those modifications to continue to exist. 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, together with climate change, can pose an increasing threat to people, property and coastal habitats.

The current approach to managing the issue

We have already identified where many physical modifications are limiting ecology and have identified improvements that need to be made to habitats.

We have been improving our rivers through river restoration and have legislation in place to manage any future modification of our waters through for example the national planning framework and the Salmon and Freshwater Fisheries Act. Our Catchment Flood Management Plans now include sympathetic options to not only protect people from flooding but also ensure minimal impact on wildlife.

Actions needed in future

Due to the extent and impact of physical modifications across the river basin district, it will take significant investment to achieve all of the improvements identified. Additional actions needed include:

- developing strategies for new or existing flood defences to be set back nearer to the perimeter of floodplains, to increase flood storage while achieving a more natural floodplain
- using softer flood risk reduction measures, reducing the need for hard defences
- considering any needs for new flood storage areas and wetlands
- reviewing and refining dredging programmes for best practice
- developing further river and flood plain restoration schemes
- implementing marine spatial planning
- developing additional fish passes
- removing redundant structures

Pollution from waste water

Why this is a significant issue

Nutrients (phosphate and nitrates), ammonia, organic matter and metals in waste water are the main causes of pollution. Excessive amounts of nutrients can cause aquatic plants and algae to grow, reducing the amount of oxygen available and altering the balance of the river ecosystem. Phosphorus is the main nutrient issue for inland waters, and nitrates for estuarine and coastal waters. Ammonia, organic matter and metals also reduce water quality, which damages water life. Waste water pollution mostly affects surface water, but also contributes to groundwater pollution as well.

Good progress has been made through large-scale investment to reduce pollution from water company discharges in recent years, although water company owned sewage works remain the major contributor of pollution from waste water in towns and cities. In rural areas, waste water from other sources (including privately owned sewage systems) contributes to upstream pollution.

The current approach to managing the issue

Water companies have a five year planning cycle to reduce the effects of pollution from their sewage works. The most significant sources of pollution are prioritised and solutions are implemented to reduce the effects. This year, water companies are building phosphorus removal systems at many sewage treatment works protect the environment. Water companies are also working with us to plan where future improvements to waste water must be made to further reduce pollution levels.

Where there are pollution issues from non water company waste water, we offer advice and carry out targeted pollution prevention campaigns to reduce waste water pollution from these sources.

Figure 4: Effluent discharge point

Actions needed in future

Our main priority is to reduce nutrient pollution from phosphorus as this is the most significant cause of water quality pollution across our region. By reducing phosphorus levels, we will have benefits to the wider river ecosystem as well as reducing specific pollution from waste water. Other priorities are to reduce waste water pollution from ammonia and organic sources. We will achieve all these reductions in waste water pollution through planning and regulating water companies to carry out improvements to their sewage works.

Sometimes, we cannot reduce pollutants from waste water enough to improve water quality. At times, we also require more environmental data into the effects of waste water pollution; we are investigating the environmental impact to fully understand and plan to improve water quality. We also need to continue to offer advice and target pollution prevention work from non water company sources in rural areas.

Pollution from towns, cities and transport

Why this is a significant issue

In urban areas, excess rainwater can rapidly run off from hard surfaces, washing pollutants into surface drains and the sewerage network. This mixed effluent contains nutrients, sediment, chemicals, heavy metals, pesticides and bacteria and threatens water quality and can harm ecology. These pollutants reduce the quality of water for downstream abstractors like water companies and farmers. These pollutants can also wash into soakaways and pollute groundwater.

There is significant growth planned in our towns and cities with the potential to increase pollution from urban areas and transport. If these urban areas experience the effects of climate change as well, with higher temperatures and more intense rainfall, this could result in an increase in runoff and/or a higher concentration of pollutants in our rivers.
Many houses and businesses have two separate sewers, separating waste to discharge into the foul sewer and water running off roofs direct to local water courses. In some properties domestic waste water is mixed with clean surface water through misconnections in the sewerage system. This allows waste water containing ammonia and organic matter to enter rivers untreated, which can impact upon the river ecosystem. Poorly maintained private sewage treatment works also cause pollution in urban areas by discharging ammonia and organic matter into rivers.

Transport, construction and highways also provide a source of sediment pollution, as well as metals. Pesticides can run off from road side verges, railway tracks or runways. Transport infrastructure can also cause air emissions which are deposited on hard standing areas and washed away in surface water runoff.

The current approach to managing the issue

Urban pollution is being tackled by influencing new transport infrastructure and housing at the planning stage to make sure surface water is managed to reduce the impacts of any urban pollution (e.g. Sustainable Urban Drainage Systems). We are also working with partner organisations to produce Water Cycle Studies. These plans look at the effects of growth on water quality, water resource and flooding issues to make sure the environment is protected from future growth. We also carry out specific pollution prevention campaigns at higher risk locations where pollution has occurred, or is more likely to occur.

Actions needed in future

Diffuse pollution from towns, cities and transport can be difficult to identify on occasions. Due to its intermittent nature and source we may need further information and data to tackle urban pollution in the future, especially from drainage. Further education of the public and industry via regulation, advice and good practice are required to reduce urban pollution.

Changes to natural level and flow of water

Why this is a significant issue

Our water is precious, and essential for life. It is vital for our society, from the water we drink and use at home, to agriculture, industry and power production. However, every drop of water we take from rivers and groundwater in the Anglian River Basin affects our environment, and our existing demand for water is already damaging some of our river ecosystems. The relationship between flow and ecology is complicated, but less flow in the river means that some species of fish, plants and insects might not be able to survive. Abstracting water can also mean that contaminants are less diluted and may cause other water quality issues such as high nutrient levels leading to an excessive growth of algae.

In 2011, around 1.6 trillion litres of water was licensed for abstraction from non-tidal rivers and groundwater in the Anglian River Basin District. 62% of the water abstracted was licensed for public water supply, 11% for agriculture and 23% for industrial use/power generation. Groundwater plays an important role in public water supply as well as supporting base flows to rivers.

The current approach to managing the issue

Water companies and the Environment Agency have an investigations programme covering over 300 sites where we suspect that water abstraction may be harming the environment. Where this is the case, we are looking at possible ways to reduce this harm, including habitat restoration and reducing abstraction. So far our work has enabled us to resolve over 270 schemes in Anglian Region. Our schemes also include the work required under the European Habitats & Wild Birds Directive, designated Sites of Special Scientific Interest, Biodiversity Action Plans (BAP) and undesignated sites of local importance. Some schemes identified improvement through changes to abstraction licences or habitat and other identified no further action was required because our investigations have found that abstraction did not directly link to ecological impact.

Actions needed in future

Reducing abstraction is often difficult because a new source of water will need to be found. However, these options may be controversial, costly and have their own environmental issues. Water companies will consider their future needs for water supply in their water resources management plans. These are produced every 5 years and look at how companies' available water supplies and customer demands for water are predicted to change over a 25 year period. It is important that other abstractors also consider their future needs for water and how they can make their systems more resilient.

Through initiatives like our In River Needs programme, we must continue to improve our understanding of how the changes to flow caused by abstraction affect the ecology of water bodies. We need to focus on those areas where we believe that abstraction is damaging the environment and where the solution is cost effective and viable.

Invasive non-native species

Why this is a significant issue

Non-native species affect biodiversity throughout the world and this is estimated to cost the UK alone £2 billion a year. Many non-native species in England do not pose a threat to the environment. However, about 1% of those that escape into the wild can have significant ecological and financial impacts. Examples of non-native species of concern in Anglian include Signal Crayfish, Killer Shrimp, Japanese Knotweed, Himalayan Balsam, Floating Pennywort and mink. Many organisations are concerned about the increasing risk, but there is a lack of clear responsibility as to who should lead or act to manage non-native species. Our changing climate will make the situation worse. More species are expected to arrive in the UK and survive.

Figure 5: American Signal Crayfish

Over half of all the water bodies in the Anglian River Basin District are affected by non-native species. There are a range of impacts to be tackled including an increased risk of flooding (river channels becoming clogged and bank erosion); reduced recreational opportunities (including angling and navigation); damaged infrastructure; and harm to native wildlife (predation, disease or competing for food and space). Once a non-native species becomes established it can be impossible to get rid of or adequately control. There are some species that we can eradicate if we act now.

Some non-native species can cause considerable damage. As well as affecting the ecological status of water bodies, they reduce the amenity value of our waters and damage flood defences. We should make sure we focus our efforts and resources on tackling non-native species where there is most to gain from controlling or removing them

The current approach to managing the issue

We are spending time and money controlling some of the key non-native species in the region. We have formed a regional steering group and are producing a strategy and action plan to identify and guide our future efforts. Legislation plays an important role. The Import of Live Fish Act requires licences to sell and own non-native fish species and a ban on the sale of five of the most invasive plant species will come into force from 2014.

Some of our highest profile work in recent years has been restricting the spread of Killer Shrimp. Working closely with Anglian Water we have limited the spread since the initial outbreak at Grafham Water in 2010 and have developed a close working relationship with the Broads Authority after it was discovered in the Broads system. The Check-Clean-Dry campaign (https://secure.fera.defra.gov.uk/nonnativespecies/checkcleandry/index.cfm) has been a notable success. We are investing in the control of several other species in the region, including Floating Pennywort; Signal Crayfish and mink.

Actions needed in future

We are identifying all the species present in the Anglian region and those that could potentially establish themselves in the future. These will be used to develop plans to manage and control the impacts of any invasive species within the region. The GB non-native species secretariat runs a website that allows people to identify and report non- native species. (https://secure.fera.defra.gov.uk/nonnativespecies/home/index.cfm). In addition, the successful Plant Tracker App (http://planttracker.naturelocator.org/), where mobile phone users can instantly submit records, is likely to be extended to other species.

Pollution from rural areas

Why this is a significant issue

Nutrients, sedimentation and pesticides are the primary problems associated with pollution from rural areas. Whilst agriculture is the main source, private sewage treatment works are also a likely contributor.

Pesticides entering watercourses can cause declines in biodiversity and lead to significant fish deaths. In addition, certain pesticides such as metaldehyde are currently found at levels above EU drinking water standards. Pollution from phosphates and nitrates can accelerate the growth of algae and plant life. This is called eutrophication and affects the quality of the water body and can create poor oxygenation conditions for fish and other organisms. Sedimentation from soil erosion smothers gravel beds, impacting on organism lifecycles and biodiversity.

Figure 6: Arable Farmland in the Middle Level

Intensive agriculture can also significantly affect soils and in turn watercourses. For example, increased activity from heavier machinery can seriously damage soil structure and significantly increase run off. This can transport excessive amounts of pesticides, nutrients and sediment into watercourses.

The current approach to managing the issue

The introduction of key strategies including Stewardship Schemes, Cross Compliance and the Common Agricultural Policy, has reduced pollution from agricultural practices. Events to update and inform the agriculture community are continuing with the support of partnership projects. We use Nitrate Vulnerable Zones, which are almost everywhere across our region, to protect groundwater. We have also identified safeguard zones to further protect ground and surface drinking water sources so that less treatment to remove pollution is required in the future.

Actions needed in future

We need to educate people to embed the catchment approach and manage significant water management issues. We need to continue liaising with farmers, sharing advice and guidance to improve farm practices, whilst reinforcing relationships with key partners. Pollution from sewage treatment works can be tackled by educating communities that use both the sewer network and septic tanks. We also need a specialist network of officers across the region, who can champion improvements in agricultural practices.

Groundwater pollution limits our options where we seek to restore sustainable abstractions. A future priority is to overcome the effects of diffuse nitrate in groundwater, specifically for watercourses primarily fed by groundwater flows. For more information on the protection of groundwater please follow the link below.
http://www.environment-agency.gov.uk/research/library/publications/144346.aspx

Summary of possible actions by issue

The table below summarises the possible actions (and owners) for each of the significant issues within Anglian River Basin District. These actions have been identified through an assessment of the issues and the Environment Agency's engagement with partners to date.

Physical modifications

- **Reviewing and refining dredging programmes** implementing best practice (Environment Agency, land owners Internal Drainage Boards)
- **River and flood plain restoration schemes** reinstating naturally functioning systems (Environment Agency, Landowners, Rivers Trusts and other partners).
- **Fish passes and removal of redundant structures** to improve fish migration (Environment Agency, Landowners, Rivers Trusts and other partners)

Pollution from waste water

- **Improvements to sewage works and planning controls** to reduce phosphate, ammonia and organic sources (Water Companies, developers).
- Behavioural change reducing pollution at source through **community campaigns, pollution prevention campaigns and works orders** (Water Companies, Industry).

Pollution from towns, cities and transport

- **Influence new transport infrastructure and housing at the planning stage** reducing the impacts of pollution (planning and highways authorities, developers).
- **Production of Water Cycle Studies** mitigating impacts of growth on water and flooding issues (Planning Authorities supported by water companies, developers).
- **Pollution prevention campaigns** at higher risk locations (Environment Agency, Industry).

Changes to the natural flow and level of water

- **Change abstractions licences** to utilise alternative sources or relocate abstractions or discharges to new (agriculture, water companies).
- **Water demand management** including pattern and timing of abstraction (agriculture, water companies).

Invasive non-native species

- **Prevent introduction through bio security control**, (Industry, landowners, Environment Agency, Central Government).
- **Early detection, monitoring and rapid response** to reduce establishment and prepare for new outbreaks (Environment Agency, Central Government).
- **Mitigation, control and eradication** to reduce extent where viable (Environment Agency, Central Government, Land Owners).
- **Building awareness and understanding** to slow the spread (Environment Agency, Central Government).

Pollution from rural areas

- Reduce pollution at source by implementing **good practice and regulatory compliance** (agriculture, landowners, agronomists, research organisations)
- Pollution from septic tanks reduced through **educating communities and improving the maintenance and management of dispersed discharges** (Environment Agency, landowners, rivers trusts)

8 The catchments in the Anglian River Basin District

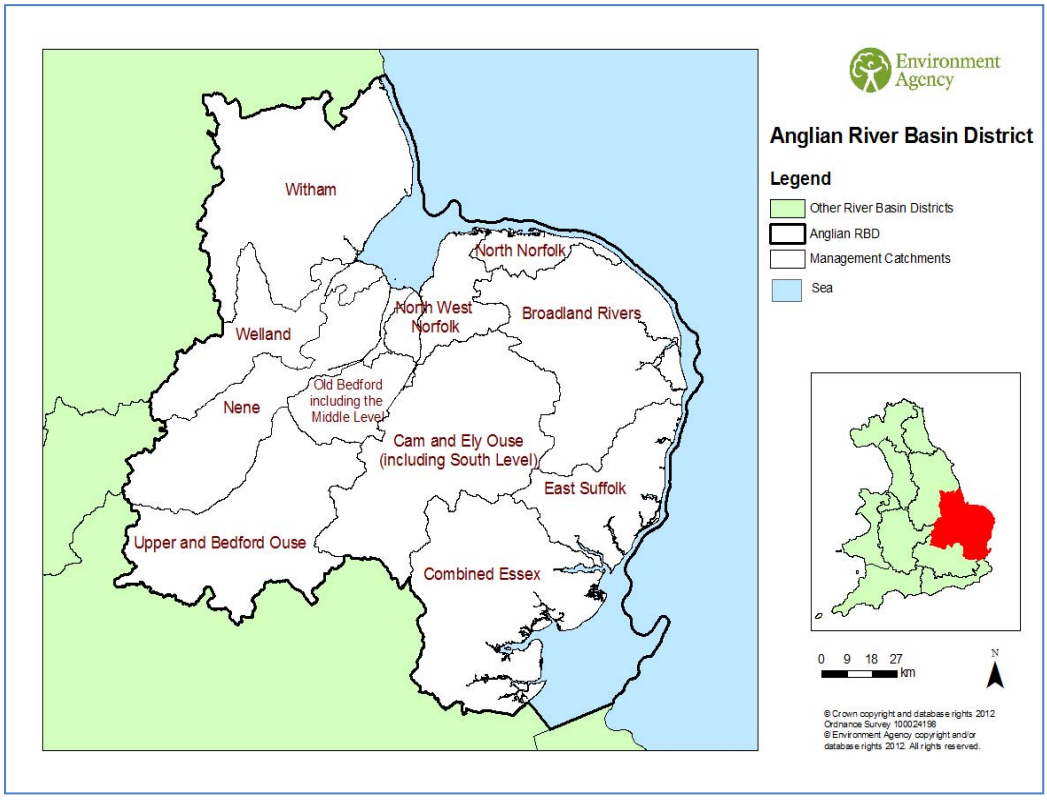


Figure 7: Map of the Anglian River Basin District catchments

A catchment is an area with several, often interconnected water bodies (rivers, lakes, groundwater and coastal waters). Many of the problems facing our water environments are best understood and tackled at a catchment level.

The Anglian River Basin District is divided into 11 management catchments, based on the boundaries of our Catchment Abstraction Management Strategies (CAMS).

Following the governments commitment to a more catchment focused approach to improving the water environment we will work with others and share information at a catchment scale to protect the water environment in the Anglian River Basin District.

More information about the catchments is available in the *Anglian River Basin District: Facts and Statistics* document. To view, please visit http://www.environment-agency.gov.uk/research/planning/140076.aspx

Responding to the consultation at catchment level

We would like you to answer the following questions on the catchment, or catchments, you are interested in from the section below:

Consultation questions

4 How are the significant issues in a catchment affecting the water environment and society? *Please specify which catchment(s) your response refers to and provide relevant information to help explain your answer.*

5 How do you think the challenges affecting each catchment should be tackled and what would you choose to do first? *Please specify which catchment(s) your response refers to. Please consider any resource implications.*

Witham Catchment

The River Witham is a predominantly rural catchment that includes Grantham, Lincoln and Boston. In its upper reaches, the Witham is fed by springs from the Lincolnshire Limestone and supports native crayfish and brown trout. These headwaters gradually give way to a slower moving, heavily modified river that drains a network of watercourses in the Fenland area. Internal Drainage Boards play a key role in draining these lower lying areas and maintaining high quality arable land. After reaching Boston, the Witham enters the nationally important conservation area, the Wash, which supports shellfish designated waters.

Chalk streams drain off the Lincolnshire Wolds into the Witham as well as forming the headwaters for the East coast catchments. The Trent, Witham, Ancholme Transfer Scheme is essential for managing water resources, maintaining levels and meeting supply demands. The River Witham is also a key navigation for the Canals and Rivers Trust and an important link with the Boston Barrier Project and the Black Sluice navigation.

Figure 8: Weed growth blanketing the River Brant

Significant urban growth areas have been identified around Lincoln and Grantham. The east coast also relies heavily on tourism, with three areas in these catchments designated as bathing waters.

The issues in the catchment

Siltation and excessive nutrients from agriculture are exacerbated by inputs from sewage treatment works and private sewerage systems.

Low flows and high summer temperatures make the pollution problems worse. Nutrients can disturb the natural balance of a watercourse and cause excessive growth of vegetation and algae. Nitrate quality issues have also been identified in the central limestone ground water, which is a vital source of public water supply.

The legacy of drainage works on large stretches of rivers and dykes has created a poor habitat in some areas. Obstructions from weirs and flood defence works prevent some species of fish and eels from spawning and migrating.

While the impacts are not yet widespread, invasive non-native species do pose a significant future threat in the catchments. For example, Signal Crayfish are present in the River Bain, increasing the amount of fine sediment in rivers.

The large sections of heavily modified watercourses will prevent many waters from becoming healthy. However, we are working in partnership with other organisations to address some of the barriers.

The Horncastle flood alleviation scheme will offer an opportunity to improve habitats. Where it is cost effective, nutrient problems can be reduced through water company investment programmes. This will run alongside campaigns to target agricultural diffuse pollution in problem catchments.

Nene Catchment

The River Nene flows through Northampton, Peterborough, Wisbech and Sutton Bridge before discharging into The Wash. To the east of Peterborough the river becomes tidal and 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 catchment is undulating, dissected by the valley of the River Nene and its tributaries. The river is navigable for 142 kilometres from Northampton to The Wash. The rural landscape is predominantly mixed farming in the Nene Catchment upstream of Northampton, with increasingly more arable farming from the Middle Nene through to The Wash. The river's fish stocks attract anglers and several associated stillwaters have been developed into popular fisheries.

Figure 9: New developments in the Nene Valley

The Nene supplies Rutland Water, which provides drinking water to Kettering, Northampton, Peterborough and surrounding areas. It is also an internationally important site for wildlife. The River Nene is popular with pleasure boaters, anglers and birdwatchers. Much of the middle valley is a series of gravel pits providing important wildlife and amenity locations.

The issues in the catchment

Development in the catchment has increased rapidly over the past 30 years, and future plans will make the Nene Catchment the largest urban growth area outside of London. Levels of treated effluent and the associated nutrients in watercourses have risen during this time, while sewage works have been improved to deal with the development.

The Nene's biggest challenge is maintaining the current quality of the catchment and improving it, whilst accepting this level of proposed development. As a result of past and future urban development, urban runoff has a significant influence on the river. Studies of Northampton and Peterborough have been completed, looking at the pressures and opportunities for improvement in those large urban areas.

Maintaining the Nene as a navigable waterway is important, and the river has been heavily engineered to allow this to happen. Modification of the river channel also allows flood water to be removed efficiently and water to be used for irrigation. These modifications do not always benefit the water environment, but actions identified in the Integrated Catchment Plan and the Nature Improvement Area, can improve some of these problems.

Agriculture is an important part of the Nene Catchment economy, and is integral to the attractive appearance of the valley. Some farming practices can lead to diffuse sources of sediment and nutrients entering the watercourses. The Nene Catchment Sensitive Farming Partnership, alongside the Revital-ISE project, is working to reduce these impacts. For more information http://www.riverneneregionalpark.org/default.asp?PageID=286

A significant emerging issue is the damaging impact of invasive species, particularly Signal Crayfish.

Welland Catchment

The River Welland Catchment is largely rural, but the river flows through the towns of Market Harborough and Stamford. The character of the river changes to a fenland river below Stamford and a tidal river at Spalding, before discharging to The Wash.

The landscape through which the Welland and its tributaries flow is varied, from mixed farming in the upper reaches to the arable dominated fenlands. The local Internal Drainage Boards maintain a network of channels to control water levels across the Fens.

The Welland Catchment is an important source of public water supply. Rutland Water, the largest man-made reservoir in England, provides water for the surrounding area but also the urban areas of Kettering, Northampton and Peterborough. It is also an internationally important site for wildlife and a renowned recreational resource.

Figure 10: View of the River Welland through Stamford

The issues in the catchment

During the 1970s, parts of the Welland Catchment were straightened and deepened as part of a flood alleviation scheme and a land drainage programme. The change to the natural course of the river has led to loss of habitat, and flood defence structures within the channel have affected fish passage. The physical modifications within the catchment will make it hard to achieve good ecological status, however there are things we can do to improve this. In the Lincolnshire Fens the river has been modified to protect prime agricultural land from flooding, and is integral to protecting people and property from flooding.

Discharges from sewage treatment works or septic tanks, and runoff from roads or industrial areas can all be sources of pollution in the Welland Catchment. When combined with pollution from the rural areas, the excessive levels of nutrients, sediments and pesticides are having a severe impact in the catchment, not only on rivers and lakes but also groundwater. By raising awareness with landowners, the water company and householders we are aiming to reduce the levels of pollutants entering the catchment. The Water Friendly Farming project is developing and testing methods to reduce the impact of diffuse pollution from farming practices. More details can be found at: http://www.gwct.org.uk/research__surveys/the_allerton_project/water_friendly_farming/default.asp

Changes to the natural flow within the Welland and its tributaries can make the problems associated with increased nutrient levels worse. Low flows and high temperatures lead to low oxygen levels, which impacts on the plants and wildlife in the river. Unnatural high flows can increase the amount of nutrient entering the river and damage habitat in the channel. Some of this can be attributed to the modifications in the channel, but levels of abstraction, particularly downstream of Stamford, may be having an effect. A balance is needed to meet the needs of abstractors while also maintaining sufficient flow to support a healthy river.

Since August 2011, the Welland Valley Partnership, which includes local authorities, businesses, internal drainage boards, National Farmers Union, charities and interest groups, has been identifying the issues within the catchment and what can be done to improve it; more details can be found at http://www.environment-agency.gov.uk/research/planning/139824.aspx

North Norfolk Rivers Catchment

The North Norfolk Rivers Catchment is 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. Much of the coastline around this catchment is nationally and internationally designated for its important habitats and species. The value of the North Norfolk coastal landscape is recognised by its designation as part of the Norfolk Coast Area of Outstanding Natural Beauty.

The main watercourses, the rivers Burn, Glaven and Stiffkey are chalk rivers, a habitat that is internationally rare. The chalk and overlying deposits have created a rare chalk river system with at least 75% of flows being derived from the underground springs.

Although they are all relatively small in terms of both flow and length, they are important in terms of the biodiversity they support.

Figure 11: River Stiffkey downstream of Stiffkey Village

The issues in the catchment

Rising nitrate levels have been identified in the groundwater abstracted at Glandford, near Holt. As a result, a Safeguard Zone has been established to reduce nitrate levels. This should lead to a reduction in the need to remove nitrates from the drinking water.

Physical barriers are present on many of the rivers in North Norfolk. This prevents fish, eels and other wildlife migrating throughout the catchment, and impacts on habitat and ecology. It is important to assess all of these barriers to see if it is technically feasible and cost effective to remove or adapt them.

Run off from fields and roads within the catchment can impact on water quality and wildlife by introducing sediment and nutrients to the water. Catchment Sensitive Farming gives advice to the agricultural community in this catchment and a partnership project is underway to identify sources of sediment entering rivers from roads. The introduction of silt traps, especially in headwaters, is being investigated.

Norfolk Rivers Trust, a charitable organisation formed in 2011, was awarded funds from Defra's Catchment Restoration Fund in 2012, for a project to improve nine chalk rivers in North and North West Norfolk. This will involve a number of river restoration projects and involve the public, supporting the work of various local volunteer groups, some of whom have been maintaining and improving the local rivers for many years.

Broadland Rivers Catchment

The catchment is mostly rural, with a few larger urban areas including the City of Norwich, Great Yarmouth and Lowestoft. Land in the catchment is mainly used for arable farming, although there are some industries around Norwich which rely on water. Water-based tourism, such as boating and angling, is vitally important to the local economy.

The Broadland Rivers Catchment includes the Broads Executive Area (the equivalent to a National Park) and has a large number of nationally important protected sites, including the Broads and River Wensum Special Areas of Conservation and the Broadland Special Protection Area, both of which are protected under European law. Many of these protected areas have more stringent targets for water quality than required under the Water Framework Directive.

There are a number of lakes in the catchment, including the broads. In many cases, these lakes have specific ecological requirements that differ from the rivers flowing into them. This must be taken into account when setting priorities for improvements within the catchment.

The issues in the catchment

Several key centres of growth are planned, including Lowestoft, Great Yarmouth and Greater Norwich, with more than 40,000 additional homes planned by 2021.

Rural land management practices and road surfaces cause high phosphate levels and increased levels of sediment in watercourses. In addition, the contribution of phosphate from households in areas without mains drainage is potentially significant. Work is underway to quantify and address this.

Figure 12: Flood alleviation works at Seven Mile Reach on the River Yare

Other issues in this catchment are barriers to fish migration and the impact of land drainage to maintain the existing landscape. All known barriers have been assessed for fish and eel passage and a number of feasibility studies have been completed.

The Broads are also at risk from saline water entering the area both from the increased salinity of groundwater under the Broads and from tidal inundation.

Invasive species are present in many of the Broadland rivers. These include Killer Shrimp, present in Barton Broad and part of the River Ant, and Signal Crayfish, in the middle and lower Wensum and in the middle Yare. There is no known method of getting rid of these invasive crayfish that pose a serious threat to native crayfish and ecology on the River Wensum and Wendling Beck.

A range of partnership projects to address physical modifications are in progress, including the Wensum Restoration Strategy: http://www.environment-agency.gov.uk/homeandleisure/wildlife/114676.aspx.This project adopts a whole river catchment restoration approach. Actions include reinstating several meander loops and backwaters, re-profiling river banks and introducing woody debris.

In tidal parts of the catchment the Broadland Flood Alleviation Project works to enhance the environment while providing sustainable flood defences.

East Suffolk Rivers

The East Suffolk Rivers catchment includes the valleys, tributaries and estuaries of the rivers Gipping, Deben, Alde, Thorpeness Hundred, Yox, Blyth and Lothingland Hundred. This area is mostly rural with significant urban areas at Felixstowe, Ipswich, Woodbridge, Wickham Market, Stowmarket, Saxmundham, Halesworth, Southwold and Kessingland. Land is predominantly used for agriculture but pockets of industry also exist, including food processing, milling, malting and the manufacture of farm machinery and fertilisers.

The East Suffolk coast and estuaries are some of Britain's most important over-wintering bird areas, supporting over 20,000 wildfowl and wading birds each year. This rich landscape includes the Suffolk Coasts and Heaths Area of Outstanding Natural Beauty and the Suffolk Rivers Valleys Environmentally Sensitive Area.

Figure 13: River Ore looking towards Orford Ness within the internationally important Suffolk Coasts and Heaths

The issues in the catchment

The key centre of growth planned within this catchment is Ipswich, where 20,000 extra homes are planned by 2021. Major infrastructure expansion is also expected at Felixstowe Port. In addition, there is the nuclear power generation site on the coast at Sizewell, which may undergo expansion.

Nutrient enrichment and waste water pollution are key challenges in this catchment. Agricultural practices, local sewage treatment works and industrial discharges contribute to high levels of phosphate in the watercourses. Catchment Sensitive Farming initiatives are giving dedicated advice to the agricultural community to improve soil management and reduce diffuse pollution. A number of additional partnership projects are also underway to improve agricultural practices across the catchment.

Many of the East Suffolk rivers are also affected by drought and periods of low flows, which causes low levels of dissolved oxygen. Despite this, the watercourses support reasonable numbers of fish.

The reduction of diverse water habitats as a result of historic physical modifications is also an issue in the catchment. A range of projects to address barriers to fish migration are in progress and targeted walkovers should identify other places where habitats and river morphology can be improved.

North West Norfolk Catchment

The North West Norfolk Catchment stretches northwards from Denver Sluice in Downham Market to King's Lynn, Hunstanton and Brancaster. The North West Norfolk Catchment is predominantly rural with a population of 109,000. The countryside is mainly used for arable farming and is gently undulating, about a quarter of it 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.

The River Great Ouse, flanked by the Relief Channel, flows from the south to The Wash in the north. The Smeeth Lode drains the low-lying fenland area from Emneth to Terrington St Clements, characterised by high value agricultural land and man-made drainage systems pumped into the River Great Ouse.

From the east the rivers Heacham, Ingol, Babingley and Nar flow from springs in the chalk uplands towards King's Lynn and the Wash.

Figure 14: The River Nar at Castle Acre

The issues in the catchment

Rivers in the low-lying fenland areas are slow flowing, often resulting in low levels of dissolved oxygen. Modification of river channels has reduced the diversity of habitats and barriers such as weirs prevent fish from migrating freely.

Nutrient enrichment is a significant problem in parts of the catchment. Diffuse pollution and sediment from land and roads chokes the gravel that fish need to spawn. The nutrient carried in the sediment causes plants to grow too quickly and reduces the diversity of habitat. Installing silt traps, buffer strips on field edges and reed beds are good solutions and are being explored in a number of locations.

The chalk geology of the catchment changes to the Sandringham Sands as you move east to west. The aquifers within the chalk and sands provide drinking water and irrigation water for agriculture. These aquifers are vulnerable to pollution particularly rising nitrate levels. Drinking water Safeguard Zones are planned in these areas which will alter farming practices in order to protect these sensitive areas.

Norfolk Rivers Trust was awarded funds from Defra's Catchment Restoration Fund in 2012 for a project to improve nine chalk rivers in North and North West Norfolk. This will involve a number of river restoration projects and involving the public, supporting the work of various local volunteer groups, some of whom have been improving local rivers for many years. The Trust is also involved in reducing siltation and restoring the natural features of the River Nar.

Cam and Ely Ouse Catchment

Within the Cam and Ely Ouse Catchment the Great Ouse River drains an area of approximately 3,600 square kilometres extending from Swaffham in the north to Royston and Saffron Walden in the south and from Potton in the west to Attleborough in the east. The Great Ouse, in this catchment, is fed by four main tributaries, the Cam, the River Lark, the Little Ouse and its tributaries, and the River Wissey.

The area is characterised by the East Anglian Chalklands in the south, Brecklands in the north and the South Level fenland to the west of the area. The catchment is predominantly rural and includes high-grade agricultural land. The main urban areas are Cambridge, Royston, Saffron Walden, Newmarket, Bury St Edmunds, Ely and Swaffham. The catchment also supports a number of nationally and internationally important water-related sites that are of exceptional value.

Figure 15: Great Ouse River at Ely

There are two important aquifers in this catchment. The largest is the Chalk which underlies the eastern and central part of the area and is primarily exploited for public water supply and spray irrigation. The groundwater in the Chalk generally rises either at discrete springs or gradually along the length of rivers providing valuable baseflow. The other principal aquifer is Lower Greensand (Woburn Sands) which outcrops further west and is separated from the Chalk by a layer of Gault Clay and is locally important for water supply.

The issues in the catchment

The main water resource pressures come from public water supply abstractions from groundwater sources and spray irrigation of agricultural land. The catchment suffers from diffuse agricultural pollution which causes siltation and high nutrient levels. Discharges from sewage treatment works, private sewage systems and misconnections further exacerbate these problems which can be further compounded at times by low flows.

Invasive non-native species pose a significant future threat in the catchments. For example, Signal Crayfish are present in the River Lark disturbing banks and beds, and ecology through predation and increasing the amount of fine sediment in rivers.

The extent of historic river modification, such as heavily embanked or re-sectioned rivers, has decreased habitat diversity. Weirs and flood defence structures create obstacles to fish passage.

Diffuse nitrate quality issues are a significant problem for ground water and as a result eleven Safeguard Zones have been designated. Pesticides including metaldehyde are also a threat to public water supplies.

The large proportion of heavily modified water bodies will prevent good ecological status from being achieved across the catchment. Significant improvements are however being instigated on many water bodies. Phosphate stripping from sewage treatment works is central to reducing phosphate levels. Targeted agricultural campaigns to reduce the impacts of pollution from rural areas will also play an important role. Balancing the requirements of abstractors, environment and recreational users of water resources is key in this catchment.

Upper Ouse and Bedford Ouse Catchment

The River Great Ouse dominates the catchment, from its source near Brackley, flowing north east to Earith. Other main tributaries include the Padbury and Clayden Brooks, rivers Tove, Ouzel, Flit, Ivel, Kym and the Alconbury Brook. The Grand Union Canal crosses through the catchment and is a key inland waterway link from London to the Midlands.

Major urban areas are Brackley, Milton Keynes, Leighton Buzzard, Bedford, St Neots, Huntingdon and the North Hertfordshire towns of Hitchin, Letchworth and Baldock. The catchment has significant development, with over 80,000 new homes planned. Rivers are generally slow flowing, although the chalk stream tributaries of the River Ivel rise in the Chiltern Hills. The catchment contains important protected sites, including Portholme Meadow Special Area of Conservation, and other wetland sites. Both the River Great Ouse and River Ouzel are designated as Sensitive Areas (eutrophic) under the Urban Waste Water Treatment Directive and most of the catchment is designated as a Nitrate Vulnerable Zone.

Figure 16: Rowers on the River Ouse at Bedford

Land is largely used for agriculture, particularly horticulture, arable and livestock farming. With extensive sand, gravel and clay deposits, the catchment continues to be important for surface quarrying industries. Redundant pits have been used for waste disposal or as lakes for water sports, fisheries and nature reserves.

The catchment supports a range of water-based services and activities. Water from rivers and underground water (the Chalk, Woburn Sands and Great Oolite aquifers) is abstracted for public water supply, agricultural, horticultural and industrial use. Water is taken from the River Ouse at Offord to supply Grafham Water reservoir.

The issues in the catchment

Rivers in the catchment have been modified for land drainage, flood defence and navigation, which decreases habitat and ecological diversity, and prevents fish from moving freely. Some invasive non-native species, such as Signal Crayfish and Himalayan Balsam, also thrive in the catchment at the expense of native species.

Pollution from waste water discharges introduces nutrients and chemicals such as phosphate, ammonia and organic matter in treated sewage. Discharges of chemicals, such as solvents, affect the quality of both surface and underground water.

Other water quality issues in the catchment include nitrate and sediment from agricultural land; discharges from unsatisfactory sewage/trade treatment facilities; wrongly connected foul drainage; and general poor quality surface runoff in urban areas.

We will continue to work with the public, farmers and landowners, businesses, trusts and charities in the catchment to tackle these issues.

Old Bedford including the Middle Level Catchment

The catchment is dominated by the Middle Level river system, the Counter Drain and the Hundred Foot River. Major urban areas include Whittlesey, March, Ramsey and Chatteris. The catchment is mainly below sea level. The economy of this rural area has evolved around agriculture; the catchment being almost entirely Grade 1 agricultural land. The underlying geology of the area is clay and peat.

Few of the watercourses in the catchment are natural; the majority are artificially dug drains, with the movement of water being driven by pumping and drainage operations. Management of water in the Middle Level is shared between the Middle Level Commissioners and internal drainage boards.

Figure 17: River Delph at the Welmore Lake Sluice

Water is transferred into the system from the River Nene at Stanground and discharged from the system at St Germans pumping station. A keen recreational boating community exists in the navigable drains and rivers. The catchment has waters that are internationally regarded coarse fisheries and are popular angling locations. The Great Fen Project seeks to connect currently isolated areas of wet woodland reinstating historic washlands. The wildlife reserves across the catchment are managed by charities, and are popular visitor destinations.

The Ouse Washes are a significant feature of the catchment. Created in the 17th century to provide flood water storage, they run 32 kilometres from Earith to Denver. The seasonally flooded Ouse Washes support important numbers of wintering wetland birds and are important for water plants and invertebrates.

The issues in the catchment

Being predominantly low-lying, man-made, pumped and straight, the watercourses in this fenland area have slow flows and low dissolved oxygen levels with limited habitat diversity. Nutrient enrichment from agricultural runoff and wastewater discharges encourages excessive weed and algal growth. Areas of the catchment 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.

When flood water from the Ouse Washes drains back into the Old Bedford Delph, dissolved oxygen levels can drop rapidly and kill fish. Managing the Ouse Washes in the future may be the greatest challenge in the catchment.

The Lower Ouse Fenland Fisheries Consultative Association was awarded funding from Defra in 2012 to form The Old Bedford, including the Middle Level, Water Care Partnership. This concentrates on assessing the priorities and current improvement activities in the catchment. The group sees solving the water level management issues of the Ouse Washes as the top priority.

Existing towns such as March and Chatteris have 8,000 new homes planned. Careful and sympathetic planning will be needed to protect and enhance water quality in the environment.

Combined Essex Catchment

The Combined Essex Rivers Catchment extends from Basildon and Southend in the south to Great Dunmow, Haverhill, Hadleigh and Harwich in the north. It includes the rivers and tributaries of the Roach, Crouch, Chelmer, Blackwater, Colne and Stour. Over 70% of land within the catchment is agricultural, with arable farming being most common. However, there are also significant urban centres throughout the catchment and a substantial industrial and manufacturing base.

Watercourses are used for a variety of activities, including recreation, public water supply, fisheries and conservation. The area is rich in landscape and wildlife heritage, including Dedham Vale Area of Outstanding Natural Beauty, and most of the coast is of international importance for conservation.

Figure 18:The River Wid at Buttsbury, Ingatestone

The issues in the catchment

Key centres of growth are planned throughout the catchment. By 2021, 38,500 homes are planned at Colchester, Chelmsford, Basildon and Southend. Increased pressures will be put on water resources and water quality in an already over abstracted and discharge dominated catchment. Measures need to be incorporated into new developments to prevent the quality of waters deteriorating. Flood alleviation schemes along the coast also offer opportunities to create new coastal habitat, for example, salt marshes through the managed realignment of coastal flood defences.

River channels have been widened, deepened and straightened throughout the catchment to improve land drainage and protect against flooding. Weirs and impoundments allow river flows and levels to be managed and used for abstraction, provide energy at mills and micro-hydroelectric power plants or facilitate navigation by small river craft. The Ely Ouse to Essex Transfer Scheme increases flows in the rivers Stour, Pant and Blackwater to enable public water supply abstractions to continue when natural flows in the rivers are not sufficient.

These changes affect the natural flow of water in the catchment, reduce habitat diversity, and prevent fish from moving freely. A number of projects addressing barriers to fish migration and identifying locations for habitat improvement are in progress throughout the catchment.

Nutrient enrichment is also a key challenge within this catchment. High levels of nutrients reduce habitat diversity and can cause excessive growth of algae, leading to a reduction in oxygen levels in the river. Discharges from sewage treatment works and industrial premises are contributing to high levels of phosphate within the catchment. Surface water runoff from farms and fields also carries high levels of nutrients into rivers. Catchment Sensitive Farming advice is being given to the agricultural community to improve soil management and reduce diffuse pollution. The use of rural sustainable drainage systems and precision farming techniques that target fertiliser applications are being promoted. The Environment Agency is also working closely with Anglian Water, Ofwat and industry to identify areas where investment can be made to improve sewage treatment and collection facilities.

9 Further information on the significant issues

This consultation provides an overview of what we, the Environment Agency, believe the significant issues in the Anglian River Basin District are. We have used many different sources of information and evidence to create this document. Where possible we have made this available to the public and provided links in the appropriate sections.

- **Anglian River Basin District facts and statistics** – Further information on the statistics for the Anglian River Basin District. This contains information such as water body classification results and reasons for being classified at lower than good ecological condition. It contains details on the protected areas that fall under special legal protection. To access the document, visit http://www.environment-agency.gov.uk/research/planning/140076.aspx
- **Anglian River Basin District Strategic Environmental Assessment** –To ensure the river basin management plans properly consider all aspects of the environment (for example how the plan affects the historic environment or landscape), the Environment Agency is carrying out a Strategic Environmental Assessment of each plan. There is a consultation on how we propose to approach this task in the Anglian River Basin District asking if you agree with the focus of the assessment and if you have any additional information we should be taking into account. This consultation is published alongside the Anglian River Basin District Challenges and Choices consultation and closes on 22 December 2013. To view this consultation, please visit https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices.
- **England's Waters: Challenges and Choices consultation** – There is a consultation on the nationally significant water management issues (covering the whole of England). This consultation also starts on 22 June 2013. It is open for three months, closing on 22 September 2013. To view this consultation, please visit https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices.
- **Significant Water Management Planning evidence summaries** – containing more technical detail on the significant issues in England and Wales. These summaries do not necessarily match the headings used to describe these issues in this document; rather they look at the pressures that create these issues, such as 'Abstraction and flow' or 'Chemicals and metals'. To access these packs, visit http://www.environment-agency.gov.uk/research/library/data/145758.aspx.
- **Risk assessments** – As well as considering the current state of the water environment, it is also important to look at the future risks (potential impacts). The Environment Agency has produced risk assessments for each pressure affecting the water environment. To access these packs, visit http://www.environment-agency.gov.uk/research/planning/33268.aspx
- **Water Framework Directive: DataShare** – This is a web service from which the public can download datasets that the Environment Agency uses to inform much of the analysis and work we do. Relevant datasets include detailed classification data and maps of the bodies of water in England and Wales. Note: much of the content on this site is technical and requires special software to view files. To access the DataShare, visit: http://www.geostore.com/environment-agency

10 Consultation information

Summary of consultation questions

Consultation questions

The significant issues (pages 14 – 22)

1 What do **you** consider to be the biggest challenges facing waters in the Anglian River Basin District?

2 Do you agree with our description of how the significant issues are affecting the water environment and society? *Please specify which issue(s) your response refers to and provide relevant information to help explain your answer.*

3 How do you think these issues should be tackled, and what would you choose to do first? *Please specify which issue(s) your response refers to. Please consider any resource implications.*

The catchments (pages 23 – 35)

4 How are the significant issues in a catchment affecting the water environment and society? *Please specify which catchment(s) your response refers to and provide relevant information to help explain your answer.*

5 How do you think the challenges affecting each catchment should be tackled and what would you choose to do first? *Please specify which catchment(s) your response refers to. Please consider any resource implications.*

How to respond

The Environment Agency would prefer you to respond online at: https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices . This will allow you to manage your comments more effectively, while helping us to gather and summarise responses quickly and accurately.

Alternatively, there is a Word response form available for each River Basin District which you can download and use to write your response before you submit it online, or you can email it to anglianRBD@environment-agency.gov.uk .

You can view the consultation documents and consultation questions online. But, if you would prefer a printed version of the document, please call 01733 464660 and/or use NCCC number - 03708 506506}, or anglianRBD@environment-agency.gov.uk.

Please return written responses by 22 December 2013 to:

Dave Freeman - Anglian River Basin Programme Manager
Environment Agency
Kingfisher House
Goldhay Way
Orton
Peterborough
PE2 5ZR

What the Environment Agency will use the responses for

The Environment Agency will use the responses from this consultation to shape the review and update of the Anglian River Basin Management Plan. Environment Agency staff dealing with this consultation will see all responses in full. Other Environment Agency staff may also see the responses to help them plan future consultations.

A full summary of the responses will be published on the Environment Agency website.

How the Environment Agency will use your information

The Environment Agency will make all comments (apart from personal information) publicly available on the Environment Agency website. This includes comments received online, by email, post and by fax, unless you have specifically requested that your response be kept confidential. Only names of organisations that respond and not individuals will be published.

If you respond online or provide an email address, you will receive an acknowledgement of your response. After the consultation has closed a summary of the responses will be published on the Environment Agency website. You will be contacted to let you know when this is available. You will also be notified of any forthcoming river basin consultations unless you request otherwise.

Under the Freedom of Information Act 2000, the Environment Agency may be required to publish your response to this consultation, but will not include any personal information. If you have requested your response be kept confidential, it may still be required to provide a summary.

If you have any questions or complaints about the way this consultation has been carried out, please contact:

Emma Hammonds, Consultation Co-ordinator

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

Would you like to find out more about us, or about your environment?

Then call us on

03708 506 506 (Mon-Fri 8-6)

Calls to 03 numbers cost the same as calls to standard geographic numbers (i.e. numbers beginning with 01 or 02).

email

enquiries@environment-agency.gov.uk

or visit our website

www.environment-agency.gov.uk

incident hotline 0800 80 70 60 (24hrs)
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