Anglian Drought Plan

February 2012

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.

Published by:

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Contents

Summary

This plan tells you how we prepare for and manage drought in the Anglian region. It sets out:

- Our drought management structure;
- The drought management decisions and actions we take and the triggers for these actions;
- How we monitor and measure the impacts of drought;
- How we deal with drought permit and drought order applications;
- How we report on drought;
- How we communicate with others.

During a drought, we must act in a way that ensures public water supplies are secure whilst the environment is protected as much as possible. Each drought develops in a different way, and as such, this plan aims to provide a flexible framework for actions we need to take to ensure all the competing demands for water, including public water supply, the environment, agriculture and navigation, are duly considered.

We are currently experiencing a drought in parts of Northern Area and Central Area. Lessons learned so far from this drought have been incorporated into the plan where appropriate. We have also benefited from the experience of dry weather in 2003 and 2006 to improve our plan and the actions we will take.

This single document replaces all previous Environment Agency drought plans for our region and should be considered alongside the statutory plans of the water companies operating in our region. Water company drought plans set out how water companies plan to secure public supplies during a drought, and the actions a company will take to ensure this.

For more information on drought, we have a summary guide “Managing drought in England and Wales” which explains our role and responsibilities as well as others such as water companies and local authorities. It provides additional information on drought management, for example, an explanation on temporary water use restrictions, and drought permits and ordinary drought orders. You can find it on our website.

1 Introduction

1.1 Purpose

A drought is a natural event that we can't prevent. Droughts occur as a result of a prolonged period of low rainfall, affecting available water supplies to different users. Droughts can also affect different sources (rivers or aquifers), depending on when the lack of rainfall occurs.

Every drought is different and each one can have a wide range of effects on people, businesses and the environment. Some droughts affect a large area while others are concentrated in a few catchments. This drought plan provides a flexible framework for dealing with these different droughts and is an operational manual for our drought teams operating in the Anglian region. It covers all the decisions and actions our teams take to detect the onset and end of a drought, and manage the impacts during a drought.

We work with water companies and others to manage the effects a drought may have. Water companies prepare drought plans to protect public water supplies during a drought, and our drought plans are produced to protect the environment, direct abstractors and the interests of other users of the water environment. The two plans are therefore complementary.

We update our drought plans annually and review them fully every three years. We test the actions included in this plan nearly every summer, due to the dry nature of our region. As such, our drought plan is an evolving document and will be improved following the lessons learned after each drought.

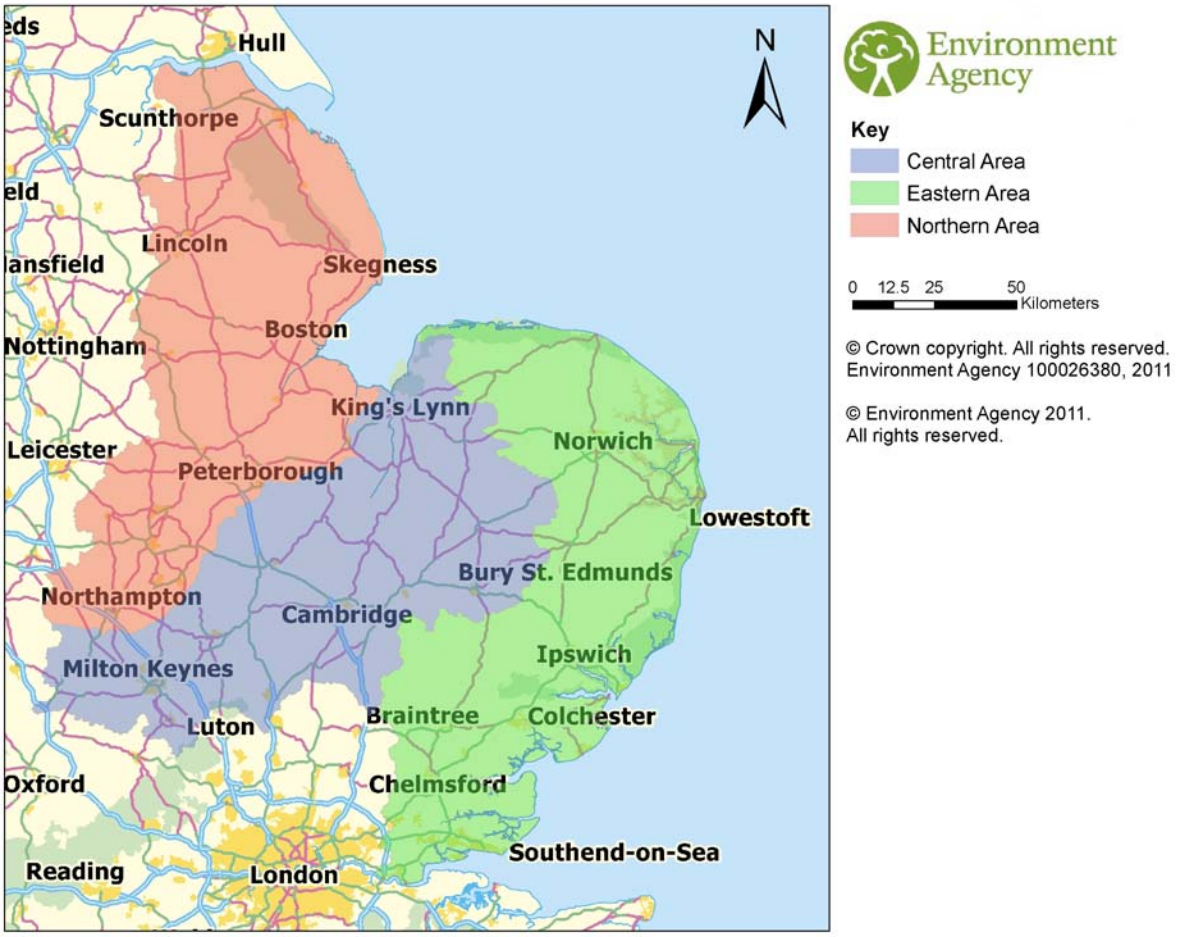
We received feedback from consultees seeking greater clarity on drought status. We plan to make sure that our external communications during drought provide a clearer and more detailed description of how and where drought is developing, its effects and future risks.

This drought plan is primarily an internal operational document and as such some of the links included connect to internal documents which cannot be accessed externally.

1.2 Background information on Anglian

The Anglian drought team covers the area of eastern England between the Humber Estuary and the Thames Estuary, and from the North Norfolk Coast to Northampton (figure 1.1). It is a densely populated area, with more than 6 million people living here, and covers an area of high grade agricultural land with a number of unique wildlife sites.

Figure 1.1 – Anglian region



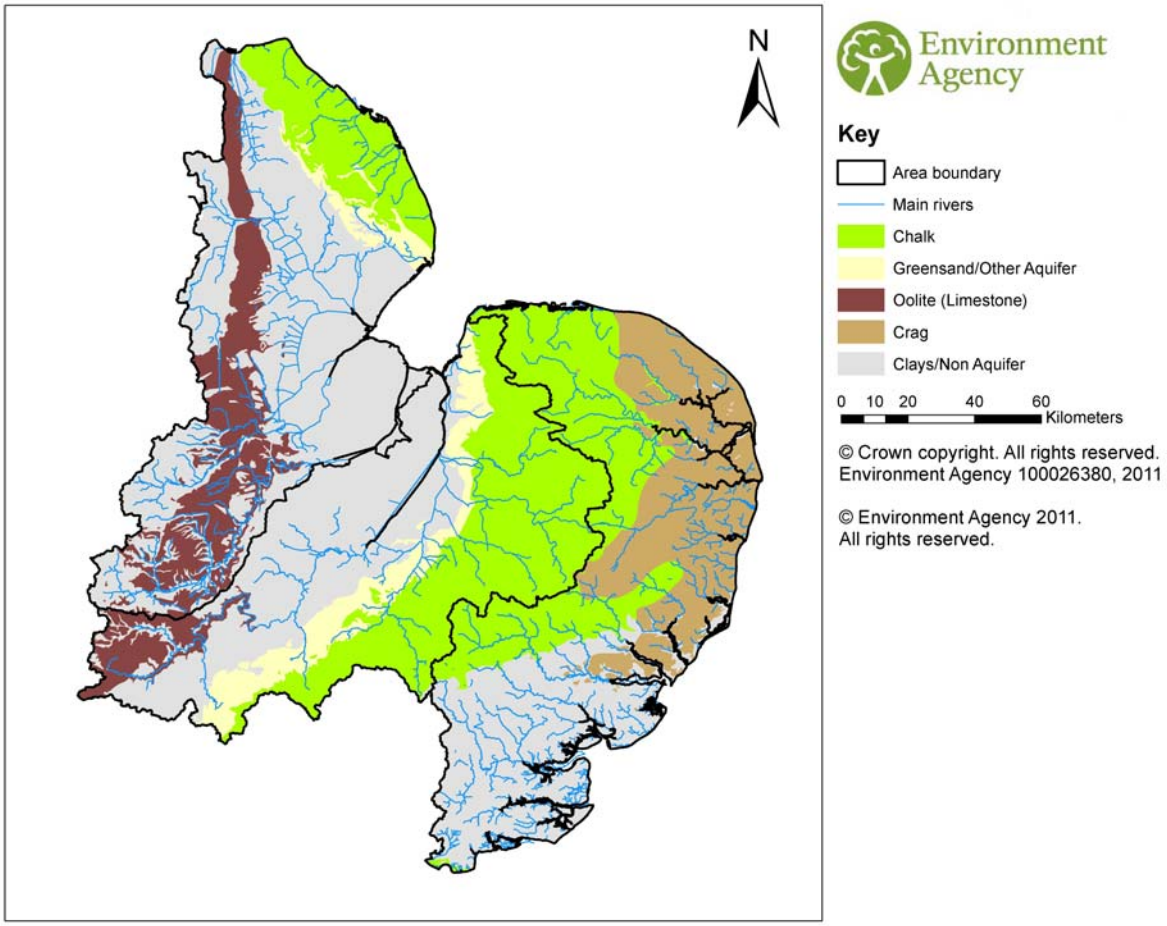
Anglian region is split into three operational Areas; Central, Eastern and Northern, and each has its own drought team. For more detailed information regarding the water resources in each Area please refer to the supporting information documents, saved locally by each Area drought team.

1.2.1 Water resources

The main rivers in Anglian region include the Great Ouse, the River Wensum and the River Stour. The lower reaches of many of the rivers, particularly in Northern Area and Central Area, flow through fenland where they take the form of high-level embanked channels into which water is pumped from the surrounding land. The flat nature of the coastal parts of much of the region also means that many rivers have long tidal reaches, sometimes extending as much as 40km inland.

Elsewhere, rivers are more conventional in nature, mostly being fed from the many aquifers that underlie the region. As such, these rivers are more sensitive to a lack of rainfall during the winter, which would normally recharge these aquifers.

Figure 1.2 – Major aquifers and rivers of Anglian region



The principal aquifers in Anglian are the chalk underlying large parts of the east, limestones in the west, sandstones in parts of the centre and east and the crag in the east. Other more minor aquifers also play an important role locally. These aquifers depend on winter rainfall for recharge, and are not affected by summer rainfall. Therefore, a drought could ensue as a result of a very dry winter even if it was preceded by a wet summer.

We receive only 600mm of rainfall a year, less than 70 per cent of the national average; hence the management of water resources is particularly critical in our region.

1.2.2 Regulation of water resources

In Anglian water is abstracted from both our rivers and groundwater sources for a range of purposes. The total amount of water licensed for abstraction in Anglian region is 5,127,236Ml/a, totalling 5194 licences[1]. The majority of abstraction (excluding tidal which is used for power generation) takes place from surface water

[1] Figures taken from ABSTAT report for 2009.

sources (61 per cent of licensed quantity), including the large reservoirs of Rutland Water and Abberton reservoir. The main uses for water in Anglian are for public water supply, agriculture and industry, however the latter is mostly non-consumptive e.g. power station cooling.

We regulate water abstraction within a licensing system. Abstraction licences have conditions which are set to protect the environment. These include conditions such as maximum daily quantity and cessation conditions, where the licence holder has to reduce or stop taking water once the river has dropped to a certain level or flow. Table 1.1 shows the numbers and volumes of licences for each of the main uses in each area.

The total number of licences for all purposes with cessation conditions is shown in table 2.1. Note that there may be duplication of licences that have both a cessation flow and cessation level.

Table 1.1 – Numbers and volumes of abstraction licences for each use in Anglian region

	Licences	Volumes Ml/a	
		Public water supply	Agriculture
Central Area	Number	105	1474
	Volume	258,685	81,637
Eastern Area	Number	85	1717
	Volume	471,368	62,926
Northern Area	Number	61	960
	Volume	318,804	27,750
Anglian region	Number	251	4151
	Volume	1,048,857	172,313

Table 1.2 – Total number of licences with cessation flow or cessation level conditions in Anglian region

	Cessation flow	Cessation level
Central	545	430
Eastern	205	22
Northern	245	308

Because Anglian is one of the driest regions in the country it has a long history of human intervention to secure reliable water supplies. Our region has a number of large water company reservoirs, two major inter-basin transfer schemes and a

number of smaller river support schemes, all of which support the basic network of surface and groundwater abstractions from which public water supplies are derived. A selection of these schemes includes:

- Ely Ouse to Essex Transfer Scheme;
- Trent-Witham-Ancholme Transfer Scheme;
- Great Ouse Groundwater Scheme;
- Waveney Augmentation Groundwater Scheme;
- Stour Augmentation Groundwater Scheme;
- River Hiz Support Scheme.

The Trent-Witham-Ancholme Scheme imports water into the region from the River Trent in Midlands region to support abstractions for both public water supply and agriculture in Lincolnshire and Humberside. The Ely Ouse to Essex Transfer Scheme transfers surplus water from the Ouse in Central Area to the River Stour and River Pant / Blackwater in Eastern Area. These transfers are crucial to the maintenance of public water supplies and also provide support for agriculture and the environment.

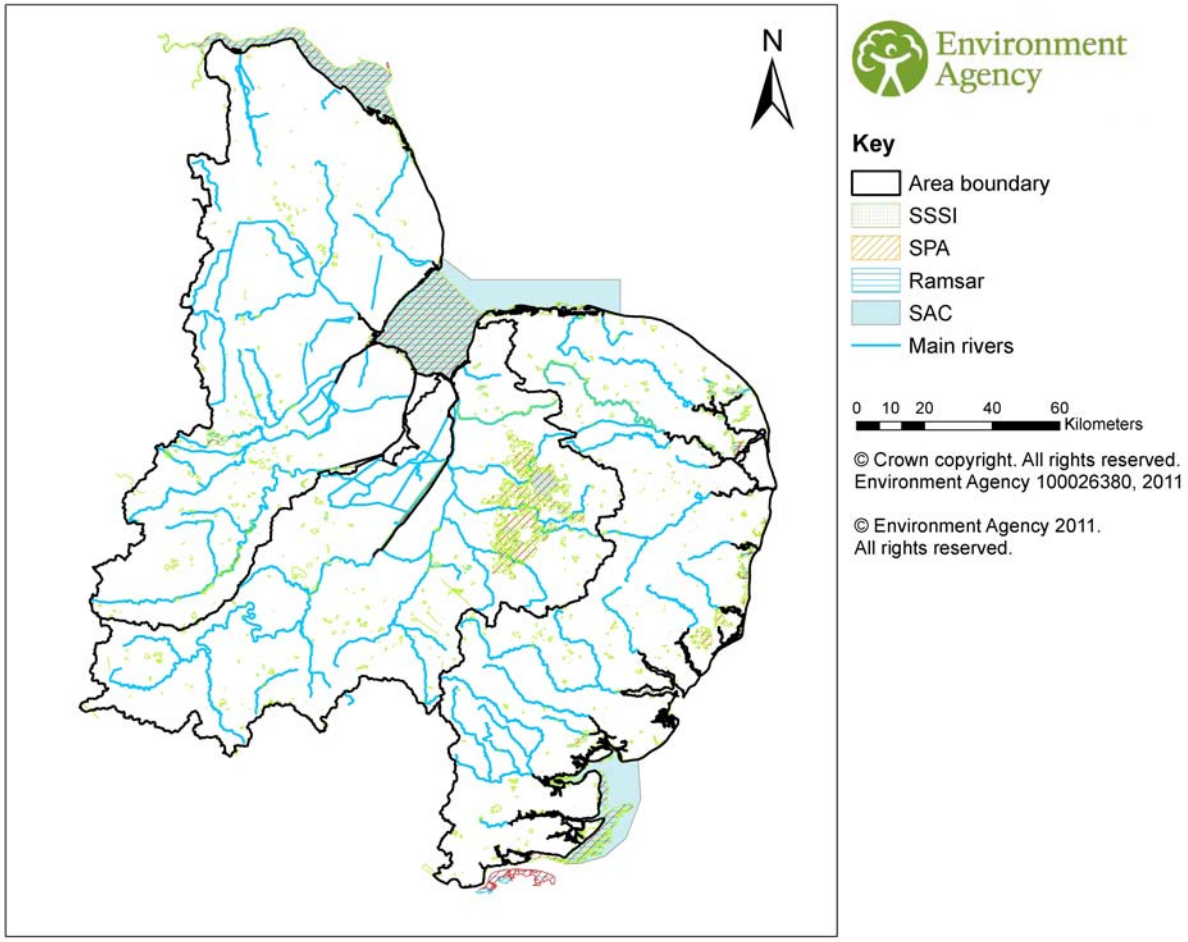
Further information on the transfer and support schemes in each area and how they are operated during a drought are included in the Area supporting information documents and operational manuals mentioned below (section 1.2.7).

1.2.3 Environmental issues

Despite being so dry, Anglian region is characterised by a high number of water-dependent designated conservation sites. These include sites such as the River Wensum, Ouse Washes, and Redgrave and Lopham Fen (see figure 1.3 for distribution of other sites).

Rivers and wetlands can suffer natural degradation during droughts which can sometimes be aggravated by abstraction or other activities. In some cases, appropriate management measures have already been identified and must be implemented once triggers are activated. When considering any extra measures to protect the environment we will always assess carefully the benefits to the environment against the possible impacts of the measures on other interests such as those of abstractors.

Figure 1.3 – Designated sites in Anglian region



When considering actions we or water companies take during a drought, we will ensure that we carry out our statutory duties (under Habitats Directive regulations and as a Section 28G authority under the Countryside and Rights of Way Act 2000), considering the impact on these important nature sites. Where appropriate, we will carry out an appropriate assessment of impacts.

Another environmental issue during drought is saline intrusion. As freshwater river flows fall, tidal influences can cause increases in salinity further upstream than normal. In extreme cases, this can affect both abstractors with licences to abstract from the affected reaches and the environment. The decrease in freshwater flows can often be alleviated by ensuring freshwater flows downstream where possible, but this needs careful management. There may also be effects on other water quality issues such as reduced dilution and elevated temperatures, and so careful monitoring and management will be required to minimise the potential impacts of saline intrusion.

As well as maintaining public water supplies, some of the transfer schemes also help to protect the environment. They may be operated by water companies and other abstractors to mitigate the impacts of their abstractions on the environment. Details of who must monitor the triggers and initiate the actions are included in individual

licence documents. Where we have a role in this, Areas have set up procedures that detail what actions we must take. More details are given in the Area supporting information documents.

Further information on sites potentially at risk from drought can be found in Area supporting information documents. These include those designated as Sites of Special Scientific Interest (SSSI) and other water dependent features.

1.2.4 Water companies

Water companies are responsible for maintaining water supplies to meet the needs of their customers, without damage to the environment or the needs of other water users. All water companies have drought plans; a requirement of The Water Act 2003. Water company plans cover a range of scenarios from high demand during short summer dry spells to more prolonged drought events, which could have significant effects on the social and economic wellbeing of people and businesses. These plans set out the actions water companies will take during a drought to maintain public water supply including temporary restrictions on water use[2], leakage control, drought permit applications and publicity campaigns encouraging water conservation. We provide guidelines for companies to follow when reviewing their drought plans (on a three-year cycle from last publication).

Following the Floods and Water Management Act 2010, from October 2010 water companies have a wider range of temporary use restrictions that they can implement during a drought. This supersedes the previous hosepipe ban powers. Water company drought plans set out in detail how they will use these new powers.

Such restrictions do not require the approval of Government or us. However there is a requirement for water companies to advertise and allow time for people to make representations.

These new powers are in recognition that some businesses that need water as an essential part of their business will have restrictions placed on them at a later stage through a drought order. The Water Use (temporary bans) order 2010 provides detailed definitions of uses, exemptions and conditions in relation to these new powers. The Drought Direction 2011 sets out those uses that still require an ordinary drought order to restrict drought.

Following appropriate demand management, water companies can apply to us for drought permits to make more water available for abstraction than under normal conditions. When determining these permits, we need to be satisfied that the water company is acting in line with its drought plan and that additional abstraction will not result in long term or significant damage to the environment. We work with water companies at every opportunity to ensure that the needs of the environment and the

[2] Further information on temporary restrictions can be found in the document “Managing drought in England and Wales” available on our website.

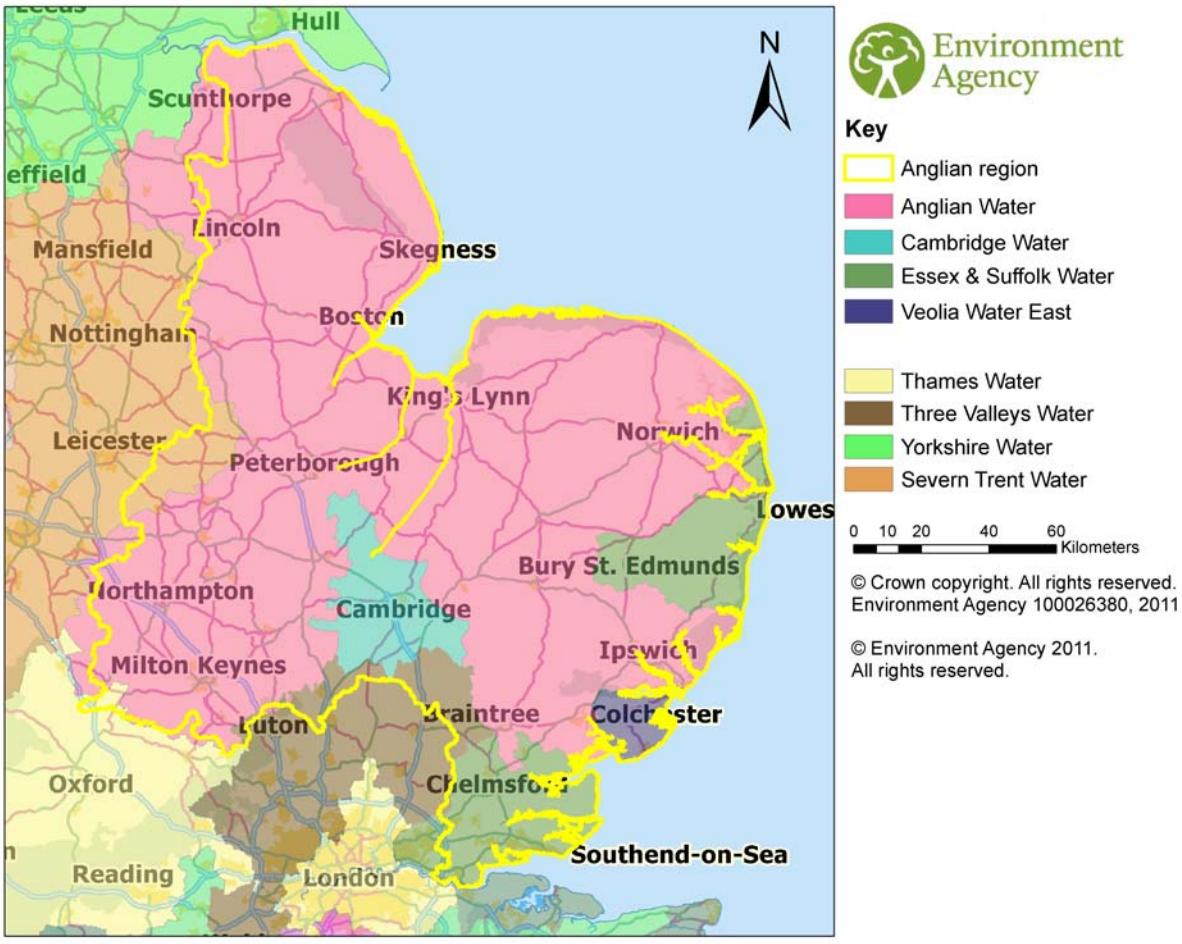
needs of consumers and businesses are balanced. However, it is the responsibility of water companies to implement temporary restrictions on water use. These decisions are taken by individual water companies in line with their drought plans, but we will tell water companies and report to Ministers if we believe companies are not acting quickly enough.

The water companies that operate and supply water within Anglian region are:

- Anglian Water;
- Cambridge Water;
- Essex and Suffolk Water (part of Northumbrian Water Limited);
- Veolia Water East;
- Veolia Water Central (the larger part of their operating area is within South East region, who act as the lead region in dealings with the company).

Figure 1.4 shows the operating areas of these water companies.

Figure 1.4 – Water company boundaries operating in Anglian region



Average per capita consumption for each of the water companies in Anglian for 2010/11 was as follows[3]:

- Anglian Water 146.18l/h/d;
- Cambridge Water 141.02l/h/d;
- Essex and Suffolk Water 156.36l/h/d;
- Veolia Water East 115.46l/h/d.

In some parts of the region, maintenance of secure public supplies is heavily dependent on the operation, by us, of the transfer and river support schemes referred to in section 1.2.2. We have separate drought plans for these schemes which are saved locally by the responsible Area drought team.

Water companies are currently reviewing their own drought plans, which detail actions they may take to conserve and / or enhance supplies during a drought. We are a statutory consultee in the development and review of water company drought plans, and provide recommendations to Government on draft plans. We must also make sure water companies follow their plans during a drought to ensure water supplies are protected for both people and the environment. The most recent versions of the water companies' drought plans are available from the water companies' websites.

During drought we need to share data with water companies to inform decisions we make and actions we take. Appendices G, H and I detail the information that we share with the companies in our region.

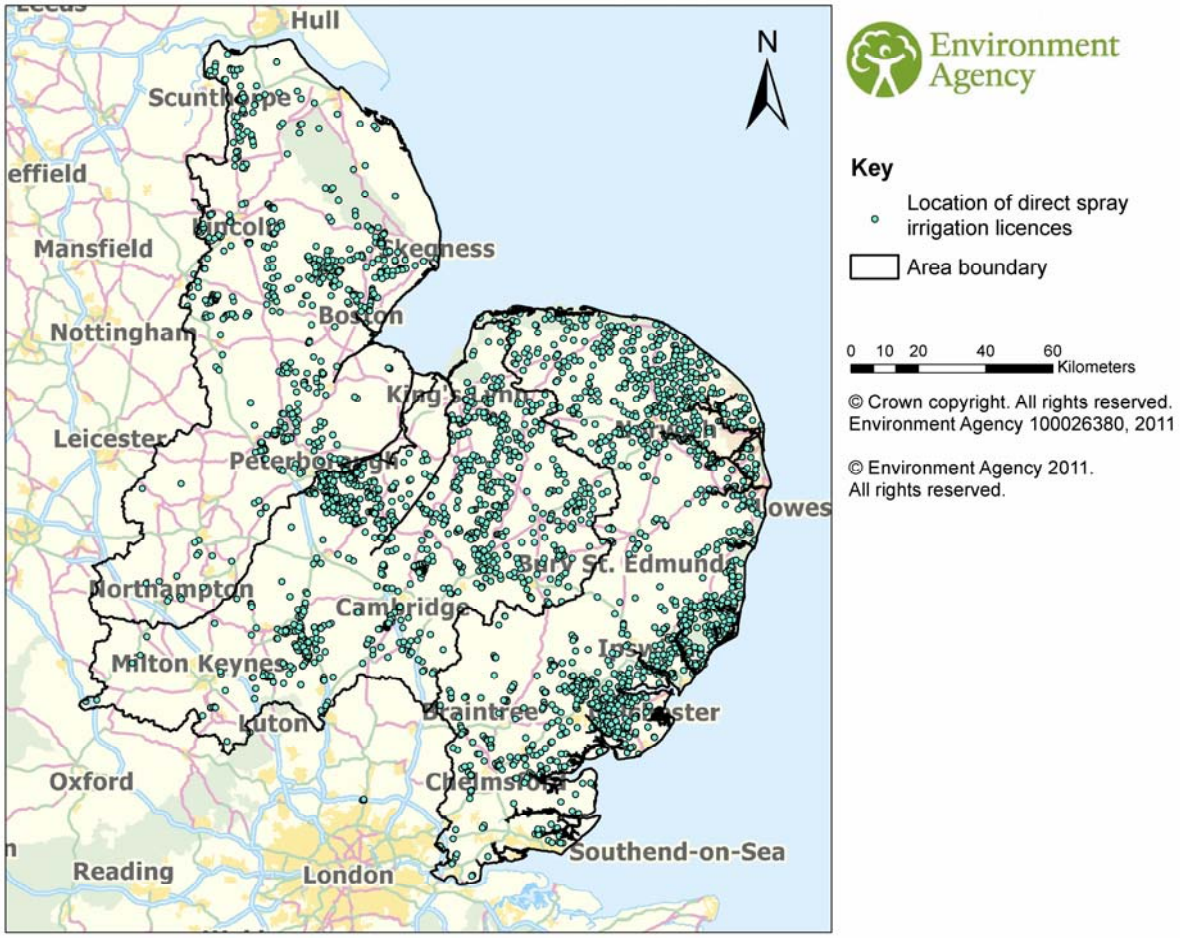
1.2.5 Irrigation

Agriculture is a key water use in the region, accounting for half of the national demand for spray irrigation (see figure 1.5), and contributes much to both the local and national economy. Anglian region grows over one third of England's wheat and barley, two thirds of the country's entire sugar beet crop, and nearly half its potato crop. It is also a key player in horticulture, growing peas, beans, apples, strawberries and salad crops. Peak demands occur during the summer months, when water availability is most scarce. All such abstraction is carried out under the terms of a licence granted by us and is often subject to restrictive conditions specified in the licence. Many agricultural licences have conditions associated with them, which allows us to restrict abstraction when flows fall below a certain level.

However, some older licences do not have these conditions. As a result, we can limit the amount of water used for spray irrigation by using Section 57 restrictions (of the Water Resources Act 1991). These allow us to restrict or ban the use of spray irrigation licences "by reason of exceptional shortage of rain". We do, however, empathise with people's concerns for their livelihoods when water restrictions are applied and therefore take great care to ensure that we strike the right balance

[3] Calculated as total household consumption divided by total household population. Data taken from water companies' June Returns 2011.

Figure 1.5 – Direct spray irrigation licences in Anglian region



between the needs of the environment and those of abstractors. When considering the need to impose these extra controls, our decisions will be based on a detailed assessment of the local water situation and will be informed by communications with licence holders and relevant organisations such as the National Farmers Union (NFU) and Country Land and Business Association (CLA). We will work with abstractors to agree voluntary restrictions first and will make every effort to avoid the imposition of complete bans whenever possible. More details about how this issue will be managed are included in appendix A, and specifically in each Area in appendix B, appendix C, and appendix D.

1.2.6 Navigation

Navigation plays an important role in Anglian. We act as the navigation authority for the River Ancholme, the Black Sluice / South Forty foot, the River Great Ouse, the River Nene, the River Stour, and the Rivers Welland and Glen.

The Ouse, Nene and Witham comprise the major navigation routes in the Fens and East Anglia, providing around 240 km (150 miles) of navigable waterway. The Broads, an area of rivers and lakes situated in Norfolk and Suffolk, provide water based recreation, navigation and ecology and have the status of a National Park.

During a drought it is important that river flows are maintained so as to reduce the impact on navigation and the communities who rely on this environment. We manage and maintain water levels to prescribed levels through a system of locks and weirs to enable navigation, manage flood risk and support water levels for public water supply abstraction. However, if this is not possible due to drought we would have to inform boaters via our Waterways team that there is not enough water to allow navigation.

Within our region British Waterways own and run a number of waterways and have their own drought plans which detail drought management options for their canals and navigable waters. We work in partnership with British Waterways when such circumstances arise as part of our drought management role.

Specific navigation areas that need our management during drought include:

- Forty Foot Drain connecting the Middle Level with the Counter Drain requires active management during the summer, and “navigation weekends” require us to support levels in the Forty Foot Drain for boaters if water is available in the Counter Drain;
- The river Ancholme and Lower Witham navigation is supported via the Trent-Witham-Ancholme scheme. Some cessation conditions associated with licences on the River Ancholme and River Witham are aligned to navigation levels on these rivers.

1.2.7 Local businesses and industry

Some businesses in our region abstract water directly from rivers rather than use mains supplies. As such, we need to ensure that their needs are considered when making our decisions as to what actions we need to take during a drought. We will endeavour to ensure that we carry out appropriate consultation and liaison with these water users to ensure that their businesses are not unnecessarily affected by the actions of others during a drought.

1.2.8 Other relevant plans and programmes

Our drought plan acts as an operational manual during drought and instructs us what actions to take and when according to the water situation. However, our drought plan has links with many other plans and programmes, and therefore should be used in combination with these to ensure consistency of actions taken. They include:

- Water company drought plans – these detail the actions water companies will take during drought. Water companies will consult us on their drought plans to ensure consistency with what actions are taken and when;
- Other regions’ drought plans – this is particularly important where transfers take place between regions (for example the Trent-Witham-Ancholme Scheme

from Midlands Region), and also where water company boundaries intersect our own regional boundaries (for example Veolia Water Central with South East region);

- Drought plans for transfer and support schemes – these detail the actions needed for the operation of these schemes. These are saved locally be the relevant Area drought team;
- Water resources management plans (WRMP) – water companies also have WRMPs that show how the companies intend to provide sufficient water over the next 25 years to meet their customers' needs whilst protecting and enhancing the environment. These plans are produced every five years and reviewed for progress annually. These are publicly available and can be found on each water company's website;
- River basin management plans (RBMP) – we have an obligation as the competent authority to implement the Water Framework Directive, primarily through RBMPs. The two overarching objectives are to achieve "good status" in all of our water bodies by 2015, and to ensure no deterioration from the current status within any water body. The River Basin District in Anglian region comprises 11 catchments and 866 water bodies. The Anglian RBMP details the status of all water bodies in the region. The RBMP sets out a baseline classification status of every waterbody and the elements for which each is failing. It also includes a series of actions that must be implemented by us and others. In a drought we will have regard to the status of relevant waterbodies and will consider the impact of drought management options (such as drought permits or orders) on the ability of a waterbody to recover and progress towards good status.
- Catchment Abstraction Management Strategies (CAMS) – CAMS assesses how much water is reliably available on a catchment by catchment basis. This helps us to decide whether new licences for water abstraction should be granted, and tries to ensure that they do not have a detrimental effect on the environment. We have recently updated the process to make sure water resources are protected despite the increasing pressures from climate change, and also to ensure catchment management is integrated so that impacts on water resources and the water environment are managed together. We are now producing the next set of catchment strategies. These will be available from our website when they are finished.
- Water Resources Strategy for England and Wales, and the Anglian Regional Action Plan – Our Water Resources Strategy sets out how we believe water resources should be managed over the coming decades so that water can be abstracted and used sustainably. The strategy looks at the long-term pressures on water resources, such as climate change and population growth, and what we need to do to minimise their impacts. Our Regional Action Plan looks at how we can take forward the actions identified in the strategy at a regional level. Both documents are available on our website.

1.2.8 Past droughts

Due to the competing demands for a limited supply of water in Anglian, we often have to actively manage a dry situation every summer. However, one of the most recent significant droughts occurred in 1995/7.

The 24 month period from April 1995 to March 1997 was the driest on record in parts of the south and east of England, beating the 1976 record. However, fewer drought orders were imposed in 1995 and 1996 than the 139 orders that were issued in 1976. Water companies said this was because they had improved their ability to meet water demands in the last 20 years.

In Lincolnshire there were Section 57 restrictions in two catchments in 1995. By the end of summer 1995, only 125 spray irrigation licences out of a total of 11,000 were subject to total bans. A further 582 were partially restricted (i.e. a limit of 50% of the licensed quantity or irrigating during specified hours only).

1996 continued the trend from 1995, with requests for voluntary restrictions on all surface water spray irrigators (excluding storage reservoir sources) around Lincolnshire. During mid-August formal S57 restrictions were imposed on surface water abstractors in catchments of River Lymn / Steeping, Bain, and Barlings Eau, and some abstractors were restricted to 20% of daily licensed abstraction.

Anglian Water defined this drought as greater than a “1 in 100 years” event but no restrictions for Anglian Water were required to maintain supplies. Anglian Water did apply for drought orders towards the end of the drought on a precautionary basis in the event of a prolonged dry period, but the return of more normal rainfall conditions meant the applications were not pursued.

Essex and Suffolk Water implemented a number of drought measures including the imposition of a hosepipe ban in both its supply areas. Rainfall for Essex at this time was significantly lower than the long-term average, and dry winters in 1995 and 1996 did not refill reservoirs to normal operating levels.

Essex and Suffolk Water implemented drought actions in 1997 which included PR campaigns, water efficiency awareness, hosepipe bans, commissioning of abandoned sources, temporary effluent recycling scheme and improving abstraction potential at Abberton reservoir. For the Suffolk supply areas restrictions on use were needed because of the unexpected high demand as a result of a long hot summer.

A drought order to permit increased abstraction from the Redgrave boreholes to supply Redgrave and Lopham Fen with 8 l/s of water was implemented during the summer. This action safeguarded the breeding conditions required by the Great Raft Spider (listed as endangered under the Wildlife and Countryside Act 1981) and freed resources enabling the company to use the full licensed quantity for public supply.

More information on actions taken can be found in our internal Area supporting information documents.

2 Drought management in Anglian

We nominate drought teams from our Central, Eastern and Northern teams and our regional office. This section provides information on who will be in these teams and what our main responsibilities are. It also covers our arrangements for securing resources during a drought and administration responsibilities.

2.1 Organisation of drought teams

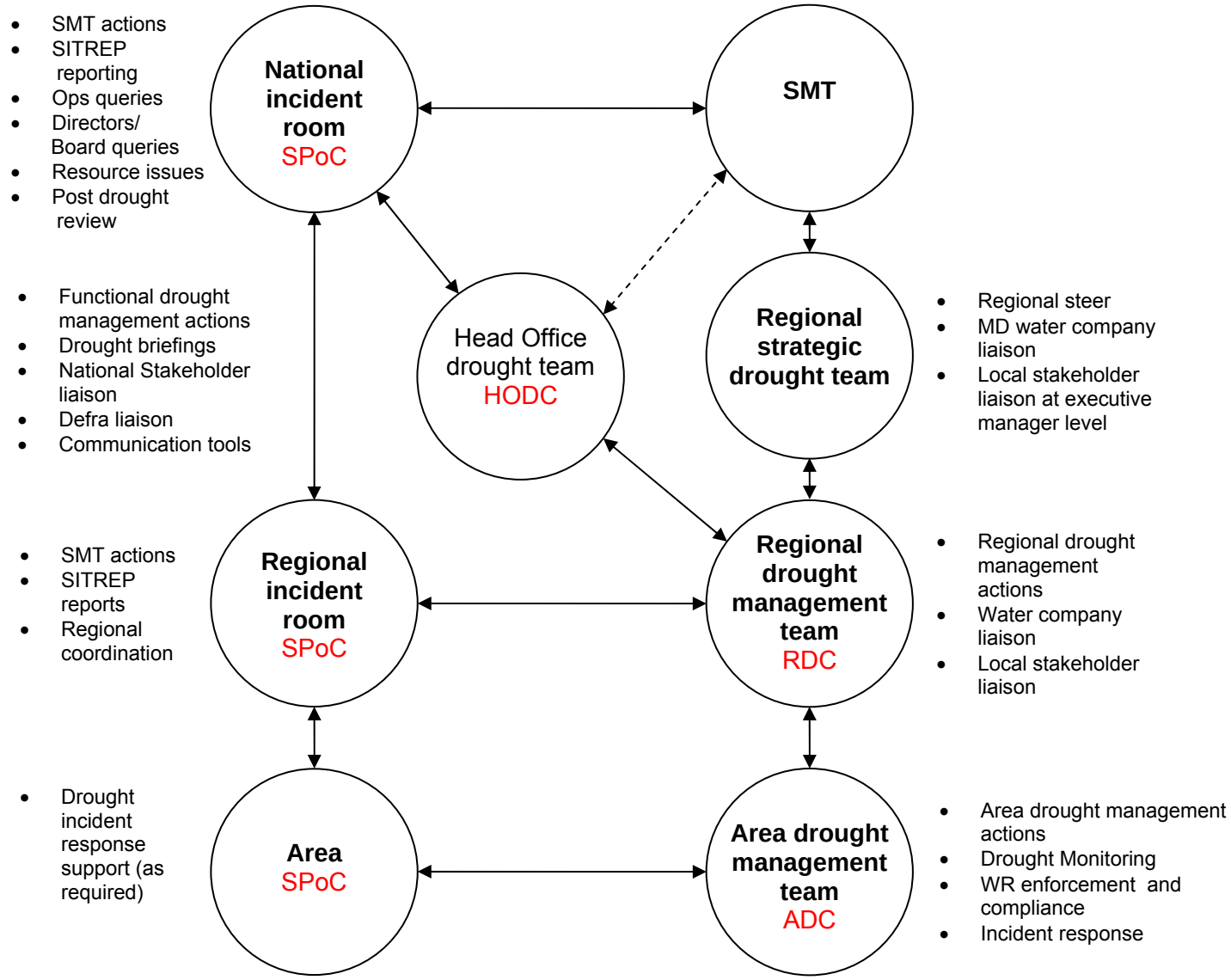
We manage droughts as part of our incidents and emergency planning procedures. The principles of how we manage droughts relate closely to incident management stages of understanding risk, mitigate, prepare, respond, recover, post incident review, and feedback. However, unlike a flood or pollution incident, droughts take time to develop and once in a drought we don't know when it will end.

Drought planning is principally led by Environment and Performance teams in region, and Area Environment Planning teams in Areas. These teams operate the day to day management of drought incidents and response. There is no significant input from dedicated incident management staff. We also have the regional strategic drought team which consists of executive managers from region and Areas. This group would convene once the severity of a drought had increased and strategic direction was required. The Head Office Drought Team convenes our strategic management team (SMT) during a drought to provide strategic governance and direction for England and Wales.

The Anglian and Area drought teams include the nominated roles of drought manager and drought coordinator. The role of the drought manager is to lead on drought for the region or Area and be the main contact for senior managers. The role of the drought coordinator is to coordinate the day-to-day activities of the drought team and to provide technical advice during the drought. Further information is available in the operational instruction Roles and responsibilities of drought teams.

The organisation of our staff involved in drought is shown in figure 2 below.

Figure 2 – Organisation of Environment Agency drought teams



Key point of contact for each team (in red text)
SPoC Specific point of contact
HODC Head Office drought coordinator
RDC Regional drought coordinator
ADC Area drought coordinator
SMT Strategic management team

2.2 Drought team responsibilities and roles

During a drought, our main responsibilities are to:

- Make sure that abstractors do not take too much water from our rivers, whilst ensuring the environment is protected;
- Check water companies are following their drought plans and taking action to protect water supplies;
- Deal with drought permit applications from water companies and respond to the Secretary of State on water company drought order applications;
- Report on the state of water resources during a drought to the public and our partners.

Our regional strategic drought team will convene in an escalating drought where strategic direction is needed from executive managers. The group will include the members of ALT and the Anglian drought manager. Our other drought teams consist of the following nominated staff:

Table 2.1 – Key drought roles

DROUGHT TEAM ROLE	Who Anglian drought team	Who Area drought teams		
		Central	Eastern	Northern
Drought Manager	Environment Planning Manager (Water Resources)	Environment Manager (Water Resources)	Environment Manager (Water Resources)	Environment Manager (Water Resources)
Drought Coordinator	Technical Specialist (Water Resources)	Senior Environment Planning Officer (Water Resources, AEP)	Senior Environment Planning Officer (Water Resources, AEP)	Senior Environment Planning Officer (Water Resources, AEP)
Hydrology	Technical Specialist (hydrology and water resources management)	Technical Officer 1 (Hydrometry & Telemetry)	Hydrometry and Telemetry (EOETS) Team Leader and Technical Specialist (Hydrology)	Technical Officer 1 (Hydrometry & Telemetry)
Water Resources Environmental Planning	Environment Planning Officer 1 (Water Resources)	Senior Environment Planning Officer and Environment Planning Officer (Area Environment Planning)	Senior Environment Planning Officer and Environment Planning Officer (Area Environment Planning)	Area Environment Planning Team Leader
Communications	Regional Communications Manager	Area Communications Business Partner	Area Communications Business Partner	Area Communications Business Partner
Permitting and licensing	National Permitting Team Leader	Senior Environment Planning Officer (Water Resources, AEP), Environment Planning Officer (AEP)	Area Environment Planning Team Leader and Senior Environment Planning Officer	Area Environment Planning Team Leader and Senior Environment Planning Officer
Incidents and emergencies	Regional Incidents and Emergencies Planning Manager			
Environment Management		Environment Management Team Leader(s)	Environment Management Team Leader(s)	Environment Management Team Leader(s)

DROUGHT TEAM ROLE	Who Anglian drought team	Who Area drought teams		
		Central	Eastern	Northern
Groundwater and contaminated land		Technical Officer 1 (Groundwater and Contaminated Land)	Groundwater and Contaminated Land Team Leader	Technical Specialist (Groundwater and Contaminated Land)
Water Quality		Sampling and Collection Team Leader	Sampling and Collection Team Leader	Sampling and Collection Team Leader
Conservation		Environment Monitoring Officer 1 (Analysis and Reporting)	Fisheries, Recreation and Biodiversity Team Leader	Fisheries, Recreation and Biodiversity Team Leader
Ecology		Environment Monitoring Officer 1 (Analysis and Reporting)	Analysis and Reporting Team Leader	Environmental Monitoring Team Leader (Analysis & Reporting)
Single Point of Contact (for National Incidents)	Technical Specialist (water resources)			

Other staff will be called upon to provide specialist advice (e.g. legal, financial, technical) as needs arise.

Executive Managers may also be required to attend Strategic Management Team meetings on drought as the situation worsens. The Anglian Environment and Performance Manager will attend these meetings, and be deputised when needed by the SEP Water Manager.

Once SMT is convened, the Single Point of Contact (SPoC) arrangements are put in place. The Single Point of Contact (SPoC) will usually be the Anglian Drought Coordinator, and will be responsible for coordinating information for and reporting to SMT and the National Incidents Team. The SPoC will be the lead contact for drought in Anglian region, and any queries from SMT and National Incidents should be directed to them.

A list of names and contact details for our drought teams is stored in the Anglian drought folder (see section 2.5).

2.3 Responsibility and involvement in decision making

There are some drought decisions that can only be approved by certain staff. These are set out below.

Table 2.2 – Key decisions

Activity	Staff member authorised to approve
Approval of water company drought permits	National Permitting Service Manager or Area Manager(s)
Approval of our comments to the Secretary of State on water company drought orders	Director - Anglian
Approval of Environment Agency drought order applications	Director - Anglian
Approval of memorandums of understanding (MoU) that relate wholly to an area	Area Manager(s)
Approval of memorandums of understanding (MoU) that are of regional concern	Director - Anglian
Approval of invoice to water company for recovering costs relating to drought permit or order application	Director - Anglian

2.4 Securing resources

During a drought, the Anglian and Area drought managers are responsible for reviewing and identifying resource needs so that we continue to fulfil all necessary commitments. Additional resources are sourced internally via the redirection of internal staff or externally by using consultants.

2.4.1 Redirecting internal resources

Once the need for additional resources has been identified, the Anglian and Area Drought Managers explore with Area Management Teams and Environment and Performance Management Team the possibility of redirection of internal staff.

2.4.2 Financial resources

If extra staff or consultants are appointed to assist with increased workloads, the Anglian and Area drought managers must make budget holders aware of the financial implications at the earliest opportunity. Approval for this spend is sought according to the Financial Scheme of Delegation. When seeking additional staff / consultant resources, agreement by the Anglian Leadership Team (ALT) will be required.

The Anglian Drought Manager monitors the costs incurred by drought, including staff costs, consultant costs and operational costs. During drought, our drought teams and supporting teams record their time spent on drought activities. The Head Office Drought Team provides a set of time recording codes for our teams to use at the onset of drought.

Our Anglian Drought Team will actively seek to recover costs for work which we carry out in dealing with water company drought permit and drought order applications.

During drought costs of operating transfer schemes may increase. The funding for transfer scheme operation is based on a “no profit / no loss” basis. Deficits as a result of an unusually high level of operation are offset with times of low level of operation. Because the need to operate the scheme is variable and weather dependent, expenditure balances out over a number of years.

2.4.3 Obtaining external resources

The use of external resources is arranged using one of the consultancy frameworks, depending on requirements and the current rules issued by our Procurement Team.

Prior to the need to appoint consultants (at potential drought stage) the Anglian Drought Coordinator will investigate the availability of suitable skills within the Framework Consultancies.

The approach to be followed is:

- The Anglian Drought Management Team recognises the need to appoint consultants to assist with peak workloads;
- A paper is submitted to the Anglian Leadership Team detailing requirements, justification, implications and recommendations;
- The Anglian Drought Coordinator, in partnership with the relevant Area(s), produces a scope, Contract Data Form (CDF) and job description (can be based on previous contracts) for consideration under the terms of the Framework Agreement;
- If this recruitment initiative fails to attract suitable candidates, the Anglian Drought Coordinator, in partnership with the relevant Area(s), will produce an Invitation to Tender, ensuring tender processes are in accordance with procurement regulations. The specification will also detail posts, job descriptions and conditions for employment.

Note: If the competitive contract value exceeds the European Union (EU) threshold of £145k for services, then the process will have to be carried out in accordance with EU Directives.

2.5 Administration arrangements

At the onset of drought and during drought, our drought teams open and maintain several administration documents and databases.

All logs relating to drought are stored on the internal N drive. Paper copies will also be available from the Anglian and Area offices.

We retain all log sheets, notes and any other records of information for at least three years. The Anglian WR Environmental Planning Officer is responsible for filing drought documents. Each drought team member is responsible for documenting their own work and passing it to this person.

All communications may be subject to Freedom of Information (FoI) requests (such as telephone conversations, letters, emails etc.) so must be recorded and filed accordingly. General communications must be made available on request according to our FOI procedure.

3 Drought triggers and actions

The impacts of a drought vary from minor to very severe. Our drought plan covers the whole range of drought management activities and decisions we take to manage the impacts.

This section sets out the actions our drought teams take for drought planning and management, who decides on the action and what indicators trigger these actions.

3.1 Stages of drought management

The decisions and actions we take for drought planning and management are split into four stages:

Table 3.1 – Drought stages

Drought stage	
Normal	Drought planning actions in a normal water resources situation.
Potential drought	Drought actions required to prepare for drought once prolonged drier conditions are evident.
Drought	Actions required to manage drought once localised drought conditions impact on people, business and the environment.
Post drought	Actions required to monitor and manage the return to normal water resources conditions.

These stages do not indicate the severity of the situation; we use these stages to help us make timely decisions and actions.

3.2 Drought triggers and actions

We use a range of drought triggers to identify what actions to take and when. Our drought teams make a decision on whether action is needed based on a range of factors, including the present and forecast conditions and how effective the action would be. Routine hydrometric and ecological monitoring continues at all times, as described in section 4, and provides the data required to detect the onset of potential drought conditions. Local judgement is an important part of drought management.

Low rainfall during the winter and spring period provides an early warning of the potential for low surface water flows during the following summer. Results of biological monitoring, for example LIFE[4] scores, could also provide a warning of stress in the water environment. Below average winter groundwater levels resulting from low aquifer recharge and low reservoir refill provide an early warning of potential problems with maintaining public water supplies.

Low effective rainfall over two consecutive winters provides an early indication of potential surface water drought conditions during the following summer and autumn. This information is also pertinent in detecting potential groundwater and public water supply droughts. Groundwater levels and surface water flows are monitored to ensure that potential drought conditions that develop later in the year are detected. The detailed reasoning behind the decision to select these as triggers is available in appendix E for Central Area and appendix F for Eastern Area. [Please note: information not collated for Northern Area at time of publication.]

During a potential drought the level of monitoring will depend on the time of year. All monitoring is stepped up during the spring and summer to detect the onset of low surface water flow conditions. In autumn and winter the aquifer recharge and reservoir refill will be the main concerns. Once groundwater levels and reservoir storage return to near average conditions we would then revert to the monitoring used under 'normal' conditions

In drought conditions monitoring is carried out to support our drought management actions and to assess the effectiveness of mitigation measures. Additional monitoring may also be necessary to assess the impact of water company drought management actions. It is likely that groundwater levels and reservoir levels will require monitoring over a longer period. Once these return to near average conditions then we would revert to the monitoring used under 'normal' conditions.

Our drought teams take appropriate actions to manage and reduce the effects of a drought. Each Anglian drought team uses the drought action table split into the four stages of drought. Actions specific to a certain Area team have been colour coded with the following:

- **Northern Area**
- **Central Area**
- **Eastern Area**

These action tables should be used in conjunction with any other operational drought plan, such as those for transfer schemes. The order of actions is based on our previous experiences and how we would expect a drought to develop.

[4] LIFE stands for Lotic Invertebrate Index for Flow Evaluation

Table 3.2 – Anglian drought teams' actions and triggers

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Normal (drought planning)					
Hold a "water situation" meeting with drought team members to discuss current situation and confirm: • Membership of the team; • Identify training needs; • Consider drought prospects for the coming summer; • Agree any actions. Review and if necessary update the Anglian drought plan.	February each year.	All	Drought coordinators	Drought managers	Drought coordinators
Produce key hydrometric report and monthly water situation report. Weekly monitoring of weather forecasts, rainfall, SMD, river flows and reservoir levels. Monthly monitoring of groundwater levels.	Ongoing	All	H&T team leader	n/a	Hydrologists
Prepare Area inputs into "Prospects for spray irrigation" report.	February each year	Areas	Area drought coordinator	Area drought coordinator	Area drought coordinator Area senior environment planning officer Area technical specialist (hydrology)
Produce and issue "Prospects for spray irrigation" to NFU, CLA and local IDBs.	February each year	Anglian	Anglian drought coordinator	Anglian drought manager	Anglian drought coordinator

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Respond to requests for information on prospects for spray irrigation.	As required	All	Drought coordinators	n/a	AEP team leader
Ensure scavenger pumps to remove saline ingress are maintained and in working order.	February each year.	Northern	Drought coordinator	Drought manager	Drought coordinator / drought team
Maintain information exchange with water companies on water situation	Quarterly liaison meetings	Anglian	Anglian drought coordinator	Anglian drought manager	Anglian drought coordinator
Provide area water situation input into regional water company liaison meetings.	Quarterly meetings	Areas	Area drought coordinator	Anglian drought coordinator	Anglian / Area drought coordinator
Update Cessation Lists and associated monitoring spreadsheets (summer and winter), and monitor weekly	Ongoing	Central Northern Eastern	H&T technical officer AEP technical specialist AEP team leader	n/a	H&T technical officer AEP cessation lead officer AEP team / H&T (EOETS) team
Check whether Wensum cessation conditions apply.	When the groundwater level in observation borehole at Weston Longville is greater than or equal to 15.22m below datum in March and rainfall in MORECS square 120 is equal to or less than 630mm at the end of October. Cessation will apply in the following year.	Eastern	AEP team leader	AEP team leader	AEP team leader
Manage EOETS.	Conditions consistent with operating manual.	Central Eastern	H&T team leader Technical specialist (hydrology)	H&T team leader Technical specialist (hydrology)	H&T team leader Technical specialist (hydrology)

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Monitor supported catchments and review the need for river support in line with operational guidelines	Ongoing	Central	H&T technical Officer AEP environment planning officer	H&T technical Officer AEP environment planning officer	H&T technical Officer AEP environment planning officer
Respond to reports of low flow issues, for example low water levels in ponds and streams, poor water quality, fish in distress.	Reports received	Areas	H&T team leader Relevant EM team leader A&R team leader	H&T team leader Relevant EM team leader A&R team leader	H&T team leader Relevant EM team leader A&R team leader
Discuss need to implement restrictions in light of non-drought related cessation levels being reached. Implement as necessary. Notify licence holders	All Year	Areas	H&T technical officer AEP cessation lead officer	n/a	Area drought coordinator
Water quality monitoring	Ongoing	Areas	S&C team leader (chemical)	n/a	S&C team leader (chemical)
Prepare inputs to Head Office groundwater forecast report for winter	Every autumn	All	Anglian drought coordinator	Anglian drought manager	Drought coordinators
Respond to reports of well failures.	Notification by well owner	Areas	GWCL team leader AEP team leader	GWCL team leader	GWCL team leader

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Consider move to potential drought	Potential summer surface water drought: • Winter rainfall around 75 percent of LTA (notably low) or less in parts of the area; or • Late winter / spring rainfall (March to May/June) around 65 percent of LTA (notably low) or less in parts of the area; • Early onset of flow recessions and build up of SMDs; • Below average rain forecast.	Northern	Hydrologists	Drought manager Drought coordinator	Drought coordinator
	When flows at the majority of the sites listed in table I1 are within the "notably low" flow category	Eastern	Technical specialist (hydrology)	Drought manager	Drought manager
	• Effective Rainfall Trigger (February or March)[5]; • Groundwater Trigger - Level below LTA and falling (April); • Surface Water Flow between Q80 and Q90 (Summer); • LIFE O:E ratio <0.945 and >0.915 is indicative of 'Potential Drought' (spring and autumn).	Central	H&T technical officer Analysis and Reporting Officer	Area drought manager	Area drought manager

[5] The effective rainfall trigger utilises data from September to April. However, an earlier estimate can be made in February/March.

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
	Potential public water supply drought: • Winter groundwater levels below normal and falling; • Winter recharge at 50 per cent of LTA or less; • Winter public water supply reservoir levels below normal operating curve and falling; • Below average rain forecast	All	Hydrologists Hydrogeologists	Drought managers Drought coordinators	Drought coordinators
	Samples with LIFE O:E ratios below 0.945 and greater than 0.915 will be considered to be indicative of potential drought conditions. Site specific LIFE targets will also be set for 12 key sites and reference will additionally be made to these thresholds to help define drought status.	Areas	A&R team leader Area drought coordinator	Area drought manager Area drought coordinator	A&R team leader Area drought coordinator
Convene Area / Anglian drought team meetings and agree frequency of future meetings.	When an Area considers drought status should be changed	All	Drought coordinators	Drought managers	Drought coordinators
Lessons Learnt - Review drought plan and operational procedures if necessary	Once confirmed that a drought is not likely	All	Drought managers	Drought managers	Drought coordinators
Run Anglian drought exercise	If drought plan has not been used or been required for three consecutive summers	All	Drought coordinators	Drought managers	Drought coordinators

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Potential drought					
Convene the Anglian / Area Drought Teams	Once one Area has reached potential drought stage	All	Drought coordinators	Drought managers Drought coordinators	Drought managers
Set up logs on the N: drive (risk, issues, lessons learnt, decisions and actions and telephone call logs)	Once one Area has reached potential drought stage	All	Drought coordinators	Drought coordinators	Drought coordinators
Identify and budget for additional resources	Once one Area has reached potential drought stage, or January / February for anticipated summer drought	All	Drought coordinators	Drought managers	Drought managers Drought teams
Undertake administrative checks, updating mailing lists and records	Once one Area has reached potential drought stage	All	Drought coordinators	Drought coordinators	Drought coordinators
Set up project management structure and finance code for drought expenditure	Once one Area has reached potential drought stage	Anglian	Anglian drought coordinator	Anglian drought manager	Anglian drought coordinator
Start additional hydrometric monitoring in key catchments	Once one Area has reached potential drought stage	Areas	Area drought coordinator	Area drought manager	H&T team leader
Step up to potential drought hydrological monitoring as necessary depending on time of year	Once one Area has reached potential drought stage	Areas	H&T technical officer Area drought coordinator	H&T technical officer Area drought manager	H&T technical officer Area drought manager Area drought coordinator
Start up ecological drought monitoring in key catchments	Once one Area has reached potential drought stage	Areas	S&C team leader A&R team leader	Area drought manager	S&C team leader A&R team leader Relevant EM team leader

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Produce drought monitoring reports based on drought plan triggers and highlight any concerns which may require actions	Once one Area has reached potential drought stage	All	Hydrologists	Drought managers	H&T team leader
Produce weekly hydrometric summary sheets	Once one Area has reached potential drought stage	All	Hydrologists	Drought managers	H&T team leader
Alert relevant water companies to change in status to potential drought	Once one Area has reached potential drought stage	All	Drought coordinators	Drought managers	Drought coordinators
Alert farmer groups to change in status to potential drought	Once one Area has reached potential drought stage (potential summer surface water drought)	All	Drought coordinators	Drought managers	Drought coordinators
Alert Internal Drainage Boards of the need to raise drain levels to summer retention as soon as possible, and to conserve water.	Once one Area has reached potential drought stage (potential summer surface water drought)	Areas	Area drought coordinator	Area drought manager	Area drought coordinator
Inform Natural England and County Wildlife Trusts of change in status to potential drought	Once one Area has reached potential drought stage	All	Drought coordinators	Drought managers	Drought communications representative
Alert and inform Anglian Leadership Team	When drought status changes, at other times of significant change or when requested	Anglian	Anglian drought coordinator	Anglian drought manager	Anglian drought coordinator
Send letters to day ticket fisheries, still water owners and fishing clubs. Advise of possibility of drought and fish protection measures.	Once one Area has reached potential drought stage (potential summer surface water drought)	Areas	Area drought coordinator Drought team	Area drought manager	FRB team leader
Set up and maintain reporting to Head Office drought team	When drought status changes for one or more Areas or as requested by Head Office	Anglian	Anglian drought coordinator	Anglian drought manager	Anglian drought coordinator
Prepare inputs to Head Office groundwater forecast report for summer	As requested by Head Office	All	Anglian drought coordinator	Anglian drought managers	Anglian drought coordinator

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Plan environmental mitigation measures including additional help to assist with extra workload (e.g. weed clearance, aeration, fish rescue, river support schemes, and scavenger pumps to remove saline ingress).	Once one Area has reached potential drought stage (potential summer surface water drought)	Areas	Area drought coordinator Drought team	Area drought manager	Relevant EM team leader A&R team leader Environmental Monitoring Specialist Ops delivery team leader Area drought manager Drought team
Alert TWA cessation licence holders (Refer to TWAS Scheme Drought Plan)	Potential summer surface water drought in Witham and Ancholme catchments	Northern	Drought coordinator	Drought manager	Drought coordinator AEP team leader
Continue to screen results from ongoing routine biological survey programme.	Any sample with LIFE O:E ratio of <0.915 will indicate actual drought.	Areas	A&R team leader Area drought coordinator	Area drought manager	A&R team leader
Sample up to 12 key biology drought sites at monthly intervals. Key sites will be pre-defined and represent all river types.	Any sample with LIFE O:E ratio of <0.915 will indicate actual drought.	Areas	S&C team leader Area drought coordinator	Area drought manager	S&C team leader
Consider implementation of staged voluntary spray irrigation restrictions	Once one Area has reached potential drought stage	Areas	Area hydrologists Drought coordinators	Area drought managers	Area drought coordinators AEP team leader

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Consider move to drought / voluntary 50 per cent reductions for spray irrigation * The Northern Area 1997 Drought Report documents procedures developed for surface water spray irrigation restriction using Section 57 powers of the Water Resources Act (1991) and the principles are explained in Appendix B.	• Onset of summer surface water drought during peak spray irrigation season in key catchments, the Upper Witham, Barlings Eau, Bain, Lymn and Lower Welland and Glen; • Flows fall below Q90 during peak spray irrigation season; • Below average rain and above average temperatures forecast.	Northern	Drought Coordinator	Drought Manager	Drought coordinator AEP team leader
Manage EOETS – liaise with Central Area about availability of water to transfer and use of GOGS boreholes	Conditions consistent with operating manual	Eastern	Technical specialist (hydrology)	Drought manager	Technical specialist (hydrology)
Alert holders of Ely-Ouse backed licences to change in drought status	Potential drought stage reached in catchments supported by EOETS.	Eastern	Drought team	Drought manager	AEP team leader Drought team communications representative
Record and provide advice about: • Well Failure; • Low Flows / Levels.	As reports received	Areas	n/a	GWCL team leader H&T team leader	GWCL team leader H&T team leader
Respond to reports of: • Poor Water Quality; • Fish Distress.	As reports received	Areas	n/a	Relevant EM team leader A&R team leader	Relevant EM team leader A&R team leader
Monitor supported catchments and review the need for river support in line with operational guidelines	Ongoing	Areas	H&T technical officer AEP environment planning officer	H&T technical officer AEP environment planning officer	H&T technical officer AEP environment planning officer

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Notify Area drought coordinator that drought trigger levels, as indicated on the monitoring spreadsheet, are close to being met. Implement cessation conditions as necessary	See specific trigger levels. Action continues throughout the abstraction season	Areas	H&T technical officer AEP environment planning officer	Area drought coordinator	Area drought coordinator AEP environment planning officer
Liaise with Eastern Area regarding the operation of the EOET scheme	Conditions consistent with the operating manual	Central	H&T team leader	H&T team leader	H&T team leader
If "Prospects for Spray Irrigation" has not been 'good' or drought triggers have highlighted a potential water resources shortage: 1. Coordinate a liaison meeting to discuss irrigation prospects and proposals for management; 2. If restrictions are likely update mailing lists for drought prone catchments (separate SW/GW)	1. April/May 2. As early as possible	Areas	Area drought coordinators	Area drought coordinators	Area drought coordinators
Consider move to drought	Onset of summer surface water drought: • Monthly mean flows are notably low or exceptionally low in significant parts of the Area; • River flows are below Q95 in significant part of the Area; • Environmental stress (e.g. low DO, fish kills due to low flows in significant part of the Area; • Below average rain and above average temperatures forecast.	All	Drought coordinators Drought teams	Drought managers Drought coordinators	Drought coordinators

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
	Onset of public water supply drought: • Public water supply reservoir levels at or near to Drought Alert Curve; • Ground water levels are notably low or exceptionally low in significant parts of the Area (likely to be at or near to historic minima for time of year)	All	Drought coordinators Hydrologists Hydrogeologists	Drought managers Drought coordinators	Drought coordinators
	Implementation of Northern Chalk Section 20 Agreement	Northern	Drought coordinator Hydrologist Hydrogeologist	Drought manager Drought coordinator	Drought coordinator
	• River flows fall below the "Exceptionally low" flow categorisation threshold defined by baseflow recession during peak spray irrigation season and environmental indicators poor (low DO levels in river, high water temperature and forecast for below average rainfall and above average temperatures). • Any sample with LIFE O:E ratio of <0.915 will indicate actual drought. The site specific LIFE targets set for the 12 key sites will also be referred to, when defining drought status.	Areas	A&R team leader Area drought coordinator	Area drought manager Drought coordinator	A&R team leader Area drought coordinator
	When flows at the majority of sites listed in table I1 are within the "exceptionally low" flow category	Eastern	Technical specialist (hydrology)	Drought manager	Drought manager

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
	• Effective Rainfall Trigger (February / March); • Groundwater trigger level below August LTA (April); • Surface Water Flow below Q90 (summer); • LIFE O:E ratio <0.915 is indicative of 'Drought' status (monthly).	Central	H&T technical officer A&R officer	Drought manager	Drought manager
Consider move to normal conditions	• Return of river flows within or above the "below normal", public water supply reservoir levels and groundwater levels to near average / normal conditions. • LIFE O:E ratios of 0.945 or greater will indicate recovery to normal conditions. The site specific LIFE targets set for the 12 key sites will also be monitored to help define recovery.	Areas	Area drought coordinator Hydrologist Hydrogeologist A&R team leader	Area drought manager Drought coordinator	Area drought coordinator
Plan 'Drought' Status monitoring	Once 'Potential Drought' status reached, and likelihood of moving to drought status is high	Areas	Area drought coordinator	Area drought manager	Appropriate Area drought team members
Review and if necessary update the Anglian Drought Plan	Following a move from potential drought to drought or normal conditions	All	Drought coordinators	Drought managers	Drought coordinators
Lessons Learnt - Review Drought Plan and Operational Procedures following the down grading of 'Drought Status'	After confirming move from "potential drought" to "drought" or "normal" conditions.	All	Drought managers	Drought managers	Drought coordinators

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Drought					
Arrange drought team meetings at an appropriate frequency	Once one Area has reached drought stage	All	Drought managers	Drought managers	Drought managers
Step up drought monitoring (hydrological and environmental) as necessary depending on time of year (including an increase in targeted inspection and enforcement activity)	Once one Area has reached drought stage	Areas	Area drought coordinator	Area drought manager	Area drought manager Drought team
Consider need for extra resources and acquire as appropriate	Once one Area has reached drought stage	All	Drought coordinators	Drought managers	Drought managers Drought teams
Set up team of key specialists dedicated to drought management, including technical and local determination of Drought Permits / Orders	Once one Area has reached drought stage	All	Drought managers	Drought managers	Drought coordinator
Increase reporting to Head Office to weekly	Once one Area has reached drought stage	All	Drought coordinators	Head Office drought coordinator	Anglian drought coordinator
Meetings with farmer groups	Once one Area has reached drought stage	Areas	Area drought coordinator	Area drought manager	Area drought coordinator AEP team leader
Monthly meetings with water companies as required, discussing security of supply, implementation of their drought plans and possible drought permits / orders.	Once one Area has reached drought stage	All	Drought coordinators	Drought managers	Drought coordinators WREP team leader
Carry out preparatory work for potential drought permit / order applications	Once one Area has reached drought stage	All	Drought coordinators	Drought managers	Drought coordinators
Produce weekly hydrometric summary sheets	Once one Area has reached drought stage	Areas	Area hydrologist	Area drought manager	H&T team leader

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Produce briefing notes for interested staff	Once one Area has reached drought stage	All	Drought coordinators	Drought managers	Drought coordinators
Agree appropriate PR activity	Once one Area has reached drought stage	All	Drought coordinators	Drought managers Communications representative	Drought managers Communications representative
Implement environmental mitigation measures (e.g. weed clearance, low flow weir construction, aeration, fish rescue, advise to fishing clubs, river support schemes, scavenger pumps to remove saline ingress etc)	Once one Area has reached drought stage (summer surface water drought)	Areas	Area drought coordinators Drought teams	Area drought managers	Area drought managers Drought teams
Implement additional environmental monitoring	Once one Area has reached drought stage	Areas	Area drought managers	Area drought managers	Area drought managers Specific teams / specialists
Monitor supported catchments and review the need for river support in line with operational guidelines	Ongoing	Areas	H&T technical officer AEP environment planning officer	H&T technical officer AEP environment planning officer	H&T technical officer AEP environment planning officer
Consider staged Section 57 spray irrigation restrictions, as referred to in potential drought actions above	• Q90, Q95, Q98 and Q95 flows during peak SI season in key catchments Upper Witham, Barlings Eau, Bain, Lymn and Lower Welland and Glen. • Below average rain forecast	Areas	Area drought coordinators	Area drought managers	Area drought coordinators AEP team leaders

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Start TWAS Drought Management Actions: Summer SI restrictions Drought order to increase abstraction from the Trent at Torksey above the licensed daily quantity in an **exceptional** drought G:\Wat_Res\FP\Environment Management\Incident and Emergency\Drought\Drought Plans\TWA drought plan reviewed 2010.doc	Some/all of the following: • Torksey transfer is at near maximum transfer (182 Ml/d); • The abstraction demands are high and rising; • Below average rain and above average temperatures forecast; • Salinity increasing at Grand Sluice / Ferriby; • The river levels are being affected by demand	Northern	Drought coordinator	Drought manager	Drought coordinator AEP team leader
Implement staged S57 Spray Irrigation restrictions	Formal restrictions requested if in Drought status (according to flow categorisations are 'exceptionally low'). These restrictions will only be implemented after careful consideration of a number of factors.	Areas	Area hydrologist	Drought manager	Drought coordinator AEP team leader
Implement actions to improve ecological conditions in rivers.	Ecological indicators poor and flows below thresholds as set out in Appendices E, F and G.	Areas	Technical specialist (Hydrology) A&R team leader	Area drought manager	A&R team leader FRB team leader EM team leader for the relevant area.
Provide information and advice to Anglian Drought Coordinator	Drought order application	Areas	Area drought managers	Area drought managers	Area drought coordinators Drought teams

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Continue to screen routine and additional biological monitoring data.	LIFE O:E ratios of 0.915 or greater and 0.945 or greater will indicate recovery to potential drought / normal conditions. The site specific LIFE targets set for the 12 key sites will also be monitored to help define recovery.	Areas	A&R team leader Area drought coordinators	Area drought managers	A&R team leader
Instigate additional biological monitoring at monthly intervals, to measure the effectiveness of mitigation measures, such as river support schemes.	Action triggered if local rivers are defined as being in a state of drought.	Areas	A&R team leader Area drought coordinators	Area drought managers	A&R team leader
Record and provide advice about: Well Failure Low Flows/Levels	As reports received	Areas	n/a	GWCL team leader H&T team leader	GWCL team leader H&T team leader
Respond to reports of: Poor Water Quality Fish Distress	As reports received	Areas	n/a	Relevant EM team leader A&R team leader	Relevant EM team leader A&R team leader
Manage EOETS – liaise with Central Area about availability of water to transfer and use of GOGS boreholes	Conditions consistent with operating manual	Eastern	Technical specialist (Hydrology)	Drought manager	H&T team leader (EOETS)
Operate SAGS boreholes	Conditions consistent with operating manual	Eastern	Technical specialist (Hydrology)	Drought manager	H&T team leader (EOETS)
Manage WAGS in liaison with ESW	Flow at Ellingham less than 0.8 cumecs	Eastern	Technical specialist (Hydrology)	Drought manager	H&T team leader (EOETS)
Manage Deben River Support Scheme in liaison with AWS	Flow at Naunton Hall less than 0.11 cumecs and at Brandeston less than 0.05 cumecs	Eastern	Technical specialist (Hydrology)	Drought manager	H&T team leader (EOETS)

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Initiate incident management procedures due to acute drought conditions	Likely to be fish kills, significant de-oxygenation or acute low river flows.	Areas	Technical specialist (Hydrology) Relevant EM team leader A&R team leader	Area drought manager	Team leader with incident management skills likely to be from EM or AEP
Determine drought permit applications	Drought permit applications received.	All	Drought coordinators	Action must be taken	Water company lead (REP water resources) NPS PSC
Respond to Anglian drought manager regarding water company drought order applications.	Following request for info from Anglian drought manager	Areas	Area drought manager	Action must be taken	Area drought coordinator Area drought team
Apply for Environment Agency drought orders	Need for drought order identified.	All	Drought coordinators	REP water resources	REP water resources

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Consider move to normal conditions	• River flows within or above the "notably low", public water supply reservoir levels and groundwater levels rise above drought trigger levels. • LIFE O:E ratios of 0.915 or greater will indicate recovery to potential drought. The site specific LIFE targets set for the 12 key sites will also be monitored to help define recovery. See triggers is potential drought table for details and triggers to return to normal conditions	Areas	Drought coordinators Hydrologists Hydrogeologists A&R team leader	Drought managers Drought coordinators	Drought coordinators
Lessons Learnt – Review drought plan and operational procedures following the down grading of drought status	After deciding to move from 'Drought' to 'Potential Drought' or 'Normal' conditions.	All	Drought managers	Drought managers	Drought coordinators
Review and if necessary update the Anglian Drought Plan	Move from drought to potential drought or normal conditions	All	Drought coordinators	Drought managers	Drought coordinators

Action	Trigger(s) for considering if action required	Drought teams involved?	Who monitors trigger?	Who makes the decision on whether to take the action?	Who is responsible for taking the action?
Post drought					
Produce a 'lessons learnt' document, summarising what's happened, decisions made etc.	Move back to normal conditions	All	Drought coordinators	Drought managers	Drought coordinators
Continue to have regular water situation meetings to monitor situation	Move back to normal conditions	All	Drought coordinators	Drought managers	Drought coordinators
Send out post drought feedback questionnaire to water users.	Move back to normal conditions	Areas	Area drought coordinator	Area drought coordinator	Area drought coordinator
Run Anglian drought exercise	Anglian drought plan significantly updated following drought	All	Anglian drought coordinator	Anglian drought team	Anglian drought team

3.3 Drought management actions

Our drought teams take certain actions to minimise the effects of drought and to manage the need for water for abstractors and other users whilst protecting plants and animals from damage.

When water levels or river flows are low we enforce abstraction licence conditions. Some older licences do not have restrictions on them and in these cases we use Section 57 of the Water Resources Act 1991 to impose restrictions when necessary (see appendix A). Restricting spray irrigation can seriously disrupt an agricultural business so these restrictions are only implemented when the environment is threatened.

The principals of how we implement Section 57 restrictions are explained in appendix B for Northern Area, appendix C for Central Area, and appendix D for Eastern Area. Various other augmentation and transfer schemes (see section 1.2.2) operate throughout drought periods to help to mitigate the impact of drought on the environment. These are explained in more detail in the operational manuals for these schemes, saved locally by the relevant Area Drought Team.

4 Drought monitoring

We do routine drought monitoring as part of our national monitoring programme to provide data for detecting the onset and end of a drought and the impacts during a drought. This normally includes data from:

- Rainfall totals;
- Indicator flow gauging station network;
- Groundwater level monitoring network;
- National ecological drought surveillance network;
- Surface or ground water quality monitoring networks;
- Reservoir storage data.

In addition, we may collect additional hydrometric, ecological or other data during a drought where it is appropriate for us to do so.

This section sets out what data we collect and how it is used.

4.1 Hydrometric

4.1.1 Normal conditions

We routinely monitor weather forecasts, rainfall, river flows, groundwater levels, reservoir levels and soil moisture deficits to help us decide when to move through the stages of drought and to take action. To identify when a drought is approaching, our environmental monitoring teams carry out routine monitoring, analysis and reporting of the water situation in each of our areas and region. As a drought develops, our teams increase the level of hydrometric monitoring to track the development of the drought and its impacts.

Data is collected and presented in Area monthly water situation reports which are produced each month throughout the year. It primarily includes the following information:

- Summary information – month / year;
- Rainfall;
- Soil Moisture Deficit / Recharge;
- River flows;
- Groundwater levels;
- Reservoir storage / water resources zone stocks;
- Environmental impact.

Details of what is involved and the monitoring sites are outlined in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area.

Routine monitoring also takes place in connection with river transfer schemes, river support schemes and water resources operational management. Details of these and their monitoring arrangements are provided in the above appendices.

A region wide monthly report is also produced and an example is on our website http://www.environment-agency.gov.uk/research/library/publications/104036.aspx

4.1.2 Potential drought

During a potential drought the additional monitoring required will depend on the time of year. In the autumn and winter period groundwater levels and reservoir refill will be the main concern. During a potential summer surface water drought additional monitoring is necessary to detect the onset of drought conditions and to assess the impact of river support schemes currently operating. (Area specific details provided in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area).

4.1.3 Drought

During a drought additional current meter surveys / visual assessments may be required to assess the impact of drought management actions in the following river systems:

- Catchments subject to Section 57 restrictions;
- Catchments suffering from environmental stress;
- Catchments receiving river support;
- Areas subject to possible drought permits, drought orders and Water Resources Management Arrangements.

4.1.4 Post-drought

Once surface water drought conditions have receded groundwater levels and reservoir refill will be the main concern. Therefore the recovery of these will be monitored closely until near average conditions are reached.

4.2 Ecological

We carry out ecological monitoring to understand the impact of drought on the health of the environment. The national ecological monitoring network ensures that monitoring starts long before the onset of a drought and will continue after the drought ends to assess any long-term changes. We may carry out additional monitoring during a drought to understand the full range of shorter-term impacts. The frequency and duration of our monitoring will be dependent on the nature of the site and the type of drought.

4.2.1 Normal Monitoring

Biological

During normal conditions routine monitoring of national mandatory sites and local issue sites will be conducted and Lotic-invertebrate Index for Flow Evaluation (LIFE) scores screened. The LIFE method is based on changes in aquatic invertebrate communities, which can be linked to variation in antecedent flow regimes. High LIFE scores reflect faster preceding flows and low LIFE scores characterise rivers with slower preceding flows. As drought conditions develop, LIFE scores fall and critical thresholds can consequently be set. This can be done either by using raw LIFE (S) scores, or by comparing observed scores with scores expected (using RIVPACS) when flow conditions are healthy. More details are provided in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area.

All routine programme sites will be screened except for those ruled out due to:

- Chronic or persistent water quality problems;
- Heavily regulated flows (e.g. downstream from reservoirs);
- Water level management;
- Poor habitat quality (that affects LIFE scores);
- Winterbourne status;
- Salinity impacts;
- Alien species (where resident invertebrates are severely impacted).

In addition to the routine programme sites, certain pre-defined key drought sites will be monitored bi-annually and these will represent all river types susceptible to drought (this may include National mandatory or local issue sites). For these sites observed to expected ratios will be screened, but also raw LIFE scores will be used to set additional target thresholds. The raw score targets are based on LIFE scores recorded in low flow years and thresholds will be used to indicate potential or actual drought. (The use of a dual target should eliminate possible problems associated with poor RIVPACS[6] predictions.) Failure to achieve either the site-specific LIFE target at key sites, or the critical 0.945 / 0.915 thresholds, will indicate potential or actual drought.

Routine monitoring takes place in spring and autumn and therefore some level of sampling may be required during the summer depending upon the climatic conditions. This sampling would either take the form of one summer sample collected from each of the key drought sites if appropriate, or sampling every other month at a sub-set of drought sites. (This may include a sub-set of sites where drought mediated rising salinity can be monitored.)

Details of the routine programmes and key drought monitoring sites are given in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area.

[6] River Invertebrate Prediction and Classification System

Fisheries
Routine monitoring is carried out at the sites detailed in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area. A short summary of each month's survey will be sent to the Area drought team. The summary will include a brief appraisal of flow rates, fish seen, weed growth and comparison to the last months flows.

4.2.2 Potential drought

Biological
Screening of routine programme sites and key drought sites will continue. Additional sites may be added to the programme and are shown in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area.

Where potential drought thresholds have been reached prior to June, actual drought thresholds must be based on LIFE scores in previous drought summers. Spring actual drought thresholds no longer apply.

Fisheries
Monitoring of vulnerable waters by either Fisheries staff or Environment Management officers will start. In a potential drought situation the rivers used as fisheries drought indicators in normal flow conditions will be the first to display signs of drought. The following are some of the potential drought conditions which will cause disruption to fish populations:

- Pool and riffle stretches becoming ponded;
- Certain rivers becoming dry;
- Disease;
- Extensive weed growth creating poor conditions for fish life.

The Area Drought Coordinator with liaise with the Analysis and Reporting Team on a regular basis to ensure that any watercourses outside the fisheries drought monitoring network are not over looked. During this period plans will be made for ensuring that other core activities, for example, National Fish Monitoring Programme (NFMP) surveys, will continue if emergency fisheries drought work is necessary.

Some pre-emptive work to forestall the effects of drought may be possible at this time, for example, installing low flow weirs and moving particularly vulnerable groups of fish. At this time fishery management leaflets will be sent to riverine angling clubs, landowners and riverine fishery managers advising on the likelihood of a drought and giving practical information on ways to improve conditions for fish during a drought period.

4.2.3 Drought

Biological
Screening of routine programme sites and key drought sites will continue. It may also be necessary to conduct additional biological monitoring when needed on river

reaches which have support schemes. This would allow some measure of the effectiveness of such mitigation measures. This survey work would be conducted when local rivers were defined as being in drought status.

Fisheries
Increased observational monitoring, rather than mechanical monitoring, will be carried out in badly affected streams. This is because mechanical monitoring such as electro-fishing may affect already stressed fish populations, and may result in fish deaths. It is anticipated that clay catchment streams will become affected first in a drought situation (details in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area). Fish rescues may need to be carried out with fish being relocated further downstream. These are likely to be a last resort due to the risks associated, such as the low success rate and disturbing silt especially in still waters. Landowners and riverine fishing clubs will be contacted and past experience has demonstrated that there will be concern that fish are being moved away with no guarantee of return. The Area Drought Coordinator will liaise with the Analysis and Reporting Team (Biology) and monitoring of other affected rivers will continue.

A priority list of affected rivers will be produced and reviewed on a weekly basis. Liaison by the Area Drought Coordinators with other areas will be important at this time, for example, it may be that Central Area has a more stable river flow situation and can lend help to Northern Area. In a prolonged drought situation the drought management teams may ask for action to be taken to alleviate conditions in the larger rivers and still waters. It is proposed that this work will be carried out in preference to NFMP (National Fish Monitoring Programme) work where it is deemed more important and urgent.

4.2.4 Post Drought

Biological
Potential drought / drought monitoring will normally continue until the ecology has recovered to normal conditions. This may run into winter conditions, however this is considered unlikely. Alongside this, site specific LIFE targets at key sites will also be considered. Ecological integrity in the following year may be compromised by lack of reproduction and recruitment in drought conditions, so data will be assessed to determine long-term effects.

Fisheries
Recovering water levels will allow some fish to migrate upstream and re-colonise former territories and habitats. On some watercourses remedial restocking will be necessary as obstructions such as sluices and weirs prevent upstream migration. Winter electro-fishing surveys will take place on affected streams to ascertain the level of re-colonisation. However, it should be noted that winter monitoring may completely miss a shoaling population of fish and would lead to a false result with regard to re-colonisation. Investigative monitoring at existing NFMP sites (if possible)

in the summer months would be ideal to compare pre and post populations after the drought event. It may take some years for certain rivers to recover.

4.3 Water company monitoring

We routinely receive information from water companies as part of our water situation reporting. During a drought, we receive additional information from water companies to help us track the development of a drought and to monitor their actions.

Water companies are responsible for ensuring that arrangements are in place to monitor the impacts of their drought management actions on the environment. In certain cases it is more practical for us to carry out the monitoring work instead of or in addition to the water company. Where we carry out additional monitoring on behalf of a water company in relation to a drought permit or order application then we will recover the costs we incur.

Water companies must also keep the Anglian and Area Drought Coordinators informed of the actions they are going to take as a drought progresses. These will include measures to reduce demand, such as publicity campaigns and temporary water use restrictions and measures to increase supply, such as reintroducing abandoned sources and upgrading water treatment works**.**

In normal conditions, levels in the public water supply surface water reservoirs are monitored routinely. As the severity of the drought increases it may be necessary to obtain additional information from water companies. This will be dependent on the nature and timing of the drought and the circumstances of the water company. Such information might include:

- Weekly demand data (water into supply) and / or daily abstractions data for strategic sources;
- Up-to-date estimates of leakage for supply / resource zones;
- Details of unplanned outage events and the effect of any planned outages once in a potential drought or drought;
- Drought or supply / demand scenario forecasts.

A decision on whether to ask for such information and when will be made in consultation with the Regional Environmental Planning team (Water Resources).

Appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area sets out what data we receive routinely from the water company personnel in each Area.

There may be circumstances where we need to collect our own data to appraise the actions of water companies, which may include drought permit or order sites. We will only undertake this at sites of high ecological value or high sensitivity to reduced flows / levels, or sites associated with particularly complex or contentious water resources issues. This data will ensure that we have adequate understanding of the

situations most likely to involve appeals over decision making with both the water companies and conservation agencies.

4.4 Additional monitoring

Local monitoring of navigation levels, spray irrigation demand and water quality is carried out in normal conditions in connection with the river transfer schemes, river support schemes and water resources operational management. Additional monitoring is required as a drought develops. Area detail is provided in appendix G for Northern Area, appendix H for Central Area, and appendix I for Eastern Area.

5 Drought permits and drought orders

Drought permits or drought orders are granted either by us or Government Ministers to maintain public water supplies or protect the environment where there has been an exceptional shortage of rain. If granted, drought permits or orders allow:

- Water companies to abstract more water;
- Water companies to reduce other abstractions;
- Water companies to restrict certain types of water use;
- Us to modify, restrict or stop abstractions to protect the environment.

This section sets out how our drought teams and National Permitting Service (NPS) deal with water company drought permit applications and respond to Ministers on drought order applications in our region. It also sets out where and how we apply for drought orders to protect the environment.

When dealing with all drought permits and orders applications we follow the guidance available in the joint Defra / National Assembly for Wales / Environment Agency guideline and in our internal guidance 32_10 How to deal with water company drought permits and 31_10 How to respond to drought order application.

We expect to recover all significant costs incurred in the exercise of our functions that are attributable to applications for any drought order or permit from the relevant water company. We will also recover the costs of the order or permit itself, including costs incurred in connection with any associated local inquiry or hearing. As such any staff involved with drought permits or orders should, at the earliest opportunity, record time spent on these activities.

Appendix J lists potential sites for drought permit and orders in Anglian, based on water companies' drought plans.

5.1 Water company drought permits

In an escalating drought situation, water companies apply to us for a drought permit. Drought permits authorise water companies to abstract from specified sources, or can modify / suspend restrictions relating to the existing abstraction of water. Our key actions in granting or refusing a drought permit are set out in figure 5.1.

Water company drought plans include the potential sites where drought permits may be needed. During consultation on water companies' draft drought plans, we will agree what environmental information is needed to support an application. Where a drought permit application affects a designated site, we must ensure that the impacts are in accordance with the relevant regulations (e.g. Habitats Directive). We will need to confirm with Area teams that the environmental report provided by the water company is sufficient, and consult Natural England to identify any issues prior to formal application. This will allow the application to be determined as soon as

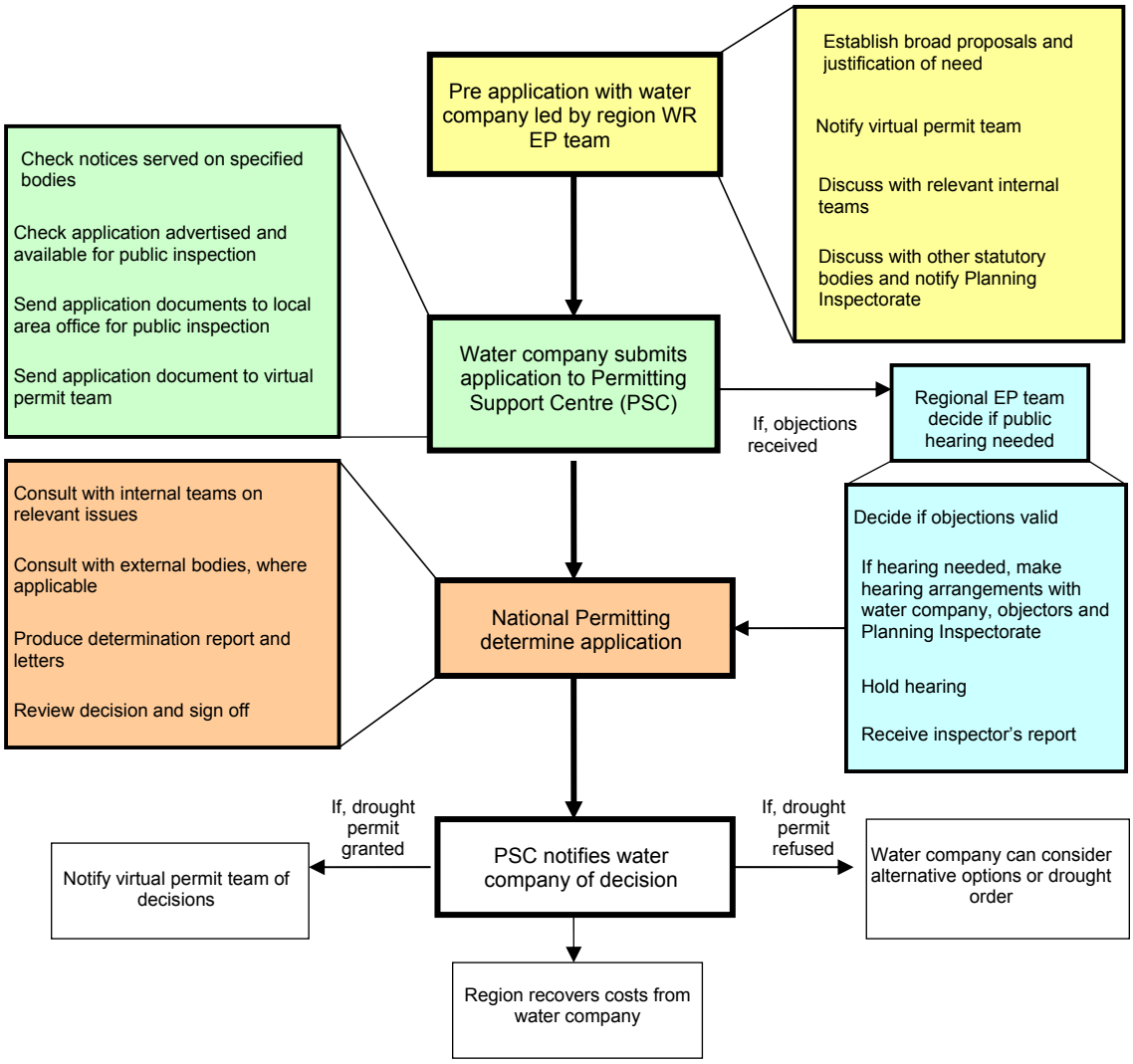
possible. We expect water companies to have implemented sufficient demand restrictions prior to applying for a drought permit.

The National Permitting Centre will coordinate responses to determine the application. The water company lead from the Anglian Environment Planning Team (Water Resources) will coordinate internal consultation on the application, with AEP providing local information to help determine the response. The Anglian and Area Drought Coordinators will act as the point of contact for the Anglian and relevant Area drought team.

A virtual permit team will be set up for each application, and will involve the following staff:

- Anglian and Area drought coordinators;
- Anglian Environment Planning (Water Resources) water company lead;
- National Permitting Centre lead;
- Permitting Support Centre lead;
- Head Office drought coordinator.

Figure 5.1 – Key actions for drought permit applications

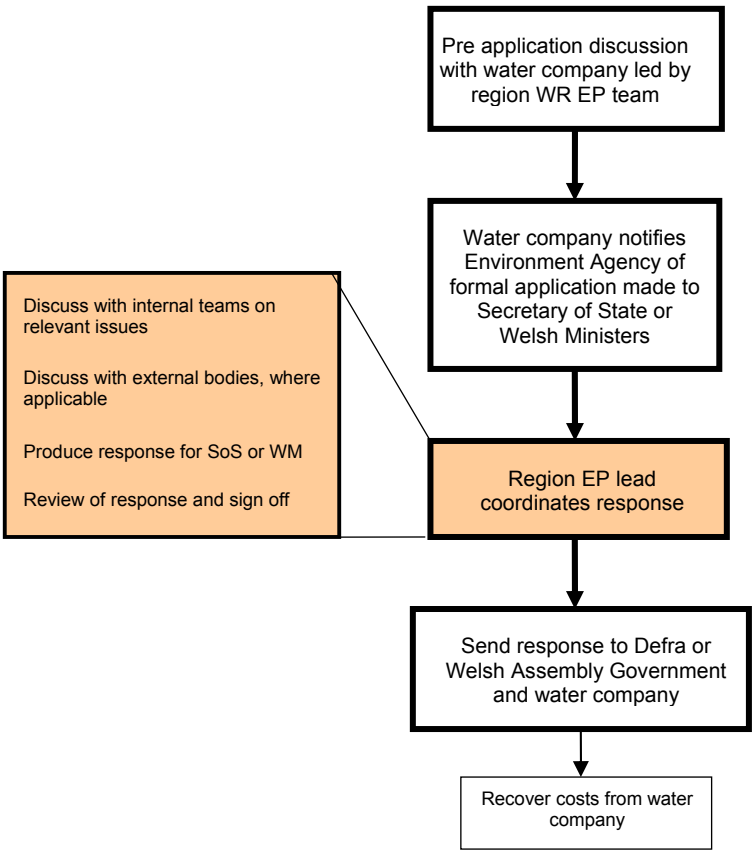


5.2 Water company drought orders

Where drought permits do not meet the needs of a water company, drought orders go further and allow water companies to prohibit or limit particular uses of water, and can also affect abstractions and discharges by other users. Emergency drought orders may be applied for where the social and economic well-being may be at risk as a result of limited water supplies, and can authorise the use of standpipes and water tanks.

Water companies apply to the Secretary of State for ordinary drought orders and emergency drought orders. Our role in this process is to provide information to the Secretary of State (SoS) for applications in England. The key actions are set out in figure 5.2.

Figure 5.2 – Key actions for water company drought order applications



We will not usually support applications for drought orders unless the water companies have implemented sufficient demand restrictions prior to applying for a drought order.

The relevant water company contact in the Anglian environment planning team will lead on water company drought order applications. However, if there are several drought orders for once water company then staff will be called upon either in the Anglian Environment Planning Team, other regional Environment Planning Teams, or the Head Office Water Resources Planning Team. The lead will be responsible for contacting and gaining views on the application from the relevant staff in:

- AEP;
- FRB;
- GWCL;
- Hydrology;
- Environmental Monitoring;
- Legal;
- NPC.

Water companies should identify possible drought order sites in their drought plans. During consultation on the water companies' draft plans we will agree what environmental information is needed to support an application. Where a drought order application affects a designated site, we must ensure that the impacts are in accordance with the relevant regulations (e.g. Habitats Directive). We will need to confirm with Area teams that the environmental report provided by the water company is sufficient, and consult Natural England to identify any issues prior to formal application.

5.3 Environment Agency drought order applications

We set abstraction licence conditions to protect the environment during a drought. We can apply for a drought order if the environment is suffering serious damage as the result of abstraction during a drought. When applying for an Environment Agency drought order, we would need to be able to satisfy to the Secretary of State that there is:

- Such a deficiency in the flow or level of water in any inland waterway to pose a serious threat to any flora or fauna which are dependent on those waters, exists or is threatened;
  and that
- The reason for the deficiency is an exceptional shortage of water.

The process for applying for an Environment Agency drought order is the same as that for a water company ordinary drought order. We may apply for drought orders in the following examples to:

- Vary one of our own licences if it's for a river augmentation scheme where the river environment is at risk;
- Prevent excessive compensation releases where a reservoir is at risk of drying up and the water company has not applied for a drought order or permit;
- Prevent releases where a reservoir is so low that compensation water is likely to affect water quality.

We do not expect this to happen so we cannot predict the location of all environmental drought orders in advance. However, we do know from past experience that some sites (appendix J) are vulnerable to environmental impacts during a drought. Our drought teams have planned and prepared for applying for an environmental drought order at these sites if it proves necessary. We would work closely with other stakeholders such as Natural England to identify where and when an environmental drought order would be necessary.

5.4 Strategic Environmental Assessment

Strategic Environment Assessments are not carried out on our drought plans as our plans are voluntary and are not required under statutory legislation, nor under regulatory or administrative provision. A drought is likely to have significant effects

on the environment and our drought plans set out how we monitor the impacts and manage the impacts where possible. In general, we would expect our drought plans to have positive effects on the environment. Our responsibilities as set out in this plan include (but are not limited to):

- Making sure that abstractors do not take too much water from our rivers, whilst ensuring the environment is protected;
- Checking water companies are following their drought plans and taking action to protect water supplies without placing unacceptable adverse impacts on the environment;
- Promoting the need to preserve water, to reduce our impact on the environment and safeguard supplies for the future.

Where actions in our drought plan could have an impact on European designated sites, we will undertake a Habitats Regulations Assessment to determine if our actions are likely to affect the site. If we consider likely effects to be significant or if they cannot be determined we will complete an appropriate assessment.

6 Drought reporting and communications

A large part of each drought team's work is reporting and coordinating drought communications across Anglian and with our partners. This includes communicating with our drought teams, with neighbouring drought teams and our national drought team. Externally, the Anglian drought team leads on communications with the media and on working with organisations spanning more than one area. Area drought teams lead on work with local communities and stakeholders. This section sets out how our drought teams communicate with others and what we want to say.

6.1 Reporting

As the water situation worsens, both the Anglian drought team and Area drought teams will be required to report on the latest situation and the impacts the drought is having on the environment and businesses. We use drought reporting to collate and summarise key drought information at regular or specific times. We report from and to Areas, regions and Head Office. The content of our reports differs depending on what information we are collating and who our audience is.

Templates for all drought reports are saved on the internal national O drive.

6.1.1 Anglian reports

The following reports will be produced by the Anglian drought team to notify interested parties of exceptional events and progress during a drought. They often involve collating Area information to provide a regional overview on the current situation, information from water companies, media activity and future prospects. Please refer to the operational instruction 105_10 How to plan for and manage our response to drought for more information on each report.

Table 6.1 – Reports produced by Anglian Drought Team

Report	Purpose	When to start	Frequency	Responsible officer	Who will receive the reports
Prospects for spray irrigation report	Outline of prospects for spray irrigation for the coming summer	February each year	Annually, unless prospects change	Anglian drought coordinator	NFU, CLA, local abstractor groups

HELP (Head office Emergency Liaison Procedure)	Notify National Incident Room of any major incident	Potential drought	As incidents or notifiable events occur	Anglian drought coordinator	Executive managers
Monthly water situation report	Comparison of water situation to normal conditions	Ongoing	Monthly, increasing to fortnightly or weekly during drought	Anglian hydrology technical specialist and area hydrologists	Published on external website
ALT drought impact	Inform ALT of latest situation and to escalate risks and issues where necessary	Potential drought	Monthly, weekly in drought	Anglian drought manager	ALT
Anglian drought report (to head office)	Provide Head Office with latest situation to inform national briefs	Potential drought	Weekly	Anglian drought manager	Head Office

6.1.2 Area reports

Area reports tend to provide more operational information, such as impacts on the environment, information on abstraction licences and navigation.

Table 6.2 – Reports produced by Area Drought Teams

Report	Purpose	When to start	Frequency	Responsible officer	Who will receive the reports
Monthly water situation report	Comparison of water situation to normal conditions	Ongoing	Monthly, fortnightly or weekly during drought	Area hydrologist	Published on external website or sent to internal interested parties
AMT	Inform AMT of latest situation and to escalate risks and issues where necessary	Potential drought	Monthly, weekly in drought	Area drought manager	AMT

Hard copies of these logs must be retained for at least three years as they may be used in legal proceedings, investigations and enquiries. The frequency of our regular reports will change depending on the scale and seriousness of the drought.

6.2 Communications action plan

The Anglian communications action plan includes separate sets of actions appropriate for communicating with our internal teams and external partners. The actions take into account:

- Our responsibilities;
- Requirements of individual teams and sectors;
- Severity of the drought;
- Current public perception of the drought situation;
- Need to conserve water;
- Water company actions;
- Other ongoing communications activities, such as flood awareness.

You can find the Anglian drought communications plan in appendix K. At the onset of drought, the communications action plan is tailored to the specific needs of the individual drought. The Anglian Drought Coordinator updates the plan when in potential drought and maintains the plan throughout the drought.

6.3 External communications

We are responsible for safeguarding water resources in England and Wales and protecting the environment. As the water regulator, we have overall responsibility for drought management and overseeing the actions water companies take to secure public water supplies. Water companies are ultimately responsible for managing water supplies to meet the needs of customers. Where appropriate, we will work in partnership with some organisations to promote water efficiency. Commitment and effort from both parties will be needed to make any partnership successful but joint working arrangements should not compromise either organisation's independence.

We are a regulator of the water industry and must maintain our regulatory position. Due to the differing roles we promote water efficiency where appropriate, but it is the responsibility of companies to educate their customers about using water wisely, particularly during drought. We lead on promoting water efficiency to non-water company abstractors.

The drought communications action plan identifies a number of external communications actions. We have set these out in appendix K, and in particular, address communications with:

- Water companies;
- Government;
- Parliamentary representatives;
- Local Government;
- Agriculture;
- Other industries;
- Wildlife and conservation organisations;

- Media;
- General public.

6.3.1 Resilience Forums

Local resilience forums coordinate planning activities during a civil emergency. Droughts are not emergencies unless there is a serious threat of restrictions to public water supply such as standpipes or rota cuts. In these circumstances, our drought teams work with Local Resilience Forums (LRFs) to make sure that water companies assess the risk of drought properly and take all the right steps to avoid standpipes or rota cuts wherever possible.

6.4 Internal communications

We have identified in the drought communications plan a number of internal actions. These are set out in appendix K. Internal communications are also included in procedures for water transfer schemes, river support schemes and routine operational water resources management (see the Area supporting information documents).

6.4.1 Communications toolkit

When our national drought team moves into potential drought stage they set up a national communications toolkit. The toolkit is stored on our shared drive at O: Drought Comms Toolkit. The folder contains drought messages, questions and answers, drought briefings, standard templates and examples of best practice communications. Our drought teams use information from the toolkit, and adapt it where necessary, for local communication needs.

7 Post drought

It is important we review the actions we have taken during a drought and identify any improvements we can make to managing future droughts. We also monitor how the environment is recovering as a drought recedes.

7.1 Monitoring

The monitoring we undertake to assess the recovery of the environment after drought is set out in section 4. Each drought is different, and as such we may need additional information. The Hydrometry and Telemetry, Environment Monitoring (Analysis and Reporting), and Fisheries, Recreation and Biodiversity teams will propose specific studies dependent on the severity and impacts of the drought. The Anglian and Area Drought Coordinators will consider and decide on any additional monitoring requirements.

7.2 Review

Once our drought teams have returned to a non-drought status, we conduct a drought review. Our drought teams will meet to review how we managed the drought and its impacts, what went well and where we can improve. Each of our drought teams will produce a lessons learnt log and write a post drought report, which will feed into the Head Office drought report. We produce this report no later than six months after the drought.

7.3 Working with water companies

The Regional Environmental Planning (Water Resources) Team will liaise with water companies to discuss any problems experienced during the drought. We will work with the companies to rectify any issues and to review monitoring arrangements, and update our plans where appropriate in our annual review. We may also suggest improvements to water companies' drought plans.

8 Related documents

Operational Instruction: Head Office Emergency Liaison procedure

Operational Instruction How to plan for and manage our response to drought

Operational Instruction Roles and responsibilities of drought teams

Operational Instruction How to deal with a water company drought permit application

Operational Instruction How to respond to drought order applications

Operational Instruction Management of major incidents

Defra/WAG/EA Drought permits/orders

Non-Financial Scheme of Delegation (NFSoD)

List of abbreviations

A&R	Analysis and Reporting
AEP	Area Environment Planning
ALT	Anglian Leadership Team
AWS	Anglian Water Services
CAMS	Catchment Abstraction Management Strategies
CDF	Contract Data Form
CLA	Country, Land and Business Association
CWC	Cambridge Water Company
DO	Dissolved Oxygen
EM	Environment Management
EOETS	Ely-Ouse to Essex Transfer Scheme
ESW	Essex and Suffolk Water
FoI	Freedom of Information
GOGS	Great Ouse Groundwater Scheme
GW	Groundwater
H&T	Hydrometry and Telemetry
HELP	Head Office Emergency Liaison Procedure
LIFE	Lotic-invertebrate Index for Flow Evaluation
LRFs	Local Resilience Forums
LTA	Long Term Average
Ml/d	Megalitres per day
MoU	Memorandum of Understanding
NFMP	National Fish Monitoring Programme
NFU	National Farmers Union
NPS	National Permitting Service
O:E	Observed : expected
PSC	Permitting Support Centre
RBMP	River Basin Management Plan
REP	Regional Environment Planning
RIVPACS	River Invertebrate Prediction and Classification System
S57	Section 57
SEP	Strategic Environmental Planning
SMD	Soil moisture deficit
SMT	Strategic Management Team
SoS	Secretary of State
SPoC	Single Point of Contact
SSSI	Site of Special Scientific Interest
SW	Surface water
TWA	Trent-Witham-Ancholme (transfer scheme)
VWC	Veolia Water Central
VWE	Veolia Water East
WRMP	Water resources management plan

Appendices

Appendix A: Explanation of Section 57 Water Resources Act 1991 restrictions on spray irrigation and their implementation

Introduction

Abstraction of water for spray irrigation occurs mostly during summer months when it is least available. As a consequence abstraction for irrigation can have a significant impact on the environment and water resources.

As a matter of course we will liaise with the agricultural community via the National Farmers Union (NFU), Country Land and Business Association (CLA) and abstractor groups and in February each year we will make a statement regarding “Prospects for Spray Irrigation” for the summer. If appropriate, licence holders will be contacted individually to explain and advise of “Prospects for Spray Irrigation”.

The quality of water in rivers is likely to decline as the dilution of sewage effluent and surface water runoff decreases. Algal and weed growth is likely to increase. We cannot guarantee the quality of water and users should be more vigilant.

Abstractions can be restricted by conditions already included in licence documents to safeguard the environment and protected rights during periods of low flow. When these licence conditions do not provide sufficient protection we will consider asking the farming community to voluntarily reduce the quantities of water abstracted. Requests for voluntary reductions will be designed to conserve water now in order to extend the total period when water is available for abstraction. It is important to continue to promote and encourage the efficient use of water through irrigation best practice and the use of night time irrigation where appropriate.

As a last resort, under Section 57 of the Water Resources Act 1991, we can take formal actions to further restrict abstraction of water for spray irrigation. In extreme circumstances, this might result in a total ban on abstraction for irrigation purposes.

Prospects for spray irrigation

Early each year Area staff will compare effective rainfall, groundwater levels and river flows with historic events to assess the prospects for spray irrigation. The Anglian Drought Team will then consider each Area’s assessment and issue a regional statement to the NFU, CLA and abstractor groups.

If appropriate licence holders will be contacted individually by the AEP Teams to explain the current situation and be advised on the prospects for spray irrigation. Teams should begin preparations for restriction procedures, including updating the licence database and address records.

During the operation of any restriction programme there should be full cooperation and consultation between our departments (Environmental Planning, Analysis and Reporting, Fisheries, Recreation and Biodiversity, and Environment Management) to aid the smooth running of the restrictions.

Voluntary reductions

In a potential drought where licence cessation conditions are not sufficient to safeguard the environment we will consider approaching spray irrigators and requesting voluntary reductions. The precise nature of the reductions requested will vary depending on the specific situation, but any request for reductions will be made in an equitable manner.

Abstraction restrictions are put in place via a stepped process, first with voluntary measures and then formal restrictions. The actions progressed by Eastern Area are driven by the drought status, defined by the flow categorisations (these are presented in Eastern Area's monthly water situation report). Our flow categorisations have been in place for 5 years and are due to be updated this year.

Section 57 restrictions

We have powers to restrict or ban spray irrigation surface licences "by reason of exceptional shortage of rain". The same applies to groundwater licences if the abstraction affects river flows. All the licences from the same source of supply must be treated the same.

Formal restrictions cannot be applied unless the region is in drought status. To move into drought status the majority of the catchments must have exceptionally low flows. The exception to these restrictions is where licences are supported and these may need to be restricted irrespective of drought status.

The Water Resources Act 1991 Section 57 defines the available powers and their use, in particular:

- Restrictions may be imposed "by reason of exceptional shortage of rain or other emergency";
- Abstraction from groundwater may only be restricted if "abstraction is likely to affect the flow, level or volume of any inland waters";
- Where there is more than one abstractor from the source, all should be treated equally.

The Water Resources Act 1991 Section 33 defines the "inland waters'" which can be protected (it does so by defining exemptions), and the Spray Irrigation (Definition) Order 1992 defines those activities to be classed as spray irrigation for the purpose of restrictions (again by defining exemptions).

If the imposition of restrictions under Section 57 becomes necessary, it will be important to ensure that they are fully justified and equitably applied. The stages to implement restrictions for our Area teams are proposed in the following appendices.

Appendix B: Northern Area Section 57 restrictions and implementation

In the key catchments of the Upper Witham, Barlings Eau, Bain, Lymn and Lower Welland and Glen the need to restrict abstraction is to avoid the cumulative effect of many abstractors all acting together, which leads to a sudden drop in river flows. To reduce the impact of abstraction and to ensure that we achieve a reasonable balance between the needs of the environment and the needs of abstractors a two abstraction group restriction mechanism has been adopted.

The abstractors are split into two groups in a catchment, so that the groups are closely balanced according to the total daily licensed quantities, the number of irrigators, spatial distribution of abstractions and licences with and without flow conditions. Each group of abstractors is allowed to abstract during alternate periods, for example, group A on odd days of the month and group B on even days of the month. The effect of allowing groups of abstractors within a catchment to abstract during alternate periods aims to:

- Limit the total amount of water being abstracted on any one day and thereby allow more water to be left in the river downstream;
- Still allow irrigators to abstract their daily quantities, but less often.

If time permits then enforcement teams should be asked to find out which irrigators will and will not be irrigating that year. The groups should then be adjusted.

Each year the list and groups of licences for each catchment will have to be adjusted to accommodate all the new and variations of existing licences since the last revision. This should be carried out each spring. The list is filed electronically in G:\Wat_Res\FP\Environment Management\Incident and emergency\Drought.

The restrictions are initially voluntary, but should this be insufficient to limit the decline in river flows (through sheer demand or “voluntary non-compliance”) then the need to move to formal restrictions will be necessary. There are three levels of formal restriction, each successively more restrictive than the former. These are summarised in table B1 along with the triggers for implementation of restrictions.

By phasing in levels of successively tighter restriction we are attempting to understand and balance the needs of the licence holders with those of the environment. This is a flexible restriction mechanism, and is not primarily aimed at complete cessation.

Table B1 – Northern Area spray irrigation restrictions and triggers

Restriction	Comments	Trigger
Voluntary		
50 percent reduction	Two groups abstract during alternate periods, the period being dependent upon the view of abstractors at time of consultation. (i.e. 2 days on, 2 days off: Odd days versus Even days of month). Night time irrigation encouraged. We would expect those irrigators with summer licences and a winter storage reservoir to stop summer abstractions and begin to use the stored winter water.	90-percentile river flows Little or no rainfall forecast
Formal		
Level 1 – 50 percent reduction	Two groups abstract during alternate periods, the period being dependent upon the view of abstractors at the time of consultation. (i.e. two days on, two days off: Odd days versus even days of month). Irrigators get half their licence entitlement. Formalises the voluntary restriction and is legally enforceable. Night time irrigation encouraged.	95 percentile river flows Little or no rainfall forecast At least two weeks after the introduction of voluntary restrictions - although if severe decline in river environment or flows formal restrictions can come sooner.

Restriction	Comments	Trigger
Level 2 - 70 percent reduction	Each group of abstractors allowed 2 days abstraction each week. No abstraction permitted on the other 3 days. Each group of abstractors allocated certain specified days of the week (i.e. Group A: Monday and Tuesday. Group B: Thursday and Friday). Irrigators would get 2/7ths of the licence amount (28percent). Night time irrigation encouraged.	98-percentile river flows - sustained for at least 2 days. No rainfall forecast
Level 3 – 100 percent Ban	No abstraction permitted.	99-percentile river flows - sustained for at least 2 days. No rainfall forecast

At the end of any restriction period it is useful to assess the success or failure of any actions and consult the various parties involved – licence holders, NFU representatives, and our departments. Any suggestions from this process should be fed back into improving and refining the procedures for future years.

Note: This procedure has been developed currently for the Bain, Barlings Eau, Lymn and Upper Witham and successfully applied to the Bain and Lymn during the drought summer of 1997.

Communications

Once the agreed triggers have been met and the need to reduce demand on the river environment has been established, the above procedure is communicated through a series of prepared letters.

Throughout any restriction program there is a need to keep the licence holders informed. Previous experience (Bain, Barlings Eau and Lymn – 1997) has used the local NFU to keep their members informed through fax updates from us.

Appendix C: Central Area Section 57 restrictions and implementation

The following stages, in chronological order, are proposed for implementing Section 57 restrictions in Central Area:

1. Routinely monitor water resource situation, stepping up where appropriate.
2. Liaise with NFU, CLA and key abstractors informing of worsening situation.
3. Prescribed flow conditions reached on licences tied to minimum residual flows. Initial restriction.
4. Determine which resource areas will be affected.
5. Appeal to spray irrigators for voluntary reductions.
6. Notify NFU, CLA and abstractors groups of intentions.
7. Write to licence holders informing them of being affected. Letter is formal 'notice' referred to in Section 57 (2). Letter includes:
    - Brief résumé of water resources situation and our statutory obligations;
    - Formal notice;
    - Statement on type of restriction. This may involve quantity reductions, limitations on when water can be abstracted and during extreme events could include the suspension of abstraction;
    - A returnable slip for completion of residual licence quantity available and revised authorised quantity for rest of season. This must be completed by the licence holder and returned immediately. Details to include meter readings.
8. Chasing up by Environment Officers of slips not returned. Generally the process is self-policing as the onus is on the licence holder to return information if he / she wishes to continue to abstract.
9. Continued monitoring and enforcement of situation.
10. Notification to licence holders of lifting of restrictions when appropriate, including a thank you for their cooperation.

In Central Area the following indicators will be considered whilst considering whether or not to implement Section 57 restrictions:

- Loss of level at Bodsey Bridge (Middle Level), Ely / Denver (South Level);
- River flows (CAMS Q95s and environmental flow requirements);
- Availability of water for transfer;
- Prevailing weather conditions and forecasts;
- Likely demand for water;
- Season.

Appendix D: Eastern Area Section 57 restrictions and implementation

Formal restrictions will initially be applied on the basis of a 50 per cent reduction in the daily quantity. In common with other areas this is achieved by placing each abstractor into one of two groups which are permitted to abstract either on odd or even dates.

If prevailing conditions (informed by the enhanced monitoring initiated during "Potential Drought") require further reductions in abstraction quantity to be put in place, we will look to restrict abstraction to 25 per cent of the daily authorised.

The mechanism to achieve reductions beyond 50 per cent will be informed / established through liaison with abstractor groups as it is recognised that abstractors would prefer to retain their authorised daily quantity but restrict the number of days of abstraction on a weekly basis.

The following considerations have been found useful in Eastern Area when deciding whether to implement Section 57 restrictions:

- What is the time of year?
- Have we set Good Irrigation Practice into motion?
- If this is a groundwater drought we have long lead in times and should concentrate on good local liaison before the irrigation season. It will save time and effort later;
- What is the crop pattern in the catchment and usual irrigation practice (beware – they change from year to year)?
- What happened during previous droughts? What were the critical triggers for action? What lessons were learned? Has anything changed through time?
- What are the antecedent conditions? What are the current conditions (temperature, rainfall, evaporation etc.)?
- What are predicted future conditions (temperature, rainfall, evaporation etc.) from any long term forecasts? Irrespective of forecasts, are meteorological conditions stable?
- How low are levels in relevant aquifers?
- What are current river flows (levels in some cases)? How do they relate to flow categorisation?
- What is our best estimate of current daily abstraction? If we restricted or banned abstraction, what difference would it make to river flows?
- What is the maximum daily abstraction from the catchment (i.e. potential demand)? What is the likelihood of it materialising?
- Is irrigation increasing or decreasing day by day (relates to time of year and crop pattern)? Can we buy time with interim voluntary measures?
- What other information is available; water quality, salinity etc.? Any trends which point to future problems?

- What are the physical signs of stress; fish kills; reports from the public, field officers etc?
- If there is a problem, what other causes might be contributing e.g. low level pollution, leaking gates, poor quality runoff?
- How serious is the problem? Is it temporary? Will the river recover? Should we be prepared to live with the short-term problem?
- Have all possible ameliorative measures been explored e.g. oxygen bubbling for low DO, temporary weirs to maintain pool level?
- What are the other losses from the river; can other abstractors help by reducing abstraction or changing their pattern of use?
- Are we making full use of transfers / augmentation, either formal or informal?
- Can we improve our river management; can other riparian owners help e.g. sluice & gate operation?
- Have we set voluntary self help schemes in motion; if we have, are they working; can they be improved; are they achieving the desired saving; can we limit abstraction further by voluntary measures?
- Is there a direct link between aquifers and river flows; is borehole abstraction contributing to the problem?
- Do proposed formal restrictions comply fully with Section 57 and the Spray Irrigation Definition Order?

Appendix E: Explanation of Trigger Selection and Setting in Central Area

The key hydrometric information for monitoring and reporting on the current status of water resources in Central Area and the likelihood of a drought developing, occurring and ultimately receding is based on groundwater, river flows rainfall and soil moisture. The basic rules and triggers for moving from one drought status to another are described below. These can be applied to the area as a whole if the trigger applies to more than 50% of the sites. The derivation of the triggers and details of how to calculate them are described below.

General Principles

Groundwater

Groundwater levels gives the best long term indication of the overall state of water resources as most of the rivers are fed by groundwater and levels reflect long term effective rainfall. They are not skewed by short term changes in the weather. Using the Cunnane probability bands which appear in the Central Area monthly water situation report it is possible to categorise levels throughout the year.

Measure:

50% of Groundwater Sites	Status Indicator
Normal or above	Normal
Below Normal	Potential Drought
Notable Low or Exceptionally Low	Drought

Before changing drought status based on groundwater triggers, consideration should be given to recent rainfall yet to reach the aquifer, Soil Moisture Deficit and the Weather Forecast.

River Flows

River flows are critical for water resources with large public water supply abstractions such as Grafham coming directly from surface water. Flows are particularly critical during the irrigation period between May and August when agricultural demand from surface water increase dramatically.

Using the Cunnane probability bands which appear in the Central Area monthly water situation report it is possible to categorise levels throughout the year.

Measure:

Outside Irrigation Period

50% of River Flow Sites	Status Indicator
Below Normal or above	Normal
Notably Low	Potential Drought
Exceptionally Low	Drought

During Irrigation Period

50% of River Flow Sites	Status Indicator
Normal or above	Normal
Below Normal	Potential Drought
Notably or Exceptionally Low	Drought

A greater weight should be given to Denver on the Ely Ouse and Offord Gross on the Bedford Ouse which are critical for Water Resources in the area. Before changing status based on river flow triggers, consideration should be given to other indicators including SMDs, weather forecast and reservoir levels.

Rainfall

During the peak irrigation period between May and August Central Area is vulnerable to periods of low rainfall. River flows can be a late indicator of drought therefore a period of 3 months with 65% of Long Term Average rainfall has been set as a trigger for potential drought. This broadly corresponds to a status of notably low rainfall. This should only been used for potential drought and not drought as this would be reflected in river flows and groundwater levels. Before changing status based on rainfall triggers consideration should be given to other indicators including SMDs and weather forecast.

Long term rainfall has not been included as this will be reflected in groundwater and river flows.

Soil Moisture Deficit

During the peak irrigation period between May and August Central Area is vulnerable to periods of low rainfall and high evapotranspiration. River flows can be a late indicator and rainfall does not consider evapotranspiration. Therefore a trigger for potential drought of notably high Soil Moisture Deficit has been set. This should only been used for potential drought. For droughts this should only be used to help inform decisions based on river flows and groundwater levels. Before changing status

based on SMDs consideration should be given to other indicators including the weather forecast.

Derivation of General Triggers

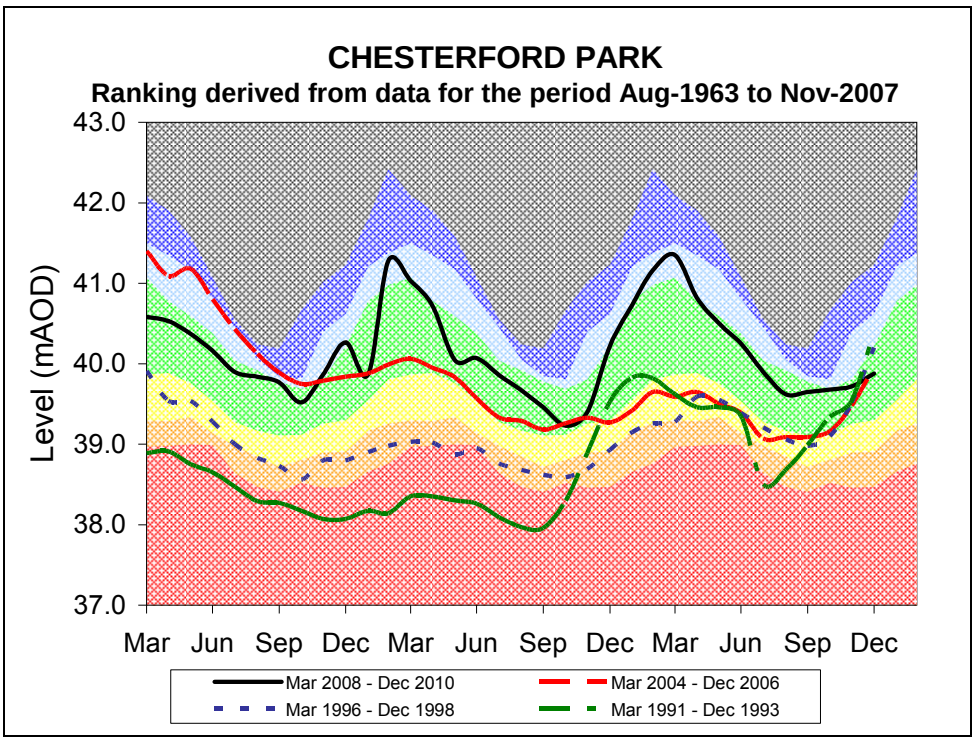
The general triggers referred to above have been derived by looking at known droughts that have occurred over the past 20 years, and seeing what conditions prevailed then.

Groundwater

The Cunnane distribution shows the groundwater level relative to what is normal for the time of year. This allows for drought triggers to be effective throughout the year as well as showing when droughts are over. The triggers are precautionary and before changing status the recent rainfall, SMD and weather forecast should be assessed to predict if levels are likely to remain below trigger level or come back up again the following month. Forecast tools are available for 3 of the key wells for Central Area.

Groundwater levels between 1991 and 1993, 1996 and 1998, 2004 and 2006 and 2008 and 2010 at Chesterford Park are plotted in Figure 14.3 alongside Cunnane probability bands. This shows 1991 to 1993 as a severe drought, 1996 to 1998 as a drought, 2006 as a potential drought and normal conditions between 2008 and 2010.

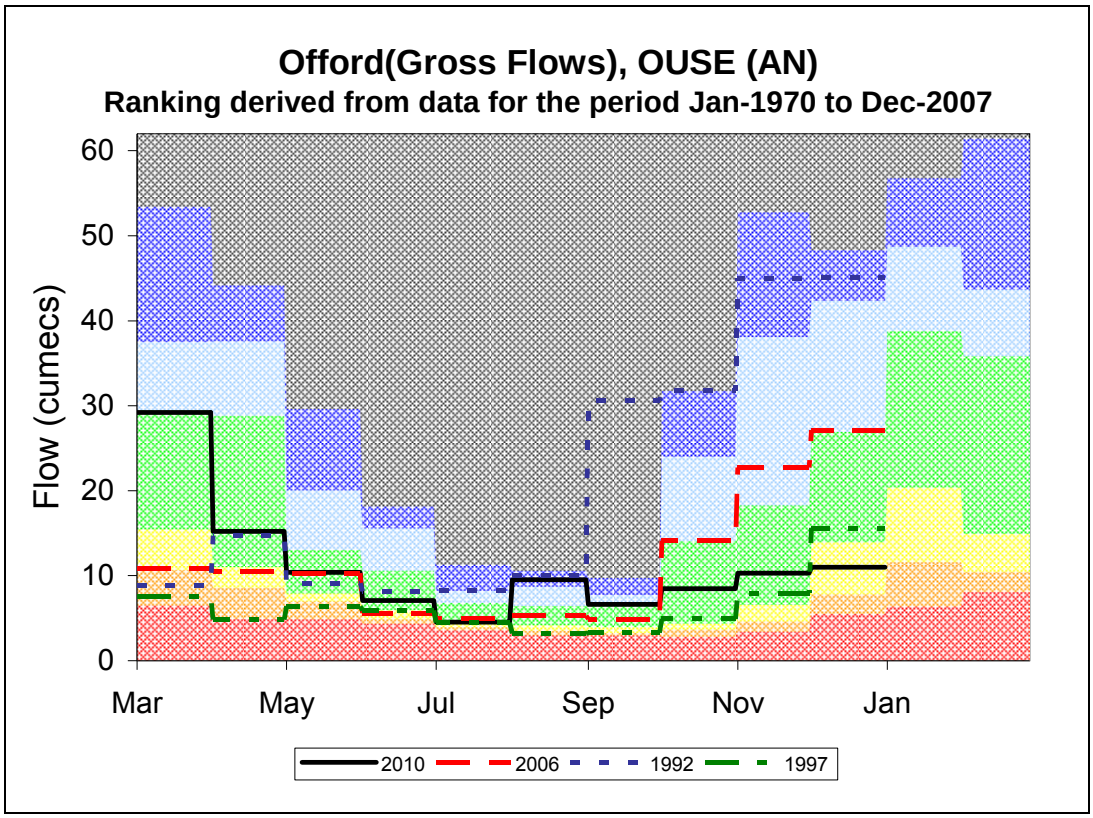
Figure E1 – Groundwater Levels at Chesterford Park



River Flows

Figure E2 shows monthly mean river flows alongside the Cunnane probability bands for Offord Gross for 1992, 1997, 2006 and 2010. This shows droughts in 1992 and 1997 and a potential drought in 2006. A potential drought is shown in July 2010. Whilst this accurately reflected conditions on the ground the trigger was not met until the end of July by which time Central Area had already changed status to Potential Drought. This highlights the need for an earlier warning of drought.

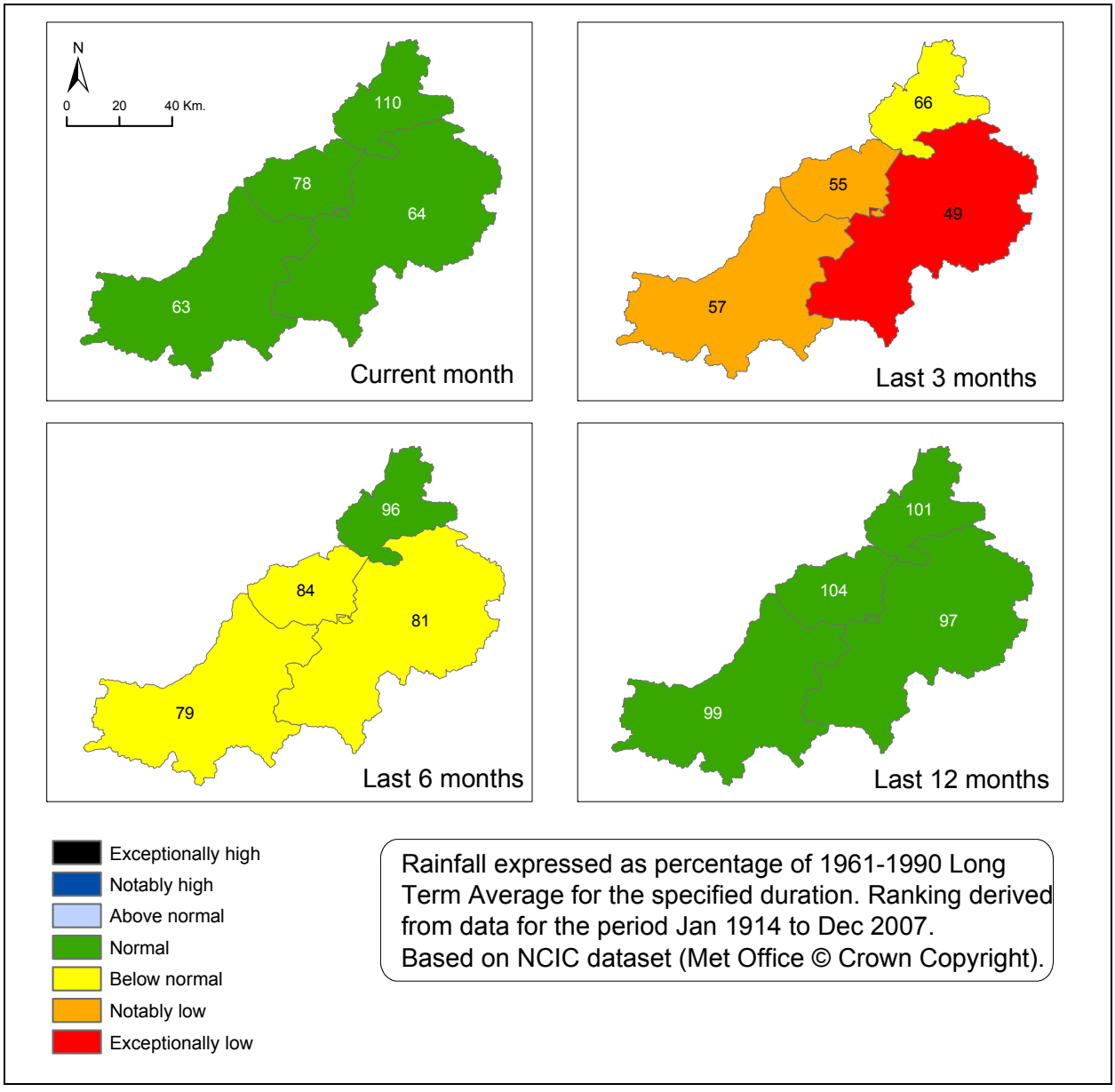
Figure E2 – Monthly Mean Flows at Offord



Rainfall

Figure E3 shows the areal rainfall for June 2010 with the percentage of the long term average written within the maps. The three month rainfall for June 2010 shows rainfall below 65% of the average in three of the four rainfall units. Subject to other information including SMDs and weather forecast this would indicate a potential drought.

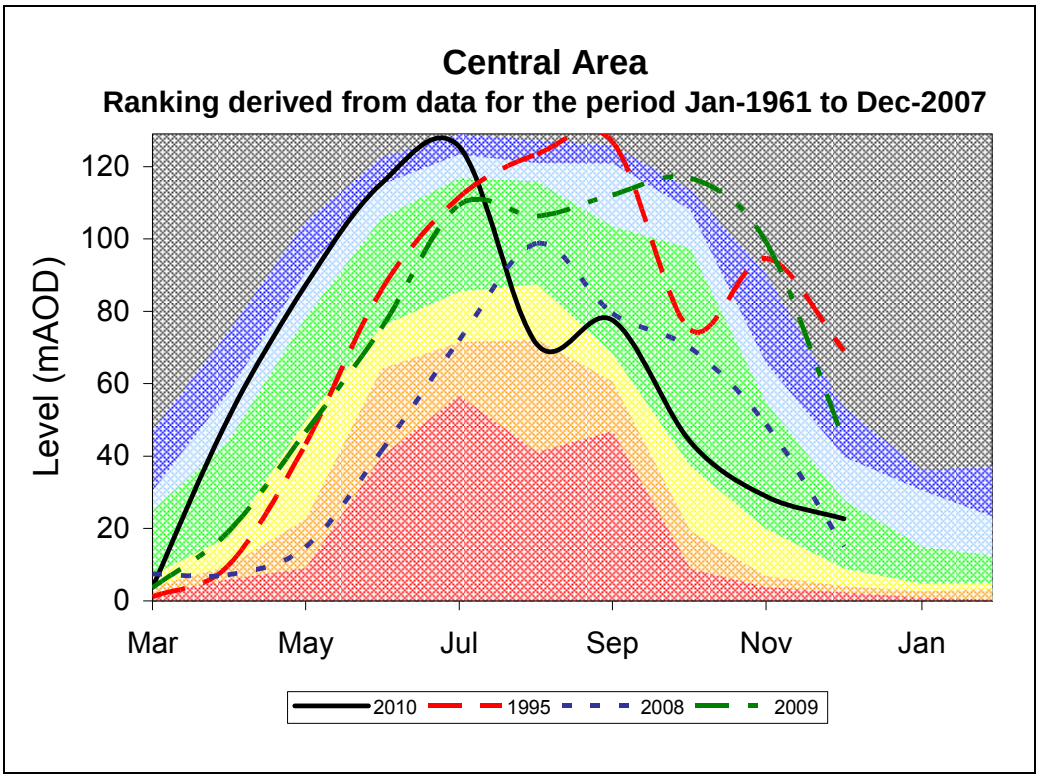
Figure E3 – Central Area Month Rainfall



Soil Moisture Deficit

Figure E4 shows monthly end of month SMD values alongside the Cunnane probability bands for Central Area for 1995, 2008, 2009 and 2010. This shows a potential drought in June 2010 and August 1995. This along with the rainfall triggers for 2010 indicates a move to potential drought a month earlier than using just the groundwater and river flow triggers.

Figure E4 – Central Area Soil Moisture Deficits



Catchment Specific Triggers

For a Central Area-wide drought more than 50% of the triggers should be crossed for the type of trigger being analysed. Catchment based droughts can be triggered from the local triggers although this should generally be treated as a warning of a potential stress area rather than a trigger for a drought. This is because there are frequent local variations which would not require a change of status in order to manage effectively.

Appendix F: Explanation of Trigger Selection and Setting in Eastern Area

It should be noted that the national standard flow categorisation drought forecasting method is being adopted. Thresholds which are based on river flow percentiles are being retained for drought management as they are sufficiently flexible to take account of different river characteristics and other factors (for example water quality including temperature and dissolved oxygen content). Management methods, including compensatory discharges where appropriate and voluntary reductions in abstraction, are used at higher flow levels.

In Eastern Area two flow thresholds have been defined to assist in deciding whether to implement spray irrigation restrictions:

- Amber threshold – the Q95 flow, at which voluntary reductions in abstraction for spray irrigation will normally be sought;
- Red threshold – 0.75 x Q95 flow, at which some formal restrictions in abstraction for spray irrigation under Section 57 will be implemented, subject to consideration of other factors as described in appendix D.

In the event of an incident linked to a drought, incident management procedures will be implemented. The Eastern Area incident room may be opened and the Area base controller post initiated. Nominations for lead officers will be made by the Area drought manager and are likely to be drawn from team leader level in Environment Management or Area Environment Planning. Incident management could run simultaneously with Area-wide activities being managed by the Area drought team.

Appendix G: Drought monitoring plan for Northern Area

1. Hydrometric Monitoring

Regular monitoring

Details of the Northern Area Monthly Water situation report:

- Map of Northern Area showing rainfall as percent of LTA values for the most recent month and the last 3, 6 and 12 month periods for the following geographic areas:
    - Ancholme-Grimsby-Louth;
    - Witham - Steeping, Great Eau and Long Eau
        - Witham to Chapel Hill
        - South Forty Foot and Hobhole;
    - Upper Welland and Nene;
    - Lower Welland and Nene.

  Monthly rainfall totals are provided by the Meteorological Office (National Climate Information Centre).
- Rainfall charts showing monthly rainfall compared with the historic monthly average rainfall over the past 12 month period for the same geographic areas as above;
- Plots showing soil moisture deficit (SMD) compared with long term mean, maximum and minimum values over the past 12 month period for the following geographic areas: Grimsby, Ancholme, Louth; Witham; Upper Welland and Nene; Lower Welland and Nene. SMD values are derived from Meteorological Office Rainfall and Evaporation Calculation System (MORECS) data;
- Map of Northern Area showing current monthly average river flows as percent of LTA values at gauging stations detailed below using data from the South West and Anglian Telemetry System (SWANTEL). Flows are categorised based on probability ranking of historic monthly flow data. The categories are:
    - Exceptionally high;
    - Notably high;
    - Above normal;
    - Normal;
    - Below normal;
    - Notably low;
    - Exceptionally low.
- Graphs showing monthly average river flows for the past 12 month period at the gauging stations detailed below compared with the categories described above;
- Map of Northern Area showing current groundwater levels at key monitoring sites detailed below categorised as described above. The data is read manually or obtained from SWANTEL;

- Groundwater level graphs for the past 12 month period at the key monitoring sites detailed below compared with the categories described above;
- Plots showing public water supply reservoir percent full for the past 2 years compared with the normal operating curve, the Drought Alert Curve and 2005 to 2006 data for:
    - Rutland;
    - Pitsford, Ravensthorpe and Hollowell combined;
    - Covenham

  The data is provided by Anglian Water.

The report is available from our website.

Table G1 – Key groundwater sites for hydrometric monitoring

SITE	AQUIFER
Grange De Lings	Northern Limestone
Winterton Carr Lane	Northern Limestone
Leasingham	Central Limestone
Grange Farm, Aswardby	Central Limestone
Greatford	Southern Limestone
Hanthorpe	Southern Limestone
Barton, Horkstow Road	Northern Chalk
Grainsby	Northern Chalk

Table G2 – Key river flow sites for hydrometric monitoring

SITE
Lud at Louth
Witham at Claypole
Glen at Kates Bridge
Welland at Ashley
Nene at St Andrews Mill
Nene at Upton
Lymn at Partney
Bain at Fulsby
Rase at Bishopbridge
Barlings Eau at Langworth

Trent Witham Ancholme scheme

Transfers from the Witham to the Ancholme occur every summer, typically from May / June to September. In dry years the transfers start earlier and can carry on into the autumn. The Trent to Witham transfers occur in most years and generally between June and September in dry summers.

Daily monitoring is carried out by Northern Area Hydrometry and Telemetry Team during periods of operation in order to determine the required transfer rates:

- Riverflows and river levels at the sites detailed below are monitored through SWANTEL;
- The Anglian Water abstraction from the Ancholme at Cadney is recorded by SWANTEL;
- Salinity levels in the Ancholme at South Ferriby are measured twice weekly by the South Ferriby lock keeper during the transfer season and sent to the Northern Area Hydrometry and Telemetry Team.

Forecasts of daily abstraction rates for the week ahead are provided by the abstractors on a weekly basis for the following:

- Anglian Water abstraction from the Ancholme at Cadney (from Elsham Water Treatment Works);
- Brigg power station abstraction from the Ancholme;
- Lincoln Water Transfer abstraction from the Fossdyke Canal;
- Lincoln Water Transfer abstraction from the Lower Witham.

The actual and forecast Anglian Water abstractions at Cadney are provided to us under a Water Resources Management Arrangement. This agreement also allows us to measure the Anglian Water abstraction and the River Ancholme level at the abstraction point by telemetry.

The TWA Scheme Operation Procedures (TWA Scheme procedures) provides detailed operational procedures.

Trent-Witham-Ancholme monitoring sites

Table G3 – Witham System

SITE	RIVER	TYPE
Honington	Honington Beck	Flow
Claypole Mill	Witham	Flow
Brant Broughton	Brant	Flow
Langworth	Barlings Eau	Flow
Nettleham	Nettleham Beck	Flow

Cream Poke Farm	Stainfield Beck	Flow
Fulsby	Bain	Flow
Heighington	Heighington Beck	Flow
Bargate Sluice u/s	Witham	Level
Bargate Sluice u/s	Witham	Level
Brayford Pool	Fossdyke	Level
Monson Street	Sincil Dyke	Level
Stamp End Sluice	Witham	Level u/s & d/s
Fiskerton Sluice	Witham	Level u/s & d/s
Bardney	Witham	Level
Kirkstead Bridge	Witham	Level
Langrick Bridge	Witham	Level
Grand Sluice	Witham	Level u/s & d/s

Table G4 – Ancholme System

SITE	RIVER	TYPE
Toft Newton	Aeration weir	Flow
Toft Newton	Ancholme	Flow
Bishopbridge	Ancholme	Flow
Bishopbridge	Rase	Flow
Nettleton	Nettleton Beck	Flow
North Kelsey	North Kelsey Beck	Flow
Kingerby Beck	Kingerby Beck	Flow
Brandy Wharfe	Ancholme	Level
Cadney	Ancholme	Level
Brigg	Ancholme	Level
Saxby	Ancholme	Level
South Ferriby Sluice	Ancholme	Level u/s & d/s
South Ferriby Sluice	Ancholme	Sluice gate position
West Drain O/F	West Drain	Level
Scabcroft Weir	West Drain	Level u/s & d/s

Lower Nene water resources management

The demand for water resources in the Lower Nene can exceed water available in dry summer periods. Anglian Water abstracts from the Nene at Wansford for transfer to Rutland Water. The residual flow downstream of Wansford is subject to high summer demands during the spray irrigation season. The largest of these demands is the transfer through Stanground Lock to maintain the water level in the Middle Level System in Central Area. Active management of the demands for water by the Northern and Central Area Hydrometry and Telemetry Teams is necessary when demands exceed water available.

The following are monitored daily during May to September through SWANTEL in order to manage the water resources in the Lower Nene:

- River Nene levels and flows at sites detailed below are monitored by the Northern Area Hydrometry and Telemetry Team;
- The Central Area Hydrometry and Telemetry Team monitor the Forty Foot Drain level at Bodsey Bridge.

Operational Management of Water Resources in the Lower Nene (Lower Nene Procedures) provides detailed operational procedures.

Table G5 – Lower Nene Water resources management – monitoring sites

SITE	RIVER	TYPE
Wansford Lock	Nene	Level u/s and d/s Flow
Wansford	Nene	Level and flow
Water Newton Sluice	Nene	Level
Orton	Nene	Level u/s and d/s Low flow
Dog in a Doublet	Nene and Tidal Nene	Level u/s and d/s
Stanground Sluice	Nene	Level
Stanground Lock	Kings Dyke	Middle Level transfer flow
Little Bridge, Whittlesey	Moretons Leam	Level

Gwash Glen transfer system

A Water Resources Management Arrangement between us and Anglian Water has been made in order to provide releases from Rutland Water for subsequent transfer to support low flows in the River Glen. This river support is in compensation for an increase in the Anglian Water licensed abstraction from the Southern Limestone. The releases from Rutland Water also support an MRF in the Gwash at Belmesthorpe (downstream of the transfer) when the transfer is operating. Transfers

from the River Gwash support low flows in the River Glen downstream of Essendine. The transfer system is managed by the Northern Area Hydrometry and Telemetry Team and only operates in dry summers when the flow in the West Glen at Shillingthorpe falls below around 3.5Ml/d or as required to support the river ecology. Transfers generally operate in the period July to October.

Riverflows and river levels at sites detailed below are monitored via SWANTEL and current meter measurements.

Gwash-Glen Transfer Scheme Operation (Gwash Glen Procedures) provides detailed operating procedures.

Table G6 – Gwash Glen monitoring sites

SITE	RIVER	TYPE
Church Bridge	Gwash	Flow from Rutland
Empingham	North Brook	Flow
Belmesthorpe	Gwash	Flow
Burton Coggles	West Glen	Flow
Little Bytham	Tham	Flow
Holywell Brook	Holywell Brook	Flow
Essendine	West Glen	Flow (current meter)
Banthorpe Lodge	West Glen	Flow (current meter)
Shillingthorpe	West Glen	Flow
Manthorpe	East Glen	Flow
King Street	Greatford Cut	Flow
Kates Bridge	Glen	Flow
Hanthorpe	Limestone	Groundwater level
Surfleet Sluice	Glen	Level u/s and d/s

Slea augmentation scheme

This scheme provides river support for environmental reasons however it is commonly referred to as an augmentation scheme. Flows in the River Slea through Sleaford are augmented during periods of low natural flow by pumping from a borehole upstream of Sleaford. The purpose of this support flow is to alleviate low flow problems resulting from nearby abstraction for public water supply from the Central Lincolnshire Limestone aquifer by Anglian Water. The augmentation scheme is managed by the Northern Area Hydrometry and Telemetry Team and operates most years. It is normal practice to set the pump to start at 5am and for pumping to continue for around 12.75 hours each day. This ensures that the Slea through

Sleaford is augmented through day light hours. With a pumping rate of 2.46Ml/d the effective daily rate is 1.31Ml/d. This arrangement allows pumping to continue for 306 days which is sufficient for normal years when natural flow returns before 1st February and continues to 15th July or beyond. The sites detailed below are monitored daily through SWANTEL by the Northern Area Hydrometry and Telemetry Team prior to and during operation of the scheme.

Surveys of the River Slea between the augmentation borehole and Cogglesford Mill including current meter measurements, river level measurements and visual inspections are carried out whilst augmentation is taking place. These surveys are carried out weekly, two-weekly or monthly depending on the state of the river.

Slea Augmentation Scheme Operation (Slea Augmentation procedures) provides detailed operating procedures.

Table G7 – Slea Augmentation monitoring sites

SITE	TYPE
Holdingham	Groundwater level
Leasingham	Groundwater level
Barrage Site	u/s and d/s river level

Abstraction licence controls

Cessation conditions on abstraction licences are monitored by the Northern Area Environmental Planning Team. The monitoring frequency depends on the time of year:

- River flows and levels at gauging stations are monitored through SWANTEL. Flows at some sites are measured by current meter. Flows and levels are generally monitored weekly during the summer months (May to September) and at two weekly intervals for the remainder of the year;
- Borehole levels are monitored monthly.

Details of cessation conditions are listed in the Abstraction Licence Controls file[7].

Northern Chalk model

[7] Abstraction Licence Controls, Environment Agency internal document (kept by the Northern Area Environmental Planning Team)

A Water Resources Management Arrangement between Anglian Water and ourselves has been made in order to manage public water supply abstractions from the northern chalk aquifer (Northern Chalk Sec 20 Agreement).

The northern chalk model is run annually in the last quarter of each year to predict whether saline intrusion to the aquifer and other adverse environmental impacts are likely. If necessary, Anglian Water abstractions from the chalk are reduced through the water resources management arrangement in order to protect the aquifer. Model runs are carried out by consultants under a regional framework agreement managed by the Regional Technical Projects team.

Helpston Contaminated Land Project Hydrogeological Action Plan

Monitoring of groundwater levels and groundwater quality in the vicinity of Helpston is carried out as part of the Helpston Contaminated Land Project Hydrogeological Action Plan[8]. This is a site specific plan which is managed within the Northern Area Groundwater and Contaminated Land Team. Anglian Water and other stakeholders will be alerted if high contamination levels were monitored in the vicinity of the public water supply abstraction from the Southern Lincolnshire Limestone at Etton.

Further details of monitoring sites during a potential drought to drought:

- During the spring and summer, projected recession curves are used to forecast summer low flows at key sites in the Area. These sites include catchments where Section 57 restrictions are possible. From experience of recent droughts these are likely to be the Upper Witham, Barlings Eau, River Bain, River Lymn and the Lower Welland and Glen. The forecasts are updated monthly or two weekly depending on current requirements. Projected recessions are applied at the sites listed below;
- Current meter surveys / visual assessments may be carried out in river systems where support schemes are in operation:
    - Gwash to Glen (operated by us)
    - Slea augmentation (operated by us)
    - Laceby Beck (operated by Anglian Water)
    - Bourne Eau (operated by Bourne United Charities)

Table G8 – Recession forecast sites

[8] Helpston Contaminated Land Project Hydrogeological Action Plan, Environment Agency internal document (2007) (kept by the Northern Area Groundwater and Contaminated Land

SITE
Rase at Bishopbridge
Waithe Beck at Brigsley
Laceby Beck
Lud at Louth
Gt Eau at Claythorpe
Lymn at Partney
Witham at Colsterworth
Witham at Claypole
Barlings Eau at Langworth
Bain at Fulsby
Scopwick Beck
Slea at Leasingham
Welland at Ashley
Gwash at Belmesthorpe
West Glen at Burton Coggles
Tham at Little Bytham
Holywell Brook
West Glen at Shillingthorpe
Glen at Kates Bridge
Welland at Tallington
Nene at St Andrews Mill
Nene at Upton
Willow Brook at Fotheringhay

1995 to 1997 Drought

Details of hydrometric monitoring during the 1995 to 1997 drought are provided in the Northern Area 1997 Drought Report (Northern Area 1997 drought report).

2. Ecological Monitoring

Biological monitoring using Lotic-invertebrate Index for Flow Evaluation (LIFE) scores

A flow score is derived for each species / family using the species / family abundance and ecological association with different flows. An overall LIFE score is calculated for the sample from the sum of the individual species / family flow scores divided by

the number of scoring species / families. LIFE scores less than 6.00 generally indicate sluggish or still water conditions. As current velocity increases, so do LIFE scores. LIFE values greater than 7.5 indicate very fast flows. A species / family LIFE score can be predicted using environmental variables and specific information about the geology and geography of the site. An observed / expected ratio for species / family level LIFE scores can be calculated. A value of 1.0 is obtained when the observed fauna meets the predicted. Ratios of less than 1.0 indicate stress caused by low flows, the lower the calculated ratio, the greater the stress.

Ecological and quality monitoring sites details

Table G9 – Biological monitoring - routine programme sites

Site ID	Regional Ref.	River	Site name	Catchment
55028	R03BFBARL110L	Barlings Eau	Langworth	Central Lincs
55088	R03BFCRIN100T	Cringle Brook	Thunder Bridge	Central Lincs
55117	R03BFFOST060A	Foston Beck	A1 (Behind Q.K. Cold Stores)	Central Lincs
55159	R03BFHONI080B	Honington Beck	Barkston LC	Central Lincs
55296	R03BFRUSK070S	Ruskington Beck	U/S River Slea	Central Lincs
55299	R03BFSAND040B	Sandhill / Branston Beck	Branston	Central Lincs
55305	R03BFSCOP040K	Scopwick Beck	Kirkby Green	Central Lincs
55417	R03BFWITH130E	Upper Witham	Easton Park	Central Lincs
55418	R03BFWITH140E	Upper Witham	Easton Bridge	Central Lincs
55420	R03BFWITH170L	Upper Witham	Little Ponton	Central Lincs
55422	R03BFWITH290B	Upper Witham	Barkston	Central Lincs
55423	R03BFWITH330H	Upper Witham	Hougham	Central Lincs
55425	R03BFWITH400C	Upper Witham	Claypole	Central Lincs
55429	R03BFWITH510A	Upper Witham	Aubourn	Central Lincs
55381	R03BFTORR070D	West Torrington Beck	D/S Holton Cum Beckering STW	Central Lincs
87358	R03BFBAIN070E	Bain	East Wykeham	East Lincs

Site ID	Regional Ref.	River	Site name	Catchment
55017	R03BFBAIN110B	Bain	Biscathorpe Ford	East Lincs
55020	R03BFBAIN190H	Bain	Hemingby	East Lincs
55023	R03BFBAIN280D	Bain	Dalderby	East Lincs
55025	R03BFBAIN390D	Bain	D/S Coningsby STW	East Lincs
83563	R03BFBELE050U	Belleau	U/S Great Eau Confluence	East Lincs
55062	R03BFBURL030W	Burlands Beck	Willoughby	East Lincs
55123	R03BFGEAU030C	Great Eau	Calceby	East Lincs
55161	R03BFHORN090W	Horncastle Canal	Wharfe Lane	East Lincs
55168	R03BFKETS050K	Ketsby Beck	D/S Ketsby Trout Farm	East Lincs
79566	R03BFLEAU020L	Long Eau	Little Cawthorpe Ford	East Lincs
55184	R03BFLEAU070L	Long Eau	Little Carlton	East Lincs
55194	R03BFLOUT020T	Louth Canal	Ticklepenny Lock	East Lincs
55196	R03BFLOUT050H	Louth Canal	High Bridge, Alvingham	East Lincs
55287	R03BFRLUD030L	Lud	Louth Trout Farm	East Lincs
76437	R03BFLUDS020T	Lud (South Branch)	Tathwell	East Lincs
55204	R03BFLYMN060S	Lymn	Salmonby - Somersby Road Bridge	East Lincs
55205	R03BFLYMN090S	Lymn	Stockwith Mill	East Lincs
55206	R03BFLYMN120P	Lymn	Partney	East Lincs
55267	R03BFORFO020K	Orford Beck	Kirmond-Le-Mire	East Lincs
79568	R03BFSALM020A	Salmonby Beck	Ashby Road	East Lincs

Site ID	Regional Ref.	River	Site name	Catchment
55393	R03BFWAIT060S	Waithe Beck	Swinhope	East Lincs
55394	R03BFWAIT080T	Waithe Beck	Thorganby	East Lincs
79565	R03BFWAIT100H	Waithe Beck	Hatcliffe	East Lincs
55395	R03BFWAIT120B	Waithe Beck	Brigsley	East Lincs
79570	R03BFWARI040B	Waring	Belchford	East Lincs
55398	R03BFWARI090L	Waring	Low Toynton Bridge	East Lincs
79569	R03BFWINC020H	Winceby Beck	Hagworthingham Ford	East Lincs
55439	R03BFWOLD070W	Woldgrift Drain	Washdyke Bridge	East Lincs
55598	R05BFHARP200A	Harpers Brook	A6116	Lower Nene
55694	R05BFNENE550W	Nene	Wansford Old Road Bridge	Lower Nene
55697	R05BFNENE605O	Nene	Orton Staunch	Lower Nene
55777	R05BFSTHP040M	Southorpe Brook	Mill Farm	Lower Nene
55852	R05BFWILL130A	Willow Brook	Apethorpe	Lower Nene
55854	R05BFWILL170F	Willow Brook	Fotheringhay	Lower Nene
55864	R05BFWITB140A	Wittering Brook	A47	Lower Nene
54998	R03BFANCN040T	Ancholme	Toft Newton Reservoir	North Lincs
55067	R03BFCAIC040W	Caistor Canal (North Lincs)	Westfield Farm	North Lincs
55250	R03BFNTBK040A	Nettleton Beck	A46 Road Bridge	North Lincs
55245	R03BFNOKE080B	North Kelsey Beck	B1434	North Lincs
55274	R03BFRASE020B	Rase	Bully Hill	North Lincs

Site ID	Regional Ref.	River	Site name	Catchment
55277	R03BFRASE150U	Rase	U/S Market Rasen STW	North Lincs
55280	R03BFRASS030D	Rase (South Branch)	De Aston School	North Lincs
55302	R03BFSCAW020B	Scawby Brook	B1207	North Lincs
55445	R05BFALLB100W	Alledge Brook	Woodford Bridge	Upper Nene
55465	R05BFBRAM040D	Brampton Branch (Nene)	Draughton/Maidwell Rd-U/S Draughton STW	Upper Nene
55467	R05BFBRAM070B	Brampton Branch (Nene)	Brixworth-Creaton Road	Upper Nene
55469	R05BFBRAM100M	Brampton Branch (Nene)	Merry Tom Lane	Upper Nene
55471	R05BFBRAM120B	Brampton Branch (Nene)	Boughton Crossing	Upper Nene
55472	R05BFBRAM129K	Brampton Branch (Nene)	Kingsthorpe	Upper Nene
55533	R05BFEVBK080E	Everdon Brook	Everdon	Upper Nene
55573	R05BFGREN040G	Grendon Brook	Grendon North	Upper Nene
55576	R05BFGROV040A	Grove Farm Feeder Stream	Ashby St Ledgers Ford	Upper Nene
55740	R05BFRISE130R	Ise	Rushton	Upper Nene
55741	R05BFRISE150B	Ise	Barford Bridge D/S Rushton STW	Upper Nene
55742	R05BFRISE180G	Ise	Geddington	Upper Nene
55743	R05BFRISE210W	Ise	Warkton	Upper Nene
55745	R05BFRISE240B	Ise	Burton Latimer	Upper Nene
55747	R05BFRISE310B	Ise	B571	Upper Nene

Site ID	Regional Ref.	River	Site name	Catchment
55666	R05BFNENE020N	Nene	Newnham	Upper Nene
55669	R05BFNENE040F	Nene	Flore Road Bridge	Upper Nene
55671	R05BFNENE060B	Nene	Bugbrooke Mill	Upper Nene
55673	R05BFNENE080D	Nene	Duston Mill	Upper Nene
55676	R05BFNENE180C	Nene	Cogenhoe	Upper Nene
55678	R05BFNENE220H	Nene	Hardwater Mill, Great Doddington	Upper Nene
55679	R05BFNENE230W	Nene	Wollaston Mill	Upper Nene
55785	R05BFSYWB020S	Sywell Brook	Sywell	Upper Nene
55842	R05BFWHIL030L	Whilton Branch	Long Buckby	Upper Nene
55846	R05BFWHIL100W	Whilton Branch	Weedon	Upper Nene
55869	R05BFWOOT100M	Wootton Brook	Milton Malsor Road Bridge	Upper Nene
55499	R05BFCHAT110N	Chater	North Luffenham	Welland
55501	R05BFCHAT140S	Chater	Station Road Bridge, Ketton	Welland
55559	R05BFGLEN400E	East Glen	Edenham	Welland
55563	R05BFGLEN480B	East Glen	Braceborough	Welland
91981	R05BFEYEB050T	Eye Brook	Tugby Wood	Welland
55538	R05BFEYEB100S	Eye Brook	Stockerston, B664	Welland
55540	R05BFFINE100D	Fineshade Brook	A43	Welland
14631	R03BFGLEN250E	Glen	Essendine	Welland
55564	R05BFGLEN500K	Glen	Kate's Bridge	Welland

Site ID	Regional Ref.	River	Site name	Catchment
55584	R05BFGWSH230T	Gwash	Tickencote D/S Empingham STW	Welland
55588	R05BFGWSH300B	Gwash	Footbridge U/S Belmesthorpe	Welland
55582	R05BFGWSH080G	Gwash (South)	Gunthorpe	Welland
55625	R05BFLANG060M	Langton Brook	Thorpe Langton	Welland
142269	R05BFMEDB090M	Medbourne Brook	Medbourne Sports Field	Welland
55659	R05BFMORC100S	Morcott Brook	South Luffenham	Welland
55713	R05BFNTBK110F	North Brook	Fort Henry Lake Outlet	Welland
55714	R05BFNTBK140E	North Brook	Empingham	Welland
55782	R05BFSTON050T	Stonton Brook	Thorpe Langton	Welland
55787	R05BFTHAM160U	Tham	U/S Little Bytham STW	Welland
55814	R05BFWELL010S	Welland	The Wrongs Sibbertoft	Welland
56698	R05BFWELL030L	Welland	Marston Trussell	Welland
55820	R05BFWELL150R	Welland	A6003 (Rockingham)	Welland
55821	R05BFWELL170G	Welland	Gretton Road Bridge	Welland
90475	R05BFWELL190H	Welland	Harringworth	Welland
55824	R05BFWELL250D	Welland	Duddington	Welland
55825	R05BFWELL260C	Welland	Collyweston Bridge D/S Collyweston STW	Welland
55826	R05BFWELL275T	Welland	Tinwell Mill	Welland
55828	R05BFWELL330U	Welland	Uffington Road Bridge	Welland

Site ID	Regional Ref.	River	Site name	Catchment
55830	R05BFWELL340T	Welland	Tallington	Welland
55832	R05BFWELL390D	Welland	Deeping	Welland
55552	R05BFGLEN110B	West Glen	B1176 (Burton-Le-Coggles Gauging Station)	Welland
55555	R05BFGLEN200L	West Glen	Little Bytham	Welland
55556	R05BFGLEN280B	West Glen	Banthorpe Lodge	Welland

Table G10 – Biological monitoring – key drought sites

SAMPLE SITE ID	REGIONAL REFERENCE	River name	SITE NAME	CATCHMENT	Potential Drought Species LIFE Trigger	Actual Drought Species LIFE Trigger
55299	R03BFSAND040B	Sandhill/Branston Beck	Branston	Central Lincs	7.00	6.80
55417	R03BFWITH130E	Upper Witham	Easton Park	Central Lincs	7.30	7.10
55168	R03BFKETS050K	Ketsby Beck	D/S Ketsby Trout Farm	East Lincs	7.75	7.40
55206	R03BFLYMN120P	Lymn	Partney	East Lincs	7.60	7.35
55395	R03BFWAIT120B	Waithe Beck	Brigsley	East Lincs	7.50	7.05
55854	R05BFWILL170F	Willow Brook	Fotheringhay	Lower Nene	7.25	6.90
55673	R05BFNENE080D	Nene	Duston Mill	Upper Nene	6.25	6.15
55499	R05BFCHAT110N	Chater	North Luffenham	Welland	7.30	7.10
55824	R05BFWELL250D	Welland	Duddington	Welland	6.60	6.40
55555	R05BFGLEN200L	West Glen	Little Bytham	Welland	6.90	6.70
55312*	RO3BFSFFD150S	South Forty Foot Drain	Swineshead Bridge	East Lincs	n/a	n/a
55214*	R03BFMAUD020R	Maud Foster Drain	Rawsons Bridge	East Lincs	n/a	n/a
55287	R03BFRLUD030L	Lud	Louth Trout Farm	East Lincs	7.00	6.80
55745	R05BFRISE240B	Ise	Burton Latimer	Upper Nene	6.50	6.30

*Salinity monitoring sites.

Table G11 – Routine fisheries monitoring sites

RIVER	SITE
East Glen	Edenham
West Glen	Creeton
Stonton Brook	Thorpe Langton
R. Ise	Rushton
Nene	Kislingbury
Witham	Colsterworth
Lymn	Stockwith Mill
Bain	Stenigot
Rase	Mkt. Rasen

3. Further Northern Area specific information

Potential Drought

Benthic Invertebrates

In the spring and summer, two additional sites on the Maud Foster Drain and the South Forty Foot Drain may be included in the monthly programme in order to detect saline ingress.

Drought

Fisheries

Streams such as the Stonton Brook in the upper Welland and the headwaters of the Ise are likely to become ponded. Water levels in some of the Lincolnshire East Coast drains are likely to fall and visual surveys by Fisheries staff will become necessary to target the largest or most vulnerable groups of fish.

4. Northern Area water company monitoring information

Routine information from Anglian Water

Monthly reservoir percentage full levels as of the first of the month. Arrives as figures in an email from Anglian Water's Water Resources Specialist (Hydrology) sent to the following Environment Agency contacts:

- Regional Environmental Planning Manager (Water Resources) - Regional Environmental Planning Team (Water Resources);
- Hydrometry and Telemetry Officer – Eastern Area;
- Hydrologist – Midlands Region Flood Risk Management team;
- Admin Support Officer – RSU Monitoring, Assessment and Reporting team;
- Technical Officer (Hydrometry and Telemetry) – Supra Area;

- Hydrologist – Central Area;
- Hydrometry and Telemetry Officer – Northern Area.

Weekly reservoir percentage full levels as of the first of the month. Arrives as a spreadsheet by email from Anglian Water's Water Resources Specialist (Hydrology) sent to the following Environment Agency contacts:

- Regional Environmental Planning Manager (Water Resources) – Regional Environmental Planning Team (Water Resources);
- Admin Support Officer – RSU Monitoring, Assessment and Reporting team;
- Technical Officer (Monitoring and Data) – Supra Area;
- Hydrometry and Telemetry Officer – Northern Area.

The TWA Scheme Operation Procedures (TWA Scheme procedures) sets out the routine data exchange with Anglian Water**.**

Normal

Anglian Water supplies river abstraction data to us to inform the management of the Trent Witham Ancholme Transfer Scheme and operational management of water resources in the Lower Nene.

The Northern Area Hydrometry and Telemetry Team monitor the Anglian Water abstraction from the Ancholme at Cadney in order to determine required rates of transfer for the Trent Witham Ancholme Scheme. Abstraction rates are recorded by SWANTEL and forecasts of daily abstraction rates for the week ahead are supplied direct to the Northern Area Hydrometry and Telemetry Team from Anglian Water at Elsham Water Treatment Works.

The Northern Area Hydrometry and Telemetry Team monitor the Anglian Water abstraction from the Nene at Wansford during May to September to manage water resources in the Lower Nene. Abstraction rates are recorded by SWANTEL. Anglian Water at Wing Water Treatment Works informs the Northern Area Hydrometry and Telemetry Team of future planned outages.

Abstractions by Anglian Water from the Louth Canal to Covenham Reservoir are controlled by licence conditions at Tetney Weir tilting gate. Also transfers from the Great Eau to support the Louth Canal in low flows are controlled by licence conditions at Cloves Bridge tilting gate. These tilting gates are owned and controlled by Anglian Water. A Water Resources Management Arrangement between Anglian Water and ourselves allows us to monitor the licence controls (level and MRF) at these structures by telemetry. (Covenham Section 20 Agreement)

During the AMP3 NEP we and Anglian Water reviewed and amended draft Drought Monitoring Plans for four AMP3/NEP sites so that agreed plans for the sites could be implemented in the future. A non-drought baseline survey was conducted during autumn 2004 including new additional sites not

routinely monitored by us. The AMP3 NEP included hydrological, biological and water quality monitoring to assess the impact of abstractions on low flow rivers in the following areas:

- Laceby Beck;
- Waithe Beck;
- Northern Lincolnshire Limestone;
- Southern Lincolnshire Limestone.

The AMP4 WREP investigation for Southern Lincolnshire Limestone was signed off, and an outcome of the work was a proposal for a Glens drought monitoring plan. We and Anglian Water are working together to determine what monitoring is needed at this site. Monitoring will be carried out in the three remaining areas on a best endeavours basis.

Environmental monitoring to support any possible drought permit / order to lower the Duston MRF during a winter period will also take place.

5. Additional Monitoring

Normal Conditions

Navigation levels in the Witham and Ancholme are monitored for Trent Witham Ancholme Transfer Scheme operations, in the Lower Nene for Lower Nene Water Resources Operational Management and in the Lower Glen for Gwash to Glen Transfer Operations.

The current state of spray irrigation demand in the Witham and Ancholme catchments is monitored for Trent Witham Ancholme Transfer Scheme operations and in Middle Level System for Lower Nene Water Resources Operational Management.

Procedures for managing and monitoring slacker transfers from the Lower Welland and Glen to support spray irrigation in the fens are currently being developed.

Routine macro invertebrate samples from appropriate downstream or level dependent sites (see above) will be screened for any change in the community, which may indicate an increase in background salinity levels. The appearance of brackish species is often seen as flushing flows decline and this information may be of additional assistance in helping to define normal, potential or actual drought conditions.

Potential drought

Additional monitoring is required in the spring and summer as a surface water drought develops:

- Drought related incidents on NIRS are reported by Environment Management teams to inform the Drought Coordinator;
- Additional salinity monitoring in lowland rivers is included as part of the routine biological monitoring program. The sites are detailed below.

Drought

Further monitoring of spray irrigation activity and water quality is required in a summer surface water drought:

- Spray irrigation activity in catchments subject to Section 57 restrictions will be monitored by Environment Officers and Enforcement Officers;
- The Environmental Monitoring (Sampling and Collection) Team may carry out monthly monitoring of salinity in lowland rivers.

Table G12 – Saline ingress monitoring sites

SAMPLE SITE ID	REGIONAL REFERENCE	River	SITE_NAME	CATCHMENT
55127	R03BFGEAU160C	Great Eau	Cloves Bridge	East Lincs
55200	R03BFLOUT120T	Louth Canal	Tetney Lock	East Lincs
55436	R03BFWITH770L	Lower Witham	Langrick Bridge	East Lincs
55214	R03BFMAUD020R	Maud Foster Drain	Rawsons Bridge	East Lincs
55266	R03BFORBY050C	Orby Drain	Chapel St Leonards	East Lincs
55311	R03BFSFFD110D	South Forty Foot Drain	Donington Bridge	East Lincs
55312	R03BFSFFD150S	South Forty Foot Drain	Swineshead Bridge	East Lincs
55441	R03BFWOLD100B	Woldgrift Drain	Bambers Bridge	East Lincs
55442	R03BFWOLD110R	Woldgrift Drain	Old Railway Bridge	East Lincs
55760	R05BFSHMD060C	South Holland Main Drain	Cliftons Bridge B1165	Lower Nene
55006	R03BFANCN280H	Ancholme	Horkstow Bridge	North Lincs

Appendix H: Drought monitoring for Central Area

1. Hydrometric monitoring

Normal

The Central Area hydrometric network, including groundwater observation boreholes, gauging stations and rain gauges is routinely monitored and this will continue at all times. On a monthly basis this information is collated into a report entitled “Central Area Key Hydrometric Report”. The report summarises the current situation by comparing groundwater level, river flows, rainfall and Soil Moisture Deficit (SMD) with the long-term average.

A similar report is produced at a regional level by the Supra Area Hydrometry and Telemetry Team. This report collates the Area data and contains additional information regarding public water supply reservoir levels. All the water situation reports are available on our website.

Of the sites that comprise the Central Area hydrometric network a number have been identified as key drought indicator sites for groundwater and surface water. These key sites are listed below. The choice of these key drought indicator sites does not negate the use of other sites within the Central Area hydrometric network.

Table H1 – Key Drought Indicator Sites – Groundwater

Catchment	Borehole	Reference	GWMU
Bedford Ouse	Furzenhall Farm	TL14/001	Woburn Sands (C16)
Ely Ouse	Chesterford Park	TL54/019	Cam Chalk (C4)
NW Norfolk	Washpit Farm	TF81/010	Nar Chalk (C11)

Table H2 – Key Drought Indicator Sites – Surface water

Catchment	Gauging Station	Reference	River
Bedford Ouse	Offord	033026	Great Ouse
Ely Ouse	Temple	033014	Lark
NW Norfolk	Heacham	033032	Heacham

Meteorological Office Rainfall and Evaporation Calculation System (MORECS) effective rainfall is a primary indicator of present and future drought status. MORECS data is available for the whole area and provides information for the Central Area Key Hydrometric Report. The MORECS areas detailed below in table H3 are used as key drought indicators.

Table H3 – Key Drought Indicators (MORECS)

Catchment	MORECS Square
Bedford Ouse	139
Ely Ouse	140
NW Norfolk	119
Middle Level	128

The Ely Ouse to Essex Transfer Scheme is operated primarily by Eastern Area in consultation with Essex and Suffolk Water to determine demand in Essex, and Central Area to determine availability of water. Data that is routinely available from the hydrometric network is required for assessing the water available for transfer. This scheme is operated in light of the procedures set out in the 'Ely Ouse-Essex Transfer Scheme High Level System Operating Manual' (2010).

The Great Ouse Groundwater Scheme can be used to supplement the volume of water available for transfer during times of shortfall. This scheme is operated by the Central Area Hydrometry and Telemetry Team in consultation with Eastern Area and Essex and Suffolk Water. The schemes are demand driven rather than drought driven, although the two normally coincide.

The Central Area river support schemes are operated to support flows and river ecology at times of stress and are operated at a range of different conditions, which cover all stages of a drought. The river support schemes are currently operated, primarily on a judgement basis, with only some of the schemes operated to quantitative trigger flows. Therefore the monitoring requirements from the schemes include data from the hydrometric network, visual assessments, weather forecasts, and to a certain extent previous experience with an element of trial and error. An operations manual for the river support schemes that defines the day to day operation of these schemes has been produced and is used in the operation of the schemes by the Hydrometry and Telemetry Team.

Routine hydrometric data is also important for the operational management of both the Counter Drain / Old Bedford (Catchment 52) and the Middle Level (Catchment 53). The operational management of these areas is described in the Central Area supporting information document.

The operation of licence cessation conditions, typically linked to surface water flows or groundwater levels, is largely reliant on information sourced from the hydrometric network. The Area Environment Planning team member responsible for cessation conditions routinely monitors the available hydrometric data to ascertain the need to implement cessations.

Table H4 – Groundwater hydrometric stations for water situation report

Catchment	Location	Reference	GWMU
Gaywood	Verge Opp Nook Well	TF71/085A	Babingley / Gaywood
Babingley	Valley Farm Massingham	TF72/007	Babingley / Gaywood
Heacham	Side Cottages Coe Ltd, Bircham, Kings Lynn	TF73/007	North West Norfolk Chalk
Nar	Washpit Farm Rougham	TF81/010	Nar Chalk
Ivel	Off Track Nr Furzenhall Farm	TL14/001	Sandy Sandstone
Ivel	Verge Sandon/Ashwell	TL23/087	Rhee Chalk
Rhee	Ivy Cottage Barley	TL33/002	Rhee Chalk
Cam	Verge A604 Stapleford	TL45/017	Cambridge Chalk
Old West	New Farm Landbeach	TL46/001	Cambridgeshire Sandstone
Cam	Chesterford Park	TL54/019	Cam Chalk
Granta	Verge A604 Nr Adoram Kennels, Hildersham	TL54/028	Granta Chalk
Cam	Nr Cherry Tree Stud	TL55/005	Lodes Chalk
Lark	Verge Nr Tank Hall Gazeley	TL76/110	Lark Chalk
Cut off Channel	Spinks Lodge Brandon	TL78/006	Lower Little Ouse Chalk
Wissey	Verge Near The Arms	TL89/019	Wissey Chalk
Thet	Verge S Side Near Heath Farm, Kenninghall	TM08/003	Thet Chalk

Table H5 – Surface Water hydrometric stations for water situation report

Catchment	Gauging Station	Reference	River
Bedford Ouse	Offord	33026	Gt Ouse
Ely Ouse	Temple	33014	Lark
NW Norfolk	Heacham	33032	Heacham
Bedford Ouse	Bedford	33002	Ouse
Bedford Ouse	Willen	33015	Ouzel
Bedford Ouse	Cappenham	33018	Tove

Bedford Ouse	Blunham	33022	Ivel
Ely Ouse	Dernford	33024	Cam
Ely Ouse	Abbey Heath	33034	Little Ouse
Ely Ouse	Northwold	33006	Wissey

Table H6 – Ecological Monitoring Sites

Regional Ref.	Site ID	Site Name	River
R02BF01M02	56493	A43 RD.BR. KINGHILL FARM	SYRESHAM STREAM
R02BF01M04	56501	A422 ROAD BRIDGE BRACKLEY	OUSE (UPPER)
R02BF01M07	56480	BOURTON MILL	OUSE (UPPER)
R02BF01M14	56491	WATER STRATFORD ROAD BRIDGE	OUSE (UPPER)
R02BF01M17	56500	WOODLAND FB 1KM N.E.EVENLEY	EVENLEY BROOK
R02BF01M22	142962	HINTON-IN-THE-HEDGES	RIVER OUSE
R02BF02M06	56495	STRATTON AUDLEY MILL	PADBURY BROOK
R02BF02M10	56482	KINGSBRIDGE FORD	PADBURY BROOK
R02BF02M20	56468	HOGSHAW	CLAYDON BROOK
R02BF02M22	56473	A413 ROAD BRIDGE ADSTOCK	HORWOOD BROOK
R02BF02M23	56471	ADDINGTON	CLAYDON BROOK
R02BF02M25	56479	WHITE BRIDGE	CLAYDON BROOK
R02BF03M04	56457	A5 ROAD BRIDGE OLD STRATFORD	OUSE (PADBURY)
R02BF04M04	56478	CAPPENHAM ROAD BRIDGE	TOVE
R02BF04M19	56484	A413 ROAD BRIDGE	SILVERSTONE BROOK
R02BF06M03	56404	STANBRIDGEFORD	OUZEL BROOK
R02BF06M04	56408	OUZEL BROOK ROAD BRIDGE BILLINGTON	OUZEL
R02BF07M03	56417	A4012 ROAD BRIDGE LEIGHTON BUZZARD	CLIPSTONE BROOK
R02BF07M09	154074	MANOR FARM	TRIB. CLIPSTONE BROOK
R02BF09M06	56431	BROUGHTON GAUGE	BROUGHTON BROOK
R02BF11M02	56445	TYRINGHAM BRIDGE	OUSE (OUZEL)
R02BF11M04	56433	OLNEY WEIR	OUSE (OUZEL)
R02BF11M09	56407	HARROLD BRIDGE	OUSE (OUZEL)
R02BF11M14	56310	KEMPSTON MILL	OUSE (OUZEL)
R02BF11M23	56311	RIVER LANE MILTON ERNEST	OUSE (OUZEL)

R02BF11M37	154071	CHICHLEY RD. BR.	CHICHLEY BROOK
R02BF12M14	56309	HARDWICK BRIDGE	ELSTOW BROOK
R02BF12M25	56285	DOVECOTE CROSSING WILLINGTON	ELSTOW BROOK
R02BF13M03	56234	U/S HITCHIN STW DISCHARGE	HIZ
R02BF13M04	56233	CADWELL ARCH	HIZ
R02BF13M06	56228	A507 ROAD BRIDGE ARLSEY	HIZ
R02BF13M18	56219	A505 RB HITCHIN	PURWELL
R02BF14M01	56195	A507 RD.BR. STOTFOLD	RIVER IVEL
R02BF14M07	56224	CHURCH END ARLESEY	PIX BROOK
R02BF14M12	56226	THE FORD POPPYHILL	IVEL
R02BF16M03	56284	BEADLOW ROAD BRIDGE	FLIT
R02BF16M06	56306	CRANFORD BRIDGE	FANCOTT BROOK
R02BF16M08	56303	RUXOX BRIDGE	RUNNING WATERS/STEPPINGLY BROOK
R02BF16M11	98501	OLD PARK FARM	RIVER FLIT
R02BF17M02	56270	SOUTH BRIDGE SHEFFORD	CAMPTON BROOK
R02BF17M05	56279	ION BRIDGE HANSCOMBE END	BARTON BROOK
R02BF18M01	56258	NAVIGATION TWIN BRIDGE CLIFTON	IVEL
R02BF19M19	56196	SUTTON FORD	MILLBRIDGE BROOK
R02BF21M01	56282	STONELY FOOTBRIDGE	KYM
R02BF21M03	56275	GT.STAUGHTON	KYM
R02BF21M14	142964	NEWTON BROMSWOLD	RIVER TIL
R02BF23M04	56223	GRINDLEYS BRIDGE	ALCONBURY BROOK
R02BF23M08	154070	LEYS FARM WOOLLEY	TRIB. ALCONBURY BROOK
R02BF26M06	56143	BROWNSHILL STAUNCH	OUSE (ST IVES)
R02BF26M14	56159	TRIB. OUSE STOCKS BR. ST IVES	MARLEY GAP BROOK
R02BF26M20	56144	HIGH CAUSEWAY BRIDGE	LONGSTANTON BROOK
R02BF26M49	56085	WELCHES DAM	OLD BEDFORD/RIVER DELPH
R02BF26M50	56047	BRIDGE WELNEY	OLD BEDFORD/RIVER DELPH
R02BF26M51	56030	WELMORE LAKE SLUICE	OLD BEDFORD/RIVER DELPH
R02BF26M52	56075	U/S OXLODE PS	GRUNTY FEN DRAIN
R02BF27M06	56065	GREAT CHESTERFORD ROAD BRIDGE	CAM

R02BF27M10	56087	DERNFORD LOCK GAUGING STATION	CAM
R02BF27M23	56081	WHITTLESFORD	CAM
R02BF27M25	56055	A1383 ROAD BRIDGE	WENDON BROOK
R02BF28M04	56037	HILDERSHAM FORD	GRANTA
R02BF28M05	56054	BOURN BRIDGE	GRANTA
R02BF28M07	56083	STAPLEFORD BRIDGE	GRANTA
R02BF28M12	56031	A604 LINTON BYPASS	GRANTA
R02BF29M03	56109	HAUXTON MILL	CAM
R02BF30M01	56179	ASHWELL SPRINGS	RIVER RHEE
R02BF30M07	56119	HASLINGFIELD RD BR	RHEE
R02BF30M19	56148	ROAD BRIDGE WHADDON	WHADDON BROOK
R02BF30M21	56139	MELBOURN BK RD CULVERT MELDRETH	MEL
R02BF30M22	56128	FOOTBRIDGE AT BOOT LANE	SHEP
R02BF33M02	56100	COE FEN BRIDGE CAMBRIDGE	CAM
R02BF33M06	56090	GREEN DRAGON FOOTBRIDGE CHESTERTON	CAM
R02BF34M02	56040	DIMMOCKS COTE ROAD BRIDGE	CAM
R02BF34M04	56061	A45 ROADE BRIDGE	QUY WATER
R02BF34M10	56034	HALLARDS FEN ROAD REACH	REACH LODE
R02BF34M13	56041	UPWARE LOCK	BURWELL LODE
R02BF34M20	56021	(MONKS LODE) 100 ACRE FARM BRIDGE	NEW RIVER
R02BF35M02	56118	FLAT BRIDGE WILLINGHAM	OLD WEST
R02BF35M05	56124	WILLINGHAM CULVERT RECREATION GROUND	WILLINGHAM LODE
R02BF35M24	56057	OLD STREATHAM PUMP STATION BRIDGE	OLD WEST RIVER
R02BF35M25	56123	B1050 ROAD BRIDGE, BRIDGE FARM	WILLINGHAM LODE
R02BF35M26	56078	LANDBEACH MARINA	BEACH DITCH
R02BF36M01	56095	ELY HIGH BRIDGE	ELY OUSE
R02BF36M10	56039	BARWAY BRIDGE	SOHAM LODE
R02BF36M19	56004	RIVER LANE FORDHAM	SNAIL
R02BF36M22	56001	ROAD BRIDGE AT SNAILWELL	RIVER SNAIL
R02BF37M02	55945	FLAT FARM BR	RIVER LARK
R02BF37M04	55941	SICKLESMERE ROAD BRIDGE A134	LARK

R02BF37M06	55950	BR STREET BURY ST.EDMUNDS	RIVER LARK
R02BF37M07	55952	TOLLGATE BRIDGE	RIVER LARK
R02BF37M08	55955	FORNHAM ALL SAINTS BRIDGE	LARK
R02BF37M09	55959	HENGRAVE BRIDGE	LARK
R02BF37M12	55974	TEMPLE STAUNCH	LARK
R02BF37M14	55994	JUDES FERRY	LARK
R02BF37M31	55971	ACCESS TRACK MILL HEATH	CAVENHAM STREAM
R02BF37M35	55977	TUDDENHAM MILL	TUDDENHAM MILL STREAM
R02BF38M06	55991	RED LODGE ROAD BRIDGE A11	KENNET
R02BF38M07	55999	BECK BRIDGE	KENNET
R02BF39M01	56000	ISLEHAM WEIR	LARK
R02BF39M03	56017	PRICKWILLOW ROAD BRIDGE	LARK
R02BF41M03	55930	BULL BRIDGE PAKENHAM	SAPISTON RIVER
R02BF41M05	55931	BARDWELL BRIDGE	SAPISTON RIVER
R02BF41M16	154073	BARDWELL MILL BRIDGE	STANTON STREAM
R02BF42M04	55908	BLO NORTON FORD	LITTLE OUSE RIVER
R02BF42M05	55932	ROAD BRIDGE KNETTISHALL	LITTLE OUSE RIVER
R02BF42M07	55938	ROAD BRIDGE EUSTON	LITTLE OUSE
R02BF42M09	55919	HOPTON RD. BR.	WESTON FEN BECK
R02BF42M24	154069	CHURCH LANE THELNETHAM	TRIB. LITTLE OUSE
R02BF44M01	55899	CROWSHALL BRIDGE ATTLEBOROUGH	RIVER THET
R02BF44M02	55906	WESTCAR BRIDGE ATTLEBOROUGH	THET
R02BF44M06	55897	BRIDGHAM TRACK BRIDGE	THET
R02BF44M31	55915	MOUNT PLEASANT ROAD BRIDGE	MELSOP STALLAND
R02BF44M34	55921	FORD AT SOUTH END	THET
R02BF45M02	55953	THETFORD NO.2 STAUNCH	LITTLE OUSE RIVER
R02BF46M07	56009	LITTLE OUSE ROAD BRIDGE	LITTLE OUSE RIVER
R02BF46M08	55992	SHEPARDS FEN	TWELVE FOOT DRAIN
R02BF47M01	56016	TEN MILE BANK BRIDGE HILGAY	TEN MILE RIVER
R02BF48M02	56325	NECTON BRIDGE	RIVER WISSEY
R02BF48M03	56327	NORTH PICKENHAM BRIDGE	WISSEY

R02BF48M06	56333	LINGHILLS FARM BR AT FORD	WISSEY
R02BF48M08	55963	ICKBURGH BRIDGE	WISSEY
R02BF48M15	56326	LITTLE CRESSINGHAM ROAD BRIDGE	WATTON BROOK
R02BF48M48	154072	A1065 MUNDFORD RD. BR.	WEST TOFTS STREAM
R02BF49M03	56342	WHITE BRIDGE OXBOROUGH	STRINGSIDE STREAM
R02BF50M01	55998	FIVE MILE BRIDGE WISSINGTON	WISSEY
R02BF50M02	56010	HILGAY BRIDGE A10	WISSEY
R02BF50M03	55984	A134 STOKE FERRY	WISSEY
R02BF51M01	56388	DENVER SLUICE	TEN MILE RIVER
R02BF52M04	56086	WELCHES DAM	COUNTER DRAIN
R02BF52M05	56048	WELNEY BRIDGE	COUNTER DRAIN
R02BF52M06	56390	OLD BEDFORD SLUICE SALTERS LODE	COUNTER DRAIN
R02BF52M14	56140	COLNEFEN FARM	CRANBROOK DRAIN
R02BF53M01	56208	STANGROUND SLUICE	KINGS DYKE
R02BF53M04	56172	TURNING TREE BRIDGE	WHITTLESEY DYKE
R02BF53M05	56399	HOBBS LOT BRIDGE	TWENTY FOOT RIVER
R02BF53M23	56392	NORDELPH ROAD BRIDGE	WELL CREEK
R02BF53M29	56169	ROAD BRIDGE AT BURY	BURY BROOK
R02BF53M46	56188	WOOD WALTON FEN SLUICE	GT RAVELEY DRAIN
R02BF53M54	56102	ANDREWS FARM MARCH	OLD COURSE R. NENE
R02BF53M55	56229	PIG WATER SL. YAXLEY	OLD COURSE R. NENE
R02BF53M57	56394	MULLICOURT PRIORY AQUEDUCT	WELL CREEK
R02BF56M08	56008	HILGAY BRIDGE A10	CUT OFF CHANNEL
R02BF56M26	55989	STOKE FERRY WTW INTAKE	CUT OFF CHANNEL
R02BF58M02	56321	B1145 RD. BR. MILEHAM	NAR
R02BF58M03	56324	LITCHAM RD. BR.	NAR
R02BF58M04	56332	WEST LEXHAM ROAD BRIDGE	NAR
R02BF58M05	56334	CASTLE ACRE RD. BR.	NAR
R02BF58M06	56335	WEST ACRE ROAD BRIDGE	NAR
R02BF58M07	56336	NARBOROUGH RD. BR.	RIVER NAR
R02BF58M09	56360	HIGHBRIDGE WORMGAY (BLACK'GH END)	NAR

R02BF58M10	56371	A10 RD. BR SETCHEY	RIVER NAR
R02BF58M11	56379	OLD SLUICE KING LYNN	NAR
R02BF59M04	56362	MIDDLETON TOWERS BRIDGE	MIDDLETON STOP DRAIN
R02BF61M13	89301	DERBY FEN	GAYWOOD RIVER
R02BF61M14	100361	A149 ROAD BRIDGE	GAYWOOD RIVER
R02BF64M01	56339	B1153 RB HILLINGTON	BABINGLEY RIVER
R02BF64M05	56357	A149 OLD ROAD BRIDGE CASTLE RISING	BABINGLEY RIVER
R02BF65M02	56353	A149 ROAD BRIDGE SNETTISHAM	INGOL
R02BF66M01	56352	HEACHAM MILL	HEACHAM RIVER

Potential Drought

Under potential drought conditions requirements for additional monitoring will depend on the time of the year. During the autumn and winter groundwater levels and reservoir levels will be of primary concern and will require increased scrutiny of existing information. During a potential summer surface water drought increased monitoring is required to detect the onset of drought conditions, trigger licence conditions and to assess the impact of river support schemes.

Current metering and visual assessments may be required in catchments where river support schemes are operating:

- The River Hiz;
- The River Rhee;
- The River Cam;
- The River Snail;
- The River Little Ouse;
- The River Thet.

Drought

Additional monitoring such as current metering and visual assessments may be required to assess the impact of drought management actions in:

- Catchments that are subject to Section 57 restrictions (Appendices A, B, C and D);
- Catchments that are suffering environmental stress;
- Catchments that are receiving river support;
- Areas that are subject to Drought Permits, Drought Orders and Section 20 agreements.

2. Ecological Monitoring

The purpose of ecological monitoring is to understand the impact of drought on the health of the environment. The routine ecological monitoring network ensures that monitoring starts long before the onset of drought and will continue after drought ends to assess any long-term changes. Additional monitoring may be needed during a drought to increase the number of sites sampled or frequency of sampling to understand the full range of shorter-term impacts. The frequency and duration of monitoring will be dependent on the nature of the site and the type of drought. Ecological monitoring will be used alongside other data to provide an indication of drought status.

Normal Conditions

During normal conditions routine monitoring of Headline Indicator (HI) sites will be conducted and Lotic-invertebrate Index for Flow Evaluation (LIFE) scores screened. The observed (O) LIFE score will be compared to the expected (E) score, which will be generated via RIVPACS. All HI sites will be screened except for those ruled out due to:

- Significant pollution problems;
- Level management;
- Poor habitat (that affects LIFE scores);
- Winterbourne status;
- Salinity impacts.

In addition to routine sites (see table H6), ten pre-defined key drought sites (listed in table H7) will be monitored bi-annually, which will represent all river types susceptible to drought and also provide a good spatial representation across Central Area. For these sites, O:E ratios and/or raw LIFE scores will be used to indicate potential or actual drought. The use of raw score targets are based on LIFE scores recorded in historic drought / low flow years. At some sites the use of raw scores could be more suitable as they can eliminate problems associated with poor RIVPACS predictions. Failure to achieve either site-specific LIFE targets at key sites and/or the critical 0.945/0.915 O:E thresholds (dependent on the site) will indicate potential or actual drought.

Table H7 – Details of the Key Ecological Drought Sites

River	Site	Biosys Code	Ref.
Great Ouse*	Water Stratford	56491	01M14
Tove	Cappenham Road Bridge	56478	04M04
Ivel*	Poppy Hill	56226	14M12
Kym	Great Staughton	56275	21M03
Cam*	Great Chesterford	56065	27M06

	Road Bridge		
Cavenham Stream (Lark)	Access Track Mill Heath	55971	37M31
Little Ouse	Euston Road Bridge	55938	42M07
Thet*	Bridgham Track Bridge	55897	44M06
Wissey*	Ickburgh Bridge	55963	48M08
Nar	Narborough	56336	58M07

* These sites form part of the national drought surveillance network.

Routine monitoring takes place during the spring and autumn, with the samples being collected and analysed by Sampling and Collection (S&C) and Analysis and Reporting (A&R) teams respectively. Therefore, depending upon the climatic conditions some level of reactive sampling may be required during the summer. This sampling would either take the form of one summer sample collected from each of the 10 key drought sites or sampling every other month at a sub-set of the drought sites depending on circumstances. These additional reactive samples will be collected and analysed by the A&R Team.

Potential Drought

During a potential drought (based on site-specific LIFE raw scores or LIFE O:E ratios between 0.944 to 0.915) screening of routine sites will continue on a bi-annual basis. The frequency of monitoring at the 10 key ecological drought sites, as identified in section 3.2.1, will increase to two-monthly intervals. LIFE O:E ratios of <0.915 and / or site-specific targets (as defined by raw scores) will indicate drought conditions.

Drought

The level of monitoring stipulated for routine sites and key drought sites at 'potential drought' status will continue until the ecology has recovered to normal conditions i.e. raw LIFE score greater than site-specific 'potential drought' threshold and / or LIFE O:E ratio >0.945.

It may also be necessary to conduct additional biological monitoring at two-monthly intervals on river reaches, which have support schemes. This would allow some measure of the effectiveness of such mitigation measures. This survey work would be conducted when local rivers were defined as being in drought status.

3. Fisheries

In consultation with the Analysis and Reporting Team it was decided that fisheries monitoring as an indicator of drought status was not particularly appropriate. This

conclusion is primarily based on the lack of regular monitoring at specific sites and the lack of opportunity to identify status changes before it is too late.

As part of the routine ecological monitoring the samplers will undertake a simple fisheries assessment, observing the state of the river from a fisheries perspective. As a drought develops other Environment Agency employees who are working in the field could be called on to undertake additional observations.

At times of distress the Analysis and Reporting and Sampling and Collection Teams will undertake to aid or rescue fish. These teams have a priority list for responding to drought related fisheries incidents and along with the Fisheries Recreation and Biodiversity team provide a call down list to try to ensure that staff is available to respond to incidents.

Of particular concern in Central Area is the possible impact of a drought on native Brown Trout populations and areas that have suffered during previous incidents. Table H8 includes a list of drought related fisheries incidents from 1995 and 1996.

Fisheries Drought Incidents

Prioritisation of drought related incidents

Below is a list of fishery types in Central Area. The list is in order of importance in terms of our commitment to carry out fish rescue operations, deploy aeration equipment and dose Hydrogen Peroxide during drought conditions.

A. Rivers / Drains
B. Angling Club / Syndicate Lakes
C. Commercial Fisheries
D. Local Authority Lakes / Village Ponds
E. Farm Ponds / Irrigation Reservoirs

Further consideration will be made based on the stock density of each fishery and also the number of anglers regularly fishing the water.

Table H8 – Drought related incidents – 1995 and 1996

Fisheries Drought Related Incidents 1995/96 (Rivers & Drains)			
Date	River	Location	Cause
28/06/1995	River Nar Tributary	U/S Litcham	Low levels
12/07/1995	Bourn Brook	D/S Bourn Village	Low levels/Do
13/07/1995	Soham Lode	D/S Clark & Butcher Mill Soham	Low levels/Do/Weed
17/07/1995	Sapiston	Drinkstone	Low levels
26/07/1995	Fenton Lode	Chatteris	Low levels
03/08/1995	Ellington Brook	Bythorn	Low levels
10/08/1996	Old West	Earith	Saline Intrusion
16/08/1995	Old Bedford	U/S Welney Sluice	Low levels

25/08/1995	Old Nene	Benwick	Low levels/Do/Duckweed
31/08/1995	40ft Drain	Horseway Arm Chatteris	Low levels/Do/Weed
13/09/1995	River Linnet	Bury St Edmunds	Low levels
10/06/1996	River Lark	Bury St Edmunds	Low levels
17/06/1996	River Kym	Gt Staughton	Low levels
22/07/1996	River Thet	Nunns Bridges Thetford	Low levels
01/08/1996	Alconbury Brook	Alconbury	Low levels

Fisheries Drought Related Incidents 1995/96 (Stillwater Fisheries & Ponds)			
Date	Water	Location	Cause
31/07/1995	Lee's Lake	Prickwillow Road Ely	Low Levels
02/08/1995	Bedford Park Lake	Bedford	Low Levels
16/08/1995	Pulloxhill Pond	Pulloxhill	Low Levels
23/08/1995	Westfield Estate Lake	Pottersbury	Low Levels
24/08/1995	Tottenhill Pits	Tottenhill near Kings Lynn	Low Levels/Do
29/08/1995	Pedva Pits	Near Burwell	Low Levels/Do
08/09/1995	High Road Farm Pond	Wiggenhall near Kings Lynn	Low Levels
01/09/1995	Brampton Golf Course	Brampton	Low Levels/Do
03/10/1995	Gt Welnetham Hall Moat	Gt Welnetham	Low Levels
27/06/1996	Eltisley Village Pond	Eltisley	Low Levels
16/08/1996	Wimpole Hall Lake	Wimpole	Low Levels
19/08/1996	Woodlakes	Stowbridge near Kings Lynn	Low Levels/Do
19/09/1996	Brack Pond	Earith	Low Levels
31/10/1996	Nethergrove Lake	Longstanton	Low Levels

4. Monitoring information from water companies

This section sets out our arrangements for obtaining water company data needed to help detect the onset of a drought and the additional data we may request during and following a drought.

Information below sets out what data we receive routinely from Anglian Water, Cambridge Water and Veolia Water Central who operate in Central Area.

As the severity of a drought increases it may be necessary to obtain additional information from water companies. This will be dependent on the nature and timing of the drought and the circumstances of the water company. Such information might include:

- Weekly demand data (water into supply) and / or daily abstraction data for strategic sources;
- Up-to-date estimates of leakage for supply / resource zones;
- Details of unplanned outage events and the effect of any planned outages once in a potential drought or drought;
- Drought or supply / demand scenario forecasts.

A decision on whether to ask for such information and when will be made in consultation with the SEP Team.

Anglian Water

Monthly reservoir percentage full levels as of the first of the month. Arrives as figures in an email from Anglian Water's Water Resources Specialist (Hydrology) sent to the following Environment Agency contacts:

- Water Resources Planning Manager – Supra Regional Water Resources Planning team;
- Hydrometry & Telemetry Officer (Hydrometry) – Eastern Area;
- Hydrometry & Telemetry Officer (Hydrometry) – Northern Area;
- Hydrologist – Midlands Region Flood Risk Management Team;
- Admin Support Officer – SEP Monitoring, Assessment and Reporting Team;
- Technical Officer Hydrometry & Telemetry – Supra Area;
- Hydrologist – Central Area.

Weekly reservoir percentage full levels as of the first of the month. Arrives as a spreadsheet by email from Anglian Water's Water Resources Specialist (Hydrology) sent to the following Environment Agency contacts:

- Water Resources Planning Manager – Supra Regional Water Resources Planning Team;
- Admin Support Officer – SEP Monitoring, Assessment and Reporting Team;
- Technical Officer Hydrometry & Telemetry – Supra Area.

Receive monthly storage data (reservoir capacity and percentage full) for Ardleigh reservoir. Sent as an emailed spreadsheet from Ardleigh reservoir committee to the following Environment Agency contacts:

- Water Resources Planner - Supra Regional Water Resources Planning Team.

And forwarded to the following Environment Agency contacts:

- Admin Support Officer – SEP Monitoring, Assessment and Reporting Team;
- Technical Officer Hydrometry & Telemetry – Supra Area.

Note: Ardleigh reservoir is shared between Anglian Water and Veolia Water East.

Veolia Water Central

South East region is the lead for Veolia Water Central. The South East Drought Coordinator will send data on the groundwater levels at the sites the company uses for triggers to the Anglian Region Drought Co-ordinator.

Cambridge Water

Cambridge Water will provide us with a detailed weekly and monthly update on its water resources situation, via email communications and monthly meetings. Any

production concerns (such as high outage levels) which may impact on resource availability will be highlighted in the updates, in addition to the impacts of the drought itself.

5. Other Monitoring

Localised management of spray irrigation demand, water transfers, water quality and navigation levels are carried out during normal conditions in connection with operational water resources management. As a drought develops more frequent scrutiny of available information may be necessary.

At all times it will be necessary to record the amount of staff time used in preparing for and managing a drought situation. Appropriate time codes will need to be identified and used, with specific codes for individual drought permit and order applications, which may involve cost recovery.

Normal Conditions

The water level in the Middle Level Main Drain is routinely monitored at Bodsey Bridge, using a dial up system. A minimum level of 99.45m South Level Datum (SLD) is required to maintain the navigation. As a consequence this is the cessation level for most spray irrigation licences that utilise water sourced from the Middle Level Main Drain.

Liaison with Northern Area staff, the Middle Level Commissioners and individual Internal Drainage Board (IDB) engineers allows estimates of the water available for transfer at Stanground and of spray irrigation demand to be made. In addition these liaisons provide information regarding the operation of slackers and transfers.

Cessation condition levels are monitored and implemented as necessary.

Potential Drought

The frequency of cessation condition monitoring is increased and conditions implemented as required.

Drought related incidents on NIRS are reported by Environment Management Teams to inform the Area Drought Coordinator.

Area Environment Planning and Groundwater and Contaminated Land Teams report well failures to inform the Area Drought Coordinator.

Enforcement effort delivered by Environment Officers may be directed to areas where cessation conditions or other restrictions are in force.

Drought

The frequency of cessation condition monitoring is increased and conditions implemented as required.

Environment Officers will monitor catchments subject to Section 57 restrictions. At these times it may be necessary to divert resources from other areas, depending on the scale of the incident.

Appendix I: Drought monitoring plans for Eastern Area

1. Hydrometric monitoring

This section describes the arrangements for monitoring hydrometric data in the Eastern Area and includes routine monitoring in connection with river transfer schemes, river support schemes and water resources operational management. Details of additional hydrometric monitoring (mainly accretion profiling) during the 1988-1992 and 1995-1997 droughts are provided in the Eastern Area Drought Reports of 1992, 1995 and 1996/97, which are located in the Eastern Area Water Resources library.

Details of routine hydrometric monitoring sites and frequency of monitoring are held by the Hydrometry and Telemetry (EOETS) Team Leader and Technical Specialist (Hydrology). Current flow gauging stations are detailed in Table I1.

Normal Conditions

Under Normal conditions the following activities are undertaken within Eastern Area

Eastern Area water situation report - The report is produced by the Eastern Area Hydrometry and Telemetry (EOETS) Team each month. The report includes the following information:

- Rainfall – monthly rainfall totals for Norfolk, Suffolk and Essex are plotted together with historical mean, maximum and minimum monthly values. They are also set in the context of rainfall category bands which are derived from probability ranking of historic monthly rainfall data;
- Soil Moisture Deficit – a graph of the weekly values from the Meteorological Office Rainfall and Evaporation Calculation System (MORECS) averaged for each county, together with historic mean, maximum and minimum values is provided;
- River flows – two graphs are provided for selected gauging stations; one shows mean daily flows for the current year and the other shows mean monthly flows. The latter includes flow category bands, which provide a context of the historical record and are derived from probability ranking of historic monthly flow data. Historical mean, maximum and minimum monthly values are also shown together with the amber and red flow thresholds (Q95 and 0.75 x Q95);
- Groundwater levels –groundwater levels for both the chalk and the drift aquifers are provided for selected sites for each county. One graph of monthly levels for the current year is shown together with groundwater level category bands which provide a context of the historical record and are derived from probability ranking of historic monthly.

Ely Ouse to Essex Transfer Scheme – Under the Ely Ouse to Essex Transfer scheme (EOETS) water from the Eastern part of the Ely Ouse River is transferred to the cut-off Channel at Denver. The impounding sluice at Denver enables water levels in the cut off channel to be raised to Blackdyke, Hockwold, where water is drawn off. The water is then pumped to the River Stour at Kirtling Green. Part of this transferred water can be abstracted from the Stour at Wixoe and pumped to the River Pant, thus the water transferred from Denver is utilised by Essex and Suffolk Water to fill Abberton and Hanningfield reservoirs.

The level in each reservoir is recorded and plotted weekly by the Eastern Area Hydrology Technical Specialist. The requirement to transfer is determined foremost by the status of the combined storage in Abberton and Hanningfield. The water company can operate the reservoirs conjunctively through redistribution within the supply network although there is no direct link between the two.

Full details of the operating protocol and management procedures can be found in the Ely Ouse to Essex Transfer scheme High Level System Operating manual (Binnie and Partners 1994). There is more specific drought-related information in the Ely Ouse to Essex Transfer Scheme Drought Plan (updated 2003).

Flows in the Ely Ouse and Essex river systems and levels in the Cut-Off Channel are monitored regularly as part of the scheme operation. Details are given in below (water company monitoring).

Stour Augmentation Groundwater Scheme - This scheme operates in conjunction with the EOETS and its purpose is to augment flows in the River Stour at times when there is insufficient water available for transfer at Denver. It is referenced in the EOETS High Level Operating Manual and in the EOETS Drought Plan (updated 2003).

There is no additional monitoring specifically associated with this scheme.

Great Ouse Groundwater Scheme - This scheme, operated by us, exists to support public water supply in Essex and abstractors in supported catchments. When the Denver MRF ceases to be maintainable, the cessation clause for the transfer of surface water from the Ely Ouse system to Essex comes into force. However, as the transfer to Essex will probably still be required, the Thet Little Ouse Groundwater Scheme (also known as the Great Ouse Groundwater Scheme (GOGS)) will need to be used to facilitate the transfer through Hockwold. This will be based on the requirements of Essex.

Waveney Augmentation Groundwater Scheme - The principal purpose of this scheme is to provide additional water for Essex and Suffolk Water to abstract downstream at their Shipmeadow intake. Details of the operating procedures are given in the document Waveney Augmentation Groundwater Scheme (WAGS) Operating Rules.

Monitoring during normal conditions comprises flow gauging at Oakley Park, Needham and Ellingham gauging stations, water level and salinity measurement at Burgh St Peter and groundwater level monitoring at the Waveney Scheme observation boreholes (these have been incorporated into the Groundwater Observation Network). Details are in the Waveney Augmentation Groundwater Scheme Operating Rules.

Deben Groundwater Support Scheme - This scheme has been developed jointly with Anglian Water and its purpose is to support the river at times of naturally low flows, which are exacerbated by abstraction. The method of operation is set out in the Anglian Water Winston abstraction licence, serial number 7/35/06/*G/0124. Monitoring during normal conditions comprises flow gauging at Naunton Hall and Brandeston gauging stations and dissolved oxygen measurement at Brandeston and Letheringham Mill.

Abstraction Licence Cessation Conditions - Eastern Area currently manages these abstractions using spreadsheets that identify licences with cessation conditions; one where the onus is on the licence holder to contact us and one where the onus is on us to contact the licence holder.

River flows at gauging stations are monitored by the Eastern Area Hydrometry and Telemetry (EOETS) Team and current flows are entered into a spreadsheet daily. This is accessed by the Area Environment Planning team and used to check abstraction licence condition compliance.

Groundwater levels are monitored by Eastern Area Hydrometry and Telemetry (EOETS) Team monthly and the data is available to the Area Environment Planning team to check abstraction licence condition compliance.

Potential Drought

The following additional monitoring may be necessary to detect the onset of drought conditions and to assess the impact of any river support schemes currently operating in Eastern Area.

Recession forecasts - spring and summer flow recession forecasts (figures H1-4) are available for key sites in the Area:

- River Deben at Naunton Hall;
- River Wensum at Swanton Morley combined;
- River Brain at Guithavon Valley;
- River Burn at Burnham Overy.

The forecasts, also known as baseflow tracking hydrographs, should be revised at approximately monthly intervals between April and October but this will depend on the development of the drought. In the winter the updates should be quarterly.

Current meter surveys - Current meter surveys and other flow checks or visual assessments should be carried out in river systems where flows are critical for the operation of support schemes or for other reasons, or where there is uncertainty about the gauging accuracy. The following should be included:

- Ellingham – additional measurements to check the accuracy of the ultrasonic flow gauge;
- River Deben – flow accretion profiles.

Groundwater Monitoring - Groundwater monitoring should be carried out where it is required in connection with one of our abstraction licences or where another need has been identified. The following should be included:

- Observation boreholes, piezometers and private wells in the Earl Soham area required to be monitored as a condition of the Agency's licence 7/35/6/*G/0113.

The Area monthly report will include details of the number of abstraction licences which are subject to restrictions.

Drought and Post Drought status

Section 4.1 of the Anglian Drought Plan provides information on the hydrometric data collected in drought and post-drought statuses.

Table I1 – Current Flow Gauging Stations

River	Station Name	County / Location	Station No.	Catchment Area	Q95	Low (Exceptionally or Notably)	Flow Indicators (m^3/s)											
				km^2	m^3/sec		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Crouch	Wickford	South Essex	37031	71.8	0.046	Exceptionally	0.11	0.10	0.10	0.08	0.10	0.08	0.07	0.06	0.06	0.06	0.10	0.10
						Notably	0.14	0.16	0.16	0.12	0.11	0.09	0.08	0.08	0.08	0.07	0.12	0.15
Can	Beaches	Mid Essex	37006	228.4	0.19	Exceptionally	0.41	0.51	0.39	0.37	0.28	0.21	0.16	0.14	0.22	0.23	0.30	0.44
						Notably	0.67	0.60	0.53	0.56	0.38	0.28	0.22	0.21	0.24	0.25	0.36	0.60
Chelmer	Churchend	Mid Essex	37011	72.6	0.056	Exceptionally	0.12	0.11	0.11	0.09	0.06	0.05	0.04	0.04	0.05	0.06	0.07	0.11
						Notably	0.20	0.16	0.20	0.11	0.10	0.08	0.05	0.05	0.06	0.07	0.08	0.15
Chelmer	Springfield	Mid Essex	37008	190.3	0.28	Exceptionally	0.51	0.48	0.43	0.38	0.33	0.30	0.25	0.23	0.29	0.30	0.37	0.47
						Notably	0.71	0.59	0.74	0.52	0.48	0.37	0.30	0.32	0.32	0.36	0.43	0.59
Brain	Guithavon	Mid Essex	37009	60.7	0.15	Exceptionally	0.22	0.22	0.21	0.19	0.16	0.16	0.14	0.14	0.15	0.17	0.19	0.22
						Notably	0.26	0.27	0.29	0.23	0.20	0.19	0.16	0.17	0.18	0.18	0.23	0.26
Blackwater	Appleford	Mid Essex	37010	247.3	0.346	Exceptionally	0.70	0.74	0.75	0.73	0.54	0.53	0.33	0.33	0.40	0.36	0.45	0.74
						Notably	1.01	1.11	1.12	0.86	0.61	0.60	0.43	0.42	0.42	0.44	0.54	0.84
Colne	Lexden	Mid Essex	37005	238.2	0.203	Exceptionally	0.49	0.51	0.48	0.36	0.28	0.23	0.18	0.15	0.18	0.25	0.31	0.45
						Notably	0.72	0.69	0.72	0.47	0.40	0.33	0.20	0.19	0.25	0.29	0.39	0.62
Stour	Westmill	North Essex	36008	224.5	0.13	Exceptionally	0.75	0.81	0.67	0.61	0.35	0.29	0.19	0.18	0.14	0.16	0.26	0.47
						Notably	1.32	1.02	0.99	0.63	0.50	0.39	0.30	0.31	0.25	0.32	0.34	0.81
Box	Polsted	South Suffolk	36003	195	0.06	Exceptionally	0.10	0.10	0.10	0.09	0.07	0.06	0.05	0.04	0.05	0.07	0.09	0.11
						Notably	0.14	0.16	0.14	0.10	0.09	0.07	0.06	0.05	0.07	0.08	0.10	0.13
Gipping	Bramford	South Suffolk	35010	298	0.17	Exceptionally	0.46	0.42	0.43	0.30	0.27	0.19	0.15	0.12	0.13	0.18	0.32	0.37
						Notably	0.62	0.84	0.70	0.38	0.36	0.25	0.16	0.17	0.20	0.25	0.35	0.58
Deben	Naunton Hall	East Suffolk	35002	163.1	0.09	Exceptionally	0.28	0.26	0.21	0.17	0.10	0.05	0.05	0.06	0.10	0.13	0.18	0.33
						Notably	0.42	0.46	0.35	0.20	0.12	0.12	0.08	0.08	0.12	0.15	0.20	0.38
Alde	Farnham	East Suffolk	35003	63.9	0.04	Exceptionally	0.12	0.11	0.09	0.06	0.05	0.04	0.04	0.03	0.04	0.05	0.05	0.09
						Notably	0.16	0.18	0.14	0.07	0.06	0.05	0.05	0.04	0.05	0.05	0.07	0.13

Ore	Beversham	East Suffolk	35004	54.9	0.07	Exceptionally	0.14	0.13	0.12	0.09	0.07	0.06	0.05	0.06	0.07	0.08	0.09	0.15
						Notably	0.18	0.19	0.15	0.11	0.09	0.09	0.07	0.06	0.08	0.09	0.11	0.17
Blyth	Holton	East Suffolk	35013	92.9	0.065	Exceptionally	0.16	0.13	0.12	0.09	0.08	0.07	0.06	0.06	0.06	0.07	0.09	0.16
						Notably	0.28	0.22	0.21	0.11	0.09	0.08	0.07	0.07	0.08	0.08	0.10	0.26
Waveney	Needham	North Suffolk	34006	370	0.275	Exceptionally	0.69	0.76	0.66	0.40	0.37	0.31	0.29	0.29	0.29	0.29	0.37	0.54
						Notably	1.17	1.28	1.11	0.52	0.47	0.41	0.35	0.30	0.33	0.37	0.46	0.92
Tas	Shotesham	South Norfolk	34002	146.5	0.17	Exceptionally	0.48	0.35	0.28	0.27	0.23	0.18	0.12	0.13	0.16	0.19	0.27	0.39
						Notably	0.53	0.50	0.41	0.35	0.27	0.21	0.16	0.15	0.18	0.23	0.30	0.45
Yare	Colney	South Norfolk	34001	231.8	0.32	Exceptionally	0.83	0.83	0.84	0.58	0.47	0.29	0.21	0.20	0.27	0.39	0.49	0.81
						Notably	1.26	1.27	1.12	0.76	0.53	0.38	0.36	0.31	0.37	0.41	0.58	1.09
Tud	Costessey Park	Mid Norfolk	34005	73.2	0.092	Exceptionally	0.30	0.24	0.21	0.16	0.12	0.08	0.08	0.06	0.08	0.10	0.14	0.26
						Notably	0.33	0.31	0.27	0.18	0.14	0.12	0.09	0.09	0.11	0.13	0.18	0.31
Wensum	Fakenham	North West Norfolk	34011	161.9	0.246	Exceptionally	0.43	0.46	0.46	0.41	0.31	0.21	0.18	0.16	0.17	0.21	0.28	0.42
						Notably	0.60	0.67	0.62	0.45	0.38	0.30	0.23	0.21	0.25	0.25	0.37	0.57
Wensum	Swanton Morley	Mid Norfolk	34014	397.8	0.909	Exceptionally	1.82	1.71	1.78	1.38	1.16	0.77	0.70	0.70	0.79	1.00	1.32	1.66
						Notably	2.32	2.41	2.10	1.63	1.26	1.05	0.85	0.92	0.98	1.04	1.42	2.14
Ant	Honing Lock	North Norfolk	34008	49.3	0.16	Exceptionally	0.24	0.25	0.24	0.21	0.18	0.14	0.16	0.14	0.18	0.20	0.23	0.26
						Notably	0.31	0.29	0.26	0.24	0.21	0.18	0.18	0.18	0.21	0.22	0.25	0.30
Bure	Ingworth	North Norfolk	34003	164.7	0.56	Exceptionally	0.93	0.89	0.87	0.69	0.64	0.51	0.50	0.50	0.57	0.65	0.75	0.93
						Notably	1.02	0.97	0.92	0.79	0.66	0.57	0.55	0.54	0.59	0.70	0.88	1.01
Stiffkey	Warham	North Norfolk	34018	87.8	0.129	Exceptionally	0.33	0.33	0.34	0.28	0.19	0.13	0.08	0.08	0.10	0.13	0.19	0.27
						Notably	0.40	0.44	0.38	0.32	0.23	0.15	0.12	0.12	0.15	0.18	0.28	0.40
Burn	Burnham	North Norfolk	34012	80	0.09	Exceptionally	0.11	0.12	0.12	0.13	0.12	0.11	0.09	0.07	0.07	0.07	0.08	0.09
						Notably	0.16	0.17	0.18	0.17	0.15	0.13	0.11	0.10	0.10	0.10	0.11	0.14

2. Ecological monitoring

The purpose of ecological monitoring is to understand the impact of drought on the health of the environment. The routine ecological monitoring network (see table I2) ensures that monitoring starts long before the onset of drought and will continue after drought ends to assess any long-term changes. Additional monitoring may be needed during a drought to increase the number of sites sampled or frequency of sampling to understand the full range of shorter-term impacts. The frequency and duration of monitoring will be dependent on the nature of the site and the type of drought.

The strategy for ecological monitoring is as follows:

- Existing routine monitoring is used to flag up warnings about rivers suffering from low flows;
- Trigger levels are set which indicate when extra monitoring is needed.
- The enhanced monitoring is then applied to any rivers showing dangerous signs of stress;
- The data generated is used to assess, through additional sets of trigger levels, when management actions are appropriate.

Table I2 – Ecological Monitoring Sites for Routine Ecological Monitoring Network

Site Name	Catchment	Tributary
Edgefield Bridge	Glaven	Glaven
Wighton Bridge	Stiffkey	Stiffkey
Ingworth Bridge	Bure	Bure
Homersfield Bridge	Waveney	Waveney
Great Witchingham Bridge	Wensum	Wensum
Langham Bridge	Ore/Alde	Alde
Holton Bridge	Blythe	Blythe
Eyke Ford	Deben	Deben
A134 Bridge Long Melford	Stour	Chad Brook
Lexden Bridge	Colne	Colne

Trigger levels for enhanced monitoring and management actions are given in tables I4 and I5 for the River Brett. It is proposed to develop similar trigger levels for other rivers that are known to suffer drought stress. Management actions may include flow augmentation, weed clearance, aeration, fish rescue etc. Through experience during drought periods, trigger levels can be refined and the strategy fine-tuned.

The real situation can be complicated and this general model requires a considerable amount of judgement and flexibility to match the type and extent of effort to the scale and manageability of the problems.

Normal Conditions
A network of sampling points on rivers is monitored monthly for water quality including dissolved oxygen (DO) and temperature. This information is available on the Monitoring Information Data Archive System (MIDAS) and failures against DO targets are also reported in the fortnightly MIDAS exceptions reports. These reports are produced by the Analysis and Reporting team. Water Quality Monitoring Stations (WQMS) monitor the given determinants continuously at the following locations:

- River Stour at Wixoe (Dissolved Oxygen);
- River Deben at Brandeston and Letheringham (Dissolved Oxygen);
- River Bure at Acle (salinity);
- River Thurne at Repps (salinity).

The routine collection of Dissolved Oxygen and temperature data is used to signal the start of low-flow related problems in most cases.

Potential Drought and Drought
Enhanced monitoring needs to be a combination of more intense scrutiny of baseline data and collection of extra data from the field. The information can be defined as either indicators of potential environmental damage (danger factors) or actual damage (damage factors). Danger factors are an indication that Dissolved Oxygen may be low or falling. Damage factors show that Dissolved Oxygen is already low, anoxic conditions may be becoming established and wildlife may be suffering.

Information available includes rainfall, weather forecast, gauged river flows, routine water quality monitoring and some WQMS data for DO and temperature. In addition there are a number of DO loggers in the Area which can be deployed as and where necessary.

Field visits will also be necessary to assess the situation more accurately. These should concentrate on predetermined locations, which may include historical monitoring sites which have been discontinued. Implementation should be according to how individual catchments are being affected by drought. DO levels are the most basic and important damage factor. If DO is already low and the river is becoming anoxic, fish may be in distress or dead and anaerobic bacteria may be visible or obvious by the smell of hydrogen sulphide. In non-ponded sections, the watercouse may be dry or shrunken. Danger factors include low velocity, the amount of plant growth and high temperatures. See table I3 for an example of a drought incident ecological monitoring form.

Once the various trigger levels have been breached, enhanced monitoring would be initiated. This would include additional DO monitoring at predetermined high risk sites along the river stretches. Should the levels drop below those identified in the monitoring tables (table I4) consideration would be given to aeration, peroxide dosing or other management actions as identified in the action table (table H5).

Should the conditions deteriorate to the point of anaerobic conditions occuring then additional sampling, including sediments, should be considered. Additional invertebrate samples would not be taken in most circumstances as invertebrates have been found not to respond rapidly or consistently to acute drought conditions.

Post Drought
Ecological monitoring during the winter is not appropriate, as temperature is a key factor in detecting the potential for ecological damage. As the end of a drought often coincides with autumn / winter rainfall, post drought monitoring will usually be expected to be a return to baseline monitoring. There may be circumstances when drought monitoring is relaxed more gradually.

Table I3 Drought Incident Ecological Monitoring Form

Surveyor(s)		**Time**	
Waterbody and Site		**DO (%)**	
NGR		**DO mg/l**	
Date		**Water Temp (C)**	
Weather Forecast	cool +/or rain	warm and dry	hot and dry

Please tick appropriate category

Surface covered by macrophytes (assessed over 100m)	<25%	25-50%	50-75%	>75%	
Water Flow/Level	High	normal	low	v. low level/ no flow	dry
Water Turbidity (state colour)	clear	slight	moderate	high	
Fish	none seen	healthy	distressed	few deaths (<5)	many deaths (≥5)
Anaerobic bacterial growth	none	local (<30%)	widespread (>31%)		
River Odour	normal	bubbles or bad smell	bad smell 50m from river		

Biology (optional)	normal	minimal impacts	significant impacts

Comments:

Table I4 – Drought Incident Actions Integrated Management – River Brett Enhanced Monitoring

Status Indicators and Action Triggers	**Stage one**	**Stage two**	**Stage three**	**Stage four**
	Baseline	**(early warning)**	**(minor incident)**	**(Serious incident)**
Danger factors				
Base flow at Hadleigh	>0.09 m^3/s 0	0.068-0.09 m^3/s 2	0.045-0.068 m^3/s 3	<0.045 m^3/s 4
Dissolved oxygen levels at key sites (min daily recorded)	>3 mg/l 0	1.5-3mg/l 2	0-1.5 mg/l 3	0 mg/l 4
Water temperature (max daily recorded)	<20°C 0	20-22°C 1	22-24°C 2	>24°C 3
Weather forecast	Cool +/or rain 0	Warm and dry 1	Warm and dry 1	Hot and dry 3
Surface covered by macrophytes (assessed over 100m)	<25% 0	25-50% 1	50-75% 2	>75% cover 3
Water flow or level	High or normal 0	Low 1	V. low level / no flow 3	Dry 5
Water Turbidity (state colour)	Clear 0	Slight 0	Moderate 1	High 2
Damage factors				
Fish community	none seen/healthy 0	none seen/healthy 0	Distressed 3	Deaths 5
Anaerobic bacterial growth	None 0	None 0	Local (<30%) 3	Widespread (>30%) 4

River odour	Normal 0	Normal 0	Bubbles or bad smell 3	Bad smell 50m from river 4
Biology and ecology (optional)	Normal 0	Normal 0	Minimal impacts 2	Significant impacts 4

Danger factor total	
Damage factor total	

Table I5 – Integrated Management – River Brett Action table

Baseline monitoring only (flow, monthly DO and temp., weather forecast)			
Danger factor total			
0-3	Do nothing		
>3	Assess need to move to enhanced monitoring		
Enhanced monitoring (at least weekly visits to record all factors)			
Danger factor total	**Action**	**Damage factor total** (over-rides danger total)	**Action**
0-3	Return to baseline monitoring	0-2	Do nothing
4-8	Continue enhanced monitoring	3-6	Restrict abstraction Assess need for river support Assess need for deploying aerators
9-13	Increase monitoring further (>weekly visits, deploy DO loggers) Convene drought team Assess need for voluntary abstraction restrictions	>6	Instigate above (where possible) Assess need for peroxide dosing Manage media issues

14-20	Continue further enhanced monitoring Assess need for statutory restriction on abstractors Consider need for incident management Prepare to take further action		

3. Monitoring information from water companies in Eastern Area

Data routinely received from water companies in Eastern Area

Anglian Water

Monthly storage data (reservoir capacity and percentage full) for Ardleigh reservoir. Sent as an emailed spreadsheet from Ardleigh reservoir committee to:

- Technical Specialist (Hydrology) - Eastern Area

Note: Ardleigh reservoir is shared between Anglian Water Services and Veolia Water East.

Essex and Suffolk Water

Weekly reservoir storage data for Abberton and Hanningfield. Percentage full and actual storage in Ml/d. Arrives as an emailed Word document from ESW Water Resources Technician and is sent to:

- Monitoring and Data Officer (Hydrometry and Telemetry (EOETS)) – Eastern Area;
- Technical Specialist (Hydrology) - Eastern Area.

Daily Reservoir and Water Treatment Works demand for Essex supply zone supplied via email to:

- Technical Specialist (Hydrology) – Eastern Area

Ely Ouse to Essex transfer scheme (EOETS) quantities are routinely discussed with the company on a weekly basis as set out in the scheme's operating manual.

4. Other Monitoring in Eastern Area

Monitoring and enforcement of S57 restrictions will be carried out in relevant catchments.

Monitoring of demand for public water supply is carried out in conjunction with the relevant water companies in connection with the operation of the Ely-Ouse to Essex Transfer Scheme and of the Waveney Augmentation from Groundwater Scheme.

Drought related incidents on NIRS are reported by Environment Management teams to inform the Drought Co-ordinator.

5. Operational management of the Ely-Ouse to Essex Transfer Scheme

Information provided by Essex and Suffolk Water:

- System through flow, including intake flows, reservoir storage and current demand/output of system;
- Current intake situation of abstractions and levels at below locations:
  - Hanningfield intake No 4;
  - Stratford intake;
  - Roman River intake;
  - Langham;
  - Brantham;
  - Wormingford Intake (new);
  - Langford 1 – Blackwater intake;
  - Langford – Chelmer intake;
  - Langford Mill – Blackwater intake;
  - Stratford Glenfield residual flow and stage;
  - Chelmer effluent reuse scheme levels;
  - Cattawade level data.

Link to Environment Agency telemetry system showing:

- Calculated flow at Stratford St Mary, both semi-natural and derived;
- Blackdyke water quality information;
- SAGS status, alarms and pump outputs;
- GOGS status, alarms and pumps outputs.

Gauging station flow levels and alarms at:

1. Copford Hall Gauging Station;
2. Great Sampford Gauging Station;
3. Kirtling Green Gauging Station;
4. Langford Gauging Station;
5. Appleford Bridge Gauging Station;
6. Guithavon Valley Gauging Station;
7. Sandon Bridge Gauging Station;
8. Crabbs Bridge Gauging Station;
9. Springfield Gauging Station;
10. Langham Gauging Station;
11. Hadleigh Gauging Station;
12. Polstead Gauging Station;
13. Higham Gauging Station;
14. Rushes Lock Gauging Station;
15. Ulting Gauging Station;
16. Beaches Mill Gauging Station;

17. Keddington Gauging Station;
18. Denver complex flow at Residual Sluice;
19. Denver complex flow at Diversion Sluice;
20. Cut Off Channel Levels at Denver and Blackdyke.

Example from Eastern Area hydrometric bulletin / water situation report

Note: Data presented within this document is intended primarily for internal use and is not validated so it should be treated with caution. Therefore the document should only be used for information and no inference should be drawn without consultation with the Environment Agency.

Eastern Area Hydrometric Bulletin Information

The Eastern Area hydrometric bulletin is presented as two separate spreadsheets, one for surface water hydrometric information and the second for below ground or sub-surface information. All information is presented on a monthly time step, with additional daily plots for surface water flows.

Monthly Mean, Maximum and Minimum Statistics are calculated from a minimum of 25 year period of record or for the period 1970 -2006 where the record permits. Rainfall figures are based on the period 1914-2006 . The use of a common baseline allows for a comparison of the long term statistics between areas and Regions. The baseline period will be updated every 5 years. It should be noted that during the Summer of 2007 some rivers in Eastern Area exceeded historic Summer monthly maximum flows, these were predominantly in Norfolk.

In addition to the basic statistics the current monthly level is set in context of the historic record to identify current event rarity. The same method for probability ranking has been used for all hydrometric data, with the exception of Soil moisture Deficits. Probability ranking of river flow and groundwater level data has been carried out using the Cunnane plotting position. This results in the Categorisation of data according to the probable return period for a particular event. For any given month the flow has been categorised into 7 categories although for purposes of clarity not all are shown on the monthly hydrographs.

Category	Return Period
Exceptionally High	Greater than 1 in 20 Years
Notably High	Between 1 in 8 and 1 in 20 years
Above Normal	Between 1 in 4 and 1 in 8 Years
Normal	Less than 1 in 4 years
Below Normal	Between 1 in 4 and 1 in 8 Years
Notably Low	Between 1 in 8 and 1 in 20 years
Exceptionally Low	Greater than 1 in 20 Years

These categories are the same as those used by the National River flow Archive in their monthly Hydrological Summary for the U.K.

These categories are intended to supplement existing drought triggers, which are fixed values based upon the annual Q 95 flow. In future both sets of figures will be used together when determining whether a catchment falls within the definition of drought.

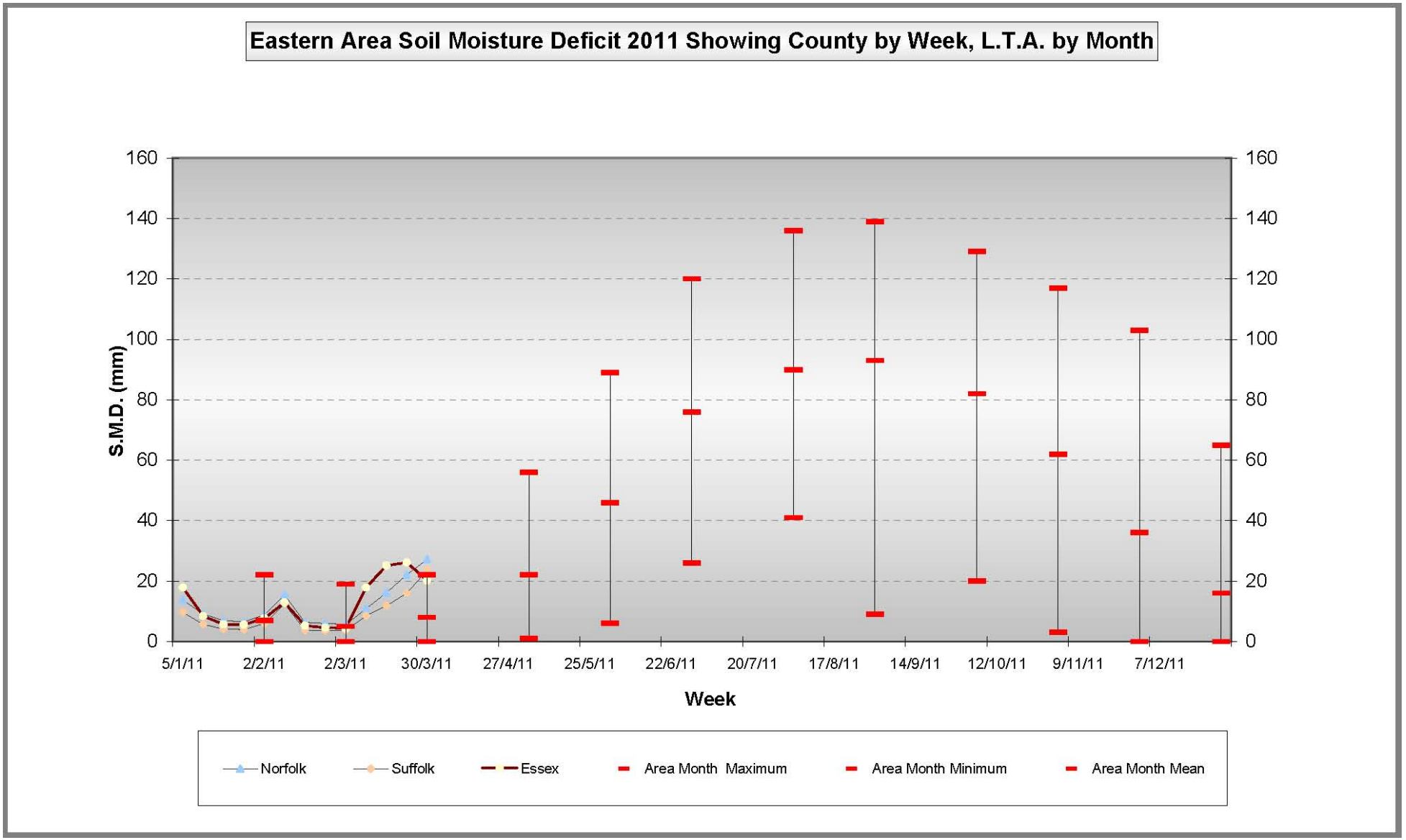
The Methods used in the Eastern Bulletin to categorise flows and groundwater levels have been adopted nationally bringing a consistent approach to water resource management and hydrometric reporting.

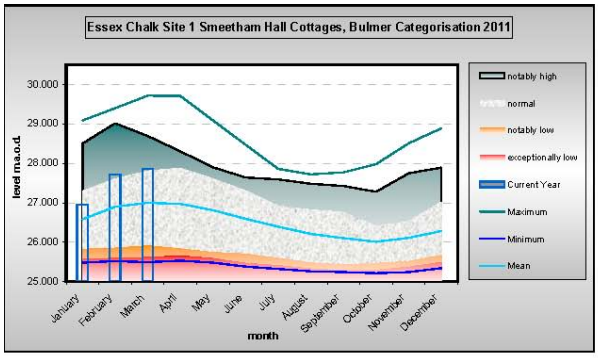
Bulletin Ref.	Site Location	Agency Ref.	Datum (a.o.d.n)
	Essex Chalk		
Essex Ck1	Smeetham Hall Cottages, Bulmer	TL84/410	54.71
Essex Ck2	Lamarsh	TL83/950	23.9
Essex Ck4	Rodbridge Corner	TL84/541	30.65
	Essex Drift		
Essex Dr1	Glebe Cottages, Ardleigh	TM02/591	37.42
Essex Dr2	Clockhouse Farm	TL63/531	64.49
Essex Dr3	Hungerdowns Farm, Ardleigh	TM02/791	37.17
Essex Dr4	Stanford-Le-Hope piezo 1.	TQ68/720A	11.43
	Suffolk Chalk		
Suffolk Ck1	Dial Farm, Coddenham	TM15/2601	64.6
Suffolk Ck2	Castle Farm, Offton	TM04/695	68.05
Suffolk Ck3	Borough Green	TL64/450	108.32
Suffolk Ck4	Strawberry Hill Framlingham	TM26/7389	48.57
	Suffolk Drift		
Suffolk Dr1	Pug Cottage, Sudbourne	TM45/2136	15.03
Suffolk Dr2	Brewery Farm, Ashbocking	TM15/5481	39.05
Suffolk Dr3	Gull Farm, Debenham	TM16/7464	37.87
Suffolk Dr4	Halfway Cottages, Sizewell	TM46/622	11.39
	Norfolk Chalk		
Norfolk Ck1	South Creake, The School	TF83/567	23.41
Norfolk Ck2	Costessey	TG11/619	17.92
Norfolk Ck3	Hindolveston	TG02/494	56.397
Norfolk Ck4	Weston Longville	TG11/151	49.28
Norfolk Ck5	Guilers	TG19/069	50.3
	Norfolk Drift		
Norfolk Dr1	Coltishall	TG22/801A	4.31
Norfolk Dr2	Thelveton	TM18/506	40.81
Norfolk Dr3	(pending)		
Norfolk Rd4	(pending)		

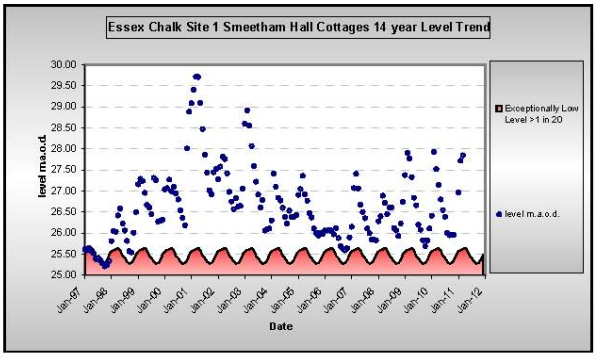
Anglian Region Eastern Area Aquifer State Summary 2011

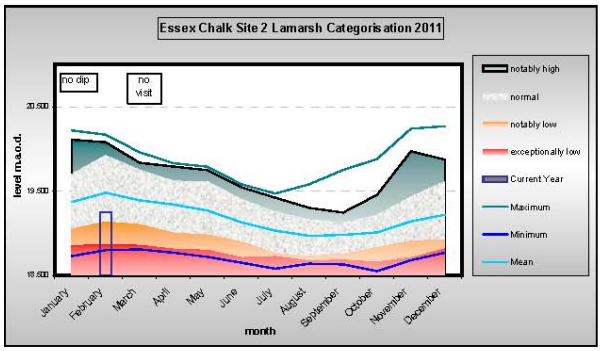
Aquifer	Borehole Location	January	February
Essex Ck1	Smeetham Hall Cottages	above normal	notably high
Essex Ck2	Lamarsh	last dip November	below normal
Essex Ck4	Rodbridge Corner	last dip October	normal
Essex Dr1	Glebe Cottages, Ardleigh	last dip November	above normal
Essex Dr2	Clockhouse Farm	normal	last dip January
Essex Dr3	Hungerdowns Farm, Ardleigh	last dip November	above normal
Essex Dr4	Stanford-Le-Hope	last dip November	notably high
Suffolk Ck1	Dial Farm, Coddenham	normal	above normal
Suffolk Ck2	Castle Farm, Offton	above normal	above normal
Suffolk Ck3	Borough Green	last dip November	normal
Suffolk Ck4	Strawberry Hill Framlingham	exceptionally high	exceptionally high
Suffolk Dr1	Pug Cottage, Sudbourne	notably high	above normal
Suffolk Dr2	Brewery Farm, Ashbocking	normal	normal
Suffolk Dr3	Gull Farm, Debenham	normal	normal
Suffolk Dr4	Halfway Cottages, Sizewell	above normal	above normal
Norfolk Ck1	South Creake	normal	normal
Norfolk Ck2	Costessey	notably high	normal
Norfolk Ck3	Hindolveston	above normal	normal
Norfolk Ck4	Weston Longville	above normal	above normal
Norfolk Ck5	Guilers	visit- no data	visit - no access
Norfolk Dr1	Coltishall	last visit May 2010	1/4 visit - logger
Norfolk Dr2	Thelveton	normal	normal
Norfolk Dr3			
Norfolk Dr4			

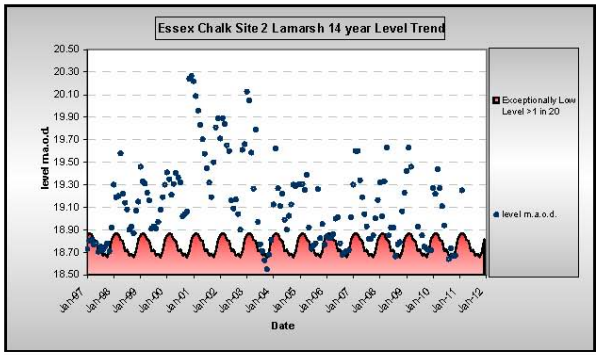
	Aquifer	Flag	Return period
	Chalk	exceptionally low	> 1 in 20
	Drift	notably low	> 1 in 8 < 1 in 20
		below normal	> 1 in 4 < 1 in 8
		normal	< 1 in 4
		above normal	> 1 in 4 < 1 in 8
		notably high	> 1 in 8 < 1 in 20
		exceptionally high	> 1 in 20

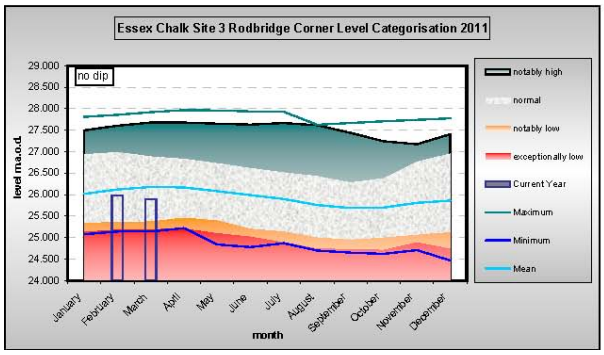

Eastern Area Soil Moisture Deficit 2011 Showing County by Week, L.T.A. by Month
S.M.D. (mm)
160
140
120
100
80
60
40
20
0
5/1/11
2/2/11
2/3/11
30/3/11
27/4/11
25/5/11
22/6/11
20/7/11
17/8/11
14/9/11
12/10/11
9/11/11
7/12/11
Week
Norfolk
Suffolk
Essex
Area Month Maximum
Area Month Minimum
Area Month Mean

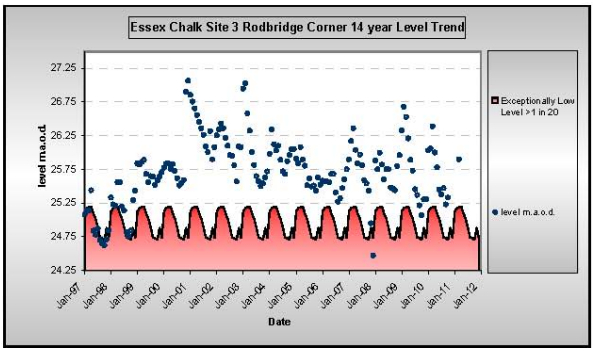

Essex Chalk Site 1 Smeetham Hall Cottages, Bulmer Categorisation 2011
level m.a.o.d.
month
notably high
normal
notably low
exceptionally low
Current Year
Maximum
Minimum
Mean


Essex Chalk Site 1 Smeetham Hall Cottages 14 year Level Trend
level m.a.o.d.
Date
Exceptionally Low Level >1 in 20
level m.a.o.d.


Essex Chalk Site 2 Lamarsh Categorisation 2011
no dip
no visit
level m.a.o.d.
month
notably high
normal
notably low
exceptionally low
Current Year
Maximum
Minimum
Mean


Essex Chalk Site 2 Lamarsh 14 year Level Trend
level m.a.o.d.
Date
Exceptionally Low Level >1 in 20
level m.a.o.d.


Essex Chalk Site 3 Rodbridge Corner Level Categorisation 2011
no dip
level m.a.o.d.
month
notably high
normal
notably low
exceptionally low
Current Year
Maximum
Minimum
Mean


Essex Chalk Site 3 Rodbridge Corner 14 year Level Trend
level m.a.o.d.
Date
Exceptionally Low Level >1 in 20
level m.a.o.d.

River	Station Name	County/Location	Station No.	Catchment Area km²	Q95 m³/sec	Flood Watch Level m
Essex						
Crouch	Wickford	South Essex	37031	71.8	0.046	1.5
Can	Beaches	Mid Essex	37006	228.4	0.19	1.46
Chelmer	Churchend	Mid Essex	37011	72.6	0.056	1.18
Chelmer	Springfield	Mid Essex	37008	190.3	0.28	0.69
Brain	Guithavon	Mid Essex	37009	60.7	0.15	0.58
Blackwater	Appleford	Mid Essex	37010	247.3	0.346	1.1
Colne	Lexden	Mid Essex	37005	238.2	0.203	1.42
Stour	Westmill	North Essex	36008	224.5	0.13	1.47
Suffolk						
Box	Polsted	South suffolk	36003	195	0.06	0.6
Gipping	Bramford	South Suffolk	35010	298	0.17	0.85
Deben	Naunton Hall	East sufolk	35002	163.1	0.09	1
Alde	Farnham	East Suffolk	35003	63.9	0.04	t.b.a
Ore	Beversham	East Suffolk	35004	54.9	0.07	0.7
Blyth	Holton	East suffolk	35013	92.9	0.065	0.85
Waveney	Needham	North Suffolk	34006	370	0.275	0.84
Norfolk						
Tas	Shotesham	South Norfolk	34002	146.5	0.17	0.85
Yare	Colney	South Norfolk	34001	231.8	0.32	0.9
Tud	Costessey Park	Mid Norfolk	34005	73.2	0.092	t.b.a
Wensum	Fakenham	North West Norfolk	34011	161.9	0.246	0.64
Wensum	Swanton Morley	Mid norfolk	34014	397.8	0.909	0.6
Ant	Honing Lock	North Norfolk	34008	49.3	0.16	t.b.a
Bure	Ingworth	North Norfolk	34003	164.7	0.56	0.55
Stiffkey	Warham	North Norfolk	34018	87.8	0.129	0.8
Burn	Burnham	North Norfolk	34012	80	0.09	0.45

Anglian Region Eastern Area River Flow Summary 2011

March Update

River	Station	January	February	March	April	May	June	July	August	September	October	November	December
Crouch	Wickford	notably high	normal	notably low									
Can	Beaches Mill	exceptionally high	normal	below normal									
Chelmer	Churchend	above normal	normal	below normal									
Chelmer	Springfield	above normal	normal	below normal									
Brain	Guithavon valley	above normal	normal	below normal									
Blackwater	Appleford Bridge	notably high	normal	notably low									
Colne	Lexden	above normal	normal	normal									
Stour	Westmill	above normal	below normal	notably low									
Box	Polsted	above normal	normal	normal									
Gipping	Bramford	above normal	below normal	below normal									
Deben	Naunton Hall	exceptionally high	normal	below normal									
Alde	Farnham	notably high	normal	below normal									
Ore	Beversham	notably high	normal	below normal									
Blyth	Holton	exceptionally high	above normal	notably low									
Waveney	Needham	above normal	normal	notably low									
Tas	Shotesham	normal	normal	below normal									
Yare	Colney	notably high	normal	below normal									
Tud	Costessey Park	above normal	normal	normal									
Wensum	Fakenham	normal	below normal	below normal									no flow data
Wensum	Swanton Morley	normal	normal	below normal									
Ant	Honing Lock	above normal	above normal	normal									
Bure	Ingworth	above normal	normal	normal									
Stiffkey	Warham	exceptionally high	normal	normal									
Burn	Burnham Overy	normal	normal	normal									

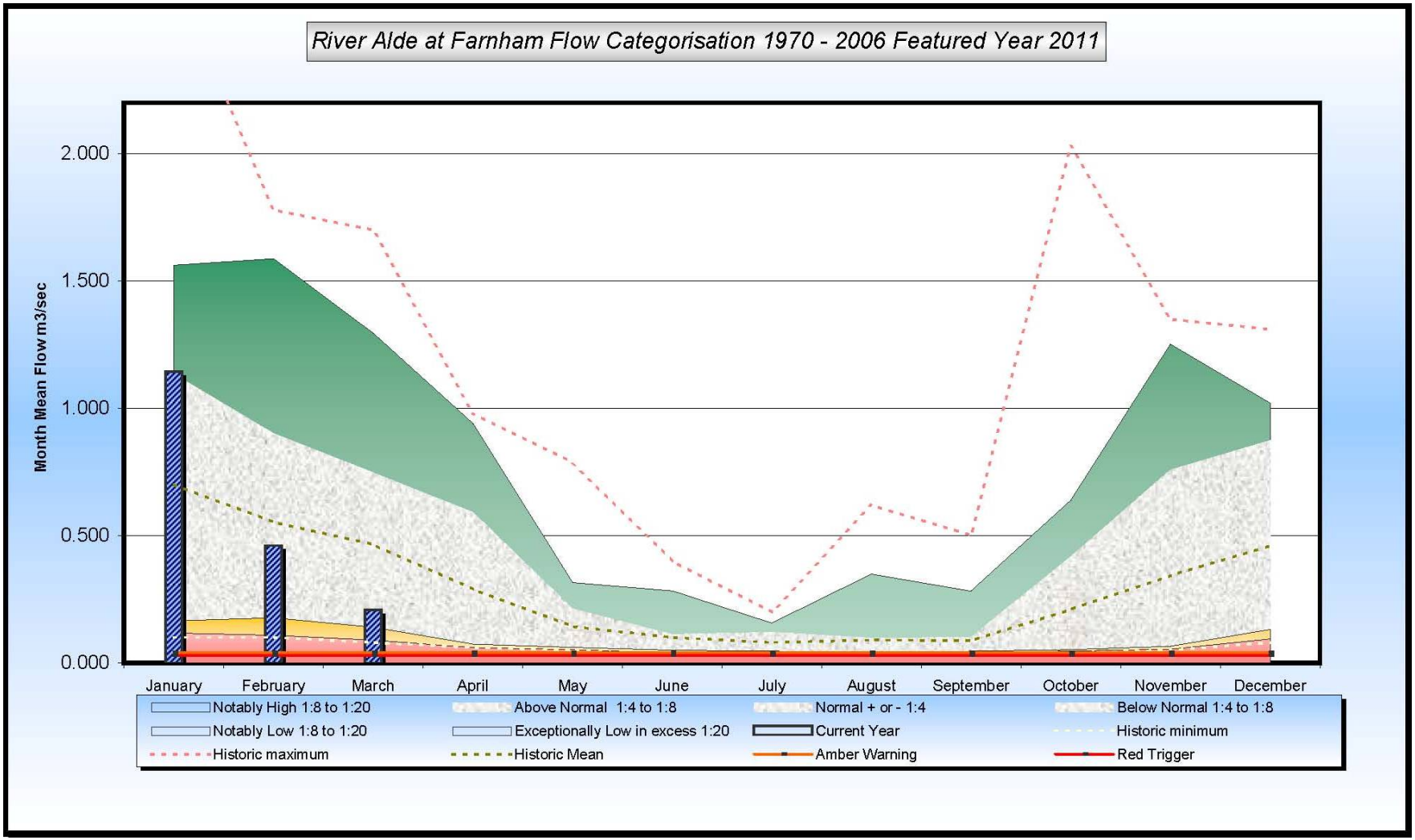
County	March	County Flows as percentage of L.T.A.
Essex		L.T.A. Period 1970-2006
Suffolk	County	% of L.T.A.
Norfolk	Essex	50
	Suffolk	47
	Norfolk	80
	Percentage of Catchments below indicative low flow triggers	
	Essex	38
	Suffolk	29
	Norfolk	0

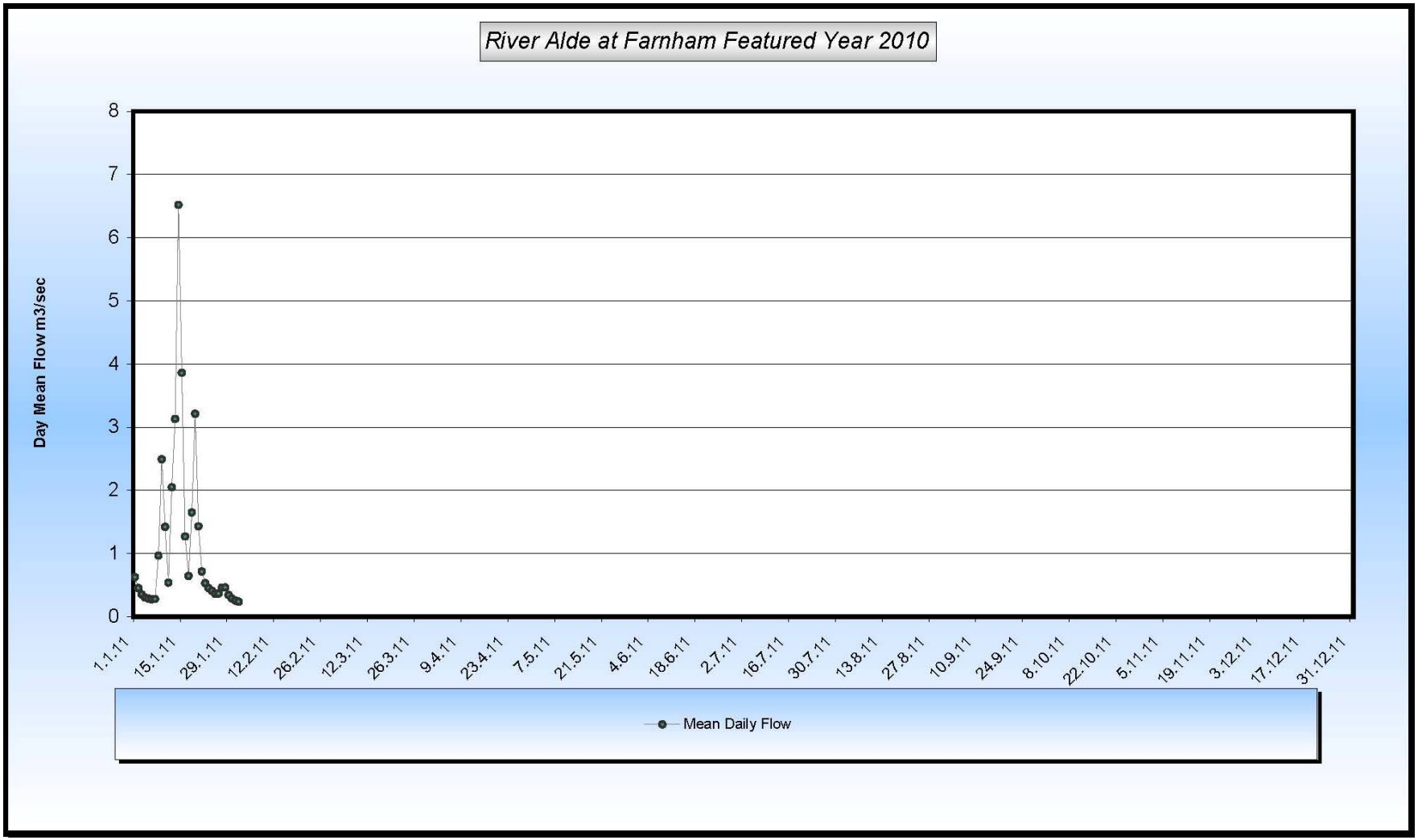
Note : Current Month Data unvalidated & may contain estimated values

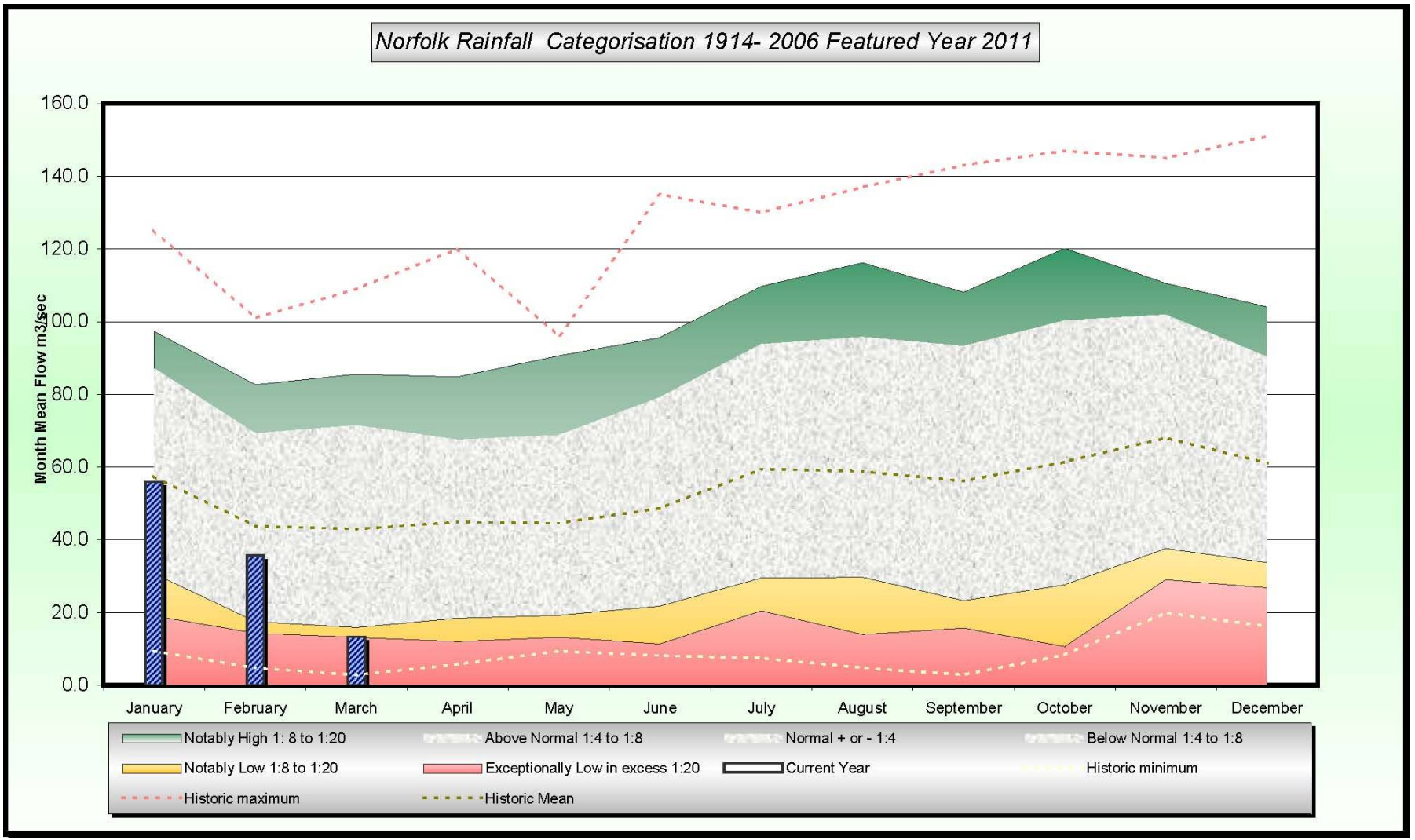
Flows at Fakenham & Bramford in particular may be inaccurate due to unadjusted gate movements

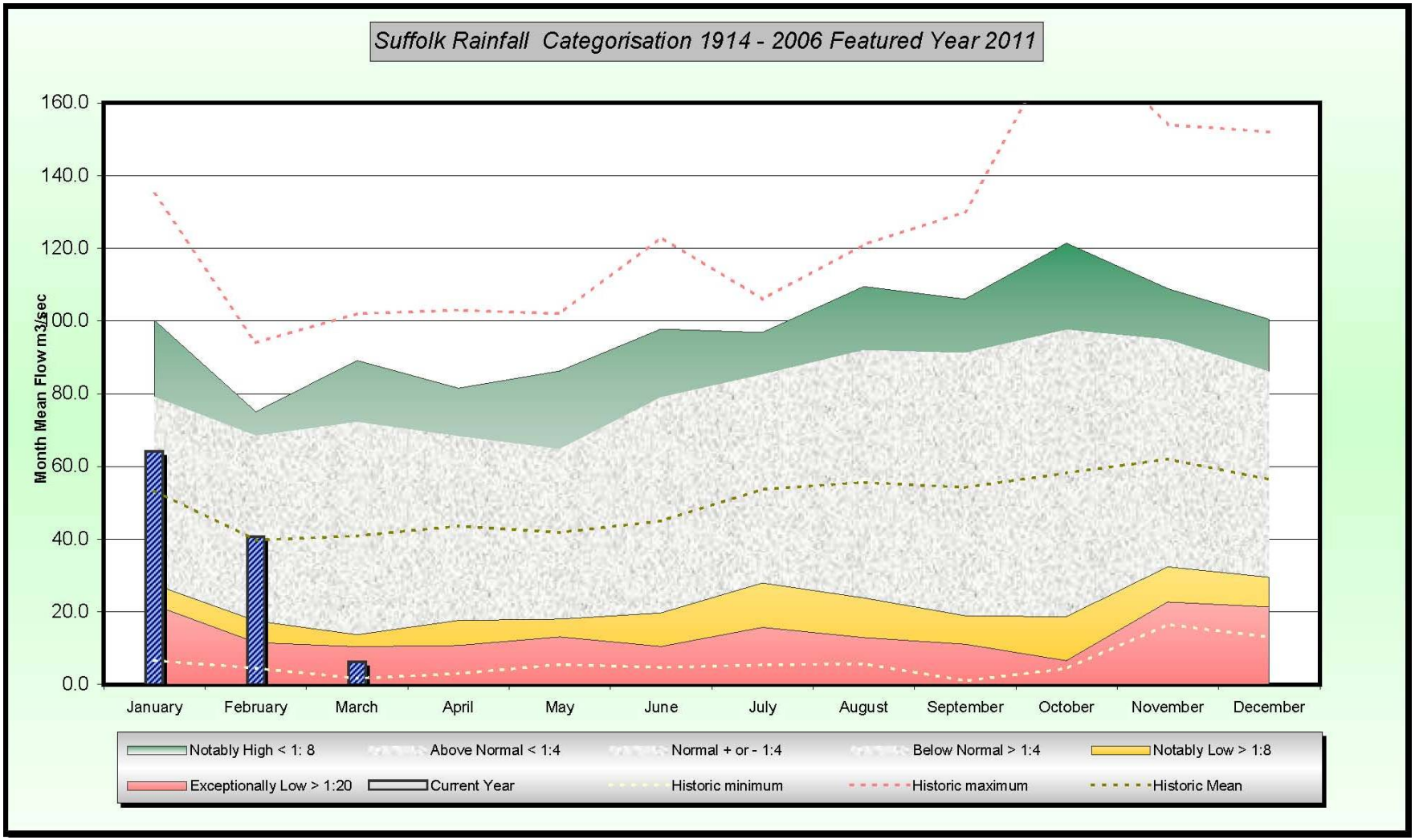
Flag	Return period
exceptionally low	> 1 in 20
notably low	> 1 in 8 < 1 in 20
below normal	> 1 in 4 < 1 in 8
normal	< 1 in 4
above normal	> 1 in 4 < 1 in 8
notably high	> 1 in 8 < 1 in 20
exceptionally high	> 1 in 20

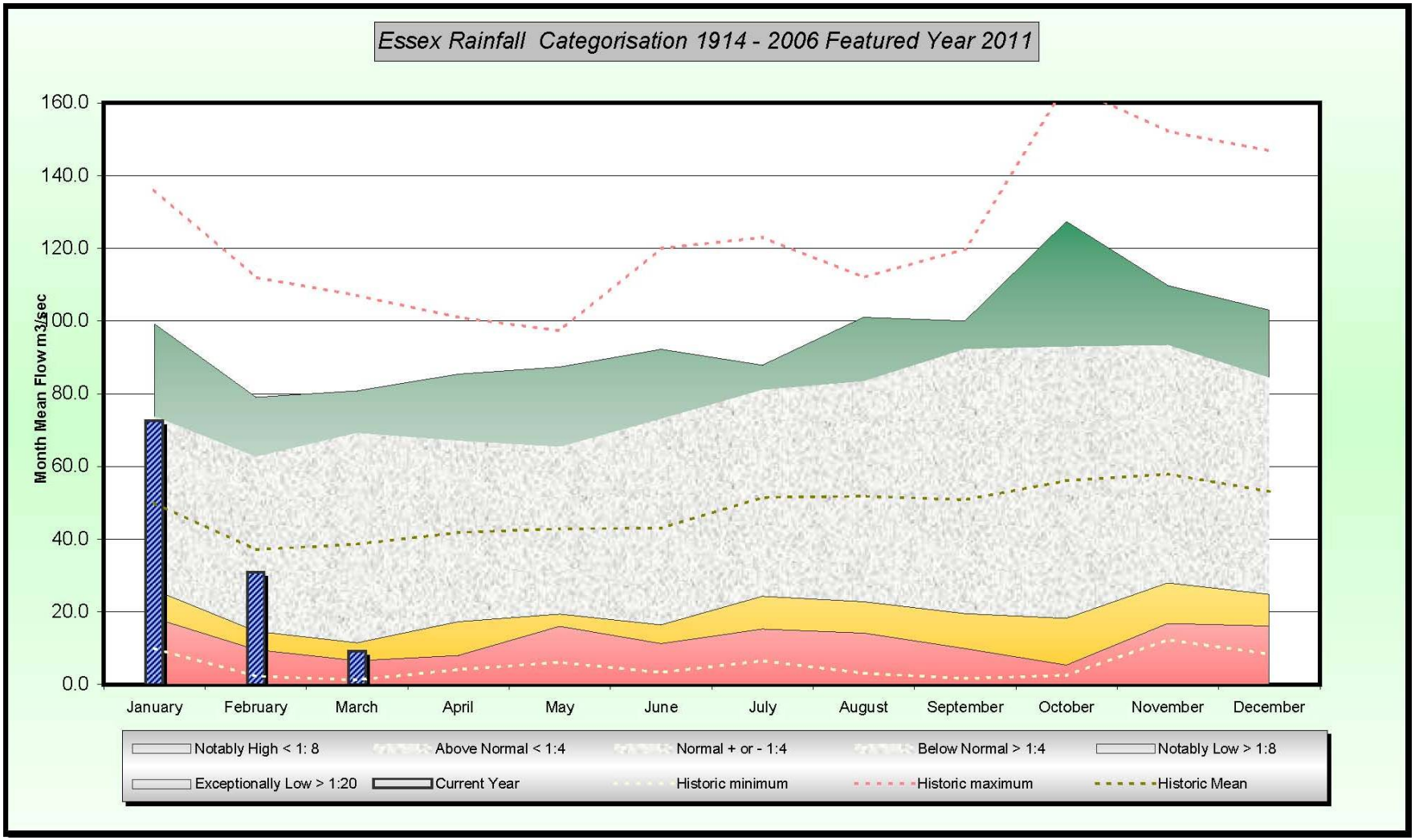
March comments


River Alde at Farnham Flow Categorisation 1970 - 2006 Featured Year 2011
Month Mean Flow m3/sec
2.000
1.500
1.000
0.500
0.000
January
February
March
April
May
June
July
August
September
October
November
December
Notably High 1:8 to 1:20
Above Normal 1:4 to 1:8
Normal + or - 1:4
Below Normal 1:4 to 1:8
Notably Low 1:8 to 1:20
Exceptionally Low in excess 1:20
Current Year
Historic minimum
Historic maximum
Historic Mean
Amber Warning
Red Trigger


River Alde at Farnham Featured Year 2010
Day Mean Flow m3/sec
0
1
2
3
4
5
6
7
8
1.1.11
15.1.11
29.1.11
12.2.11
26.2.11
12.3.11
26.3.11
9.4.11
23.4.11
7.5.11
21.5.11
4.6.11
18.6.11
2.7.11
16.7.11
30.7.11
13.8.11
27.8.11
10.9.11
24.9.11
8.10.11
22.10.11
5.11.11
19.11.11
3.12.11
17.12.11
31.12.11
Mean Daily Flow


Norfolk Rainfall Categorisation 1914- 2006 Featured Year 2011
Month Mean Flow m3/sec
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
January
February
March
April
May
June
July
August
September
October
November
December
Notably High 1: 8 to 1:20
Above Normal 1:4 to 1:8
Normal + or - 1:4
Below Normal 1:4 to 1:8
Notably Low 1:8 to 1:20
Exceptionally Low in excess 1:20
Current Year
Historic minimum
Historic maximum
Historic Mean


Suffolk Rainfall Categorisation 1914 - 2006 Featured Year 2011
Month Mean Flow m3/sec
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
January
February
March
April
May
June
July
August
September
October
November
December
Notably High < 1: 8
Above Normal < 1:4
Normal + or - 1:4
Below Normal > 1:4
Notably Low > 1:8
Exceptionally Low > 1:20
Current Year
Historic minimum
Historic maximum
Historic Mean


Essex Rainfall Categorisation 1914 - 2006 Featured Year 2011
Month Mean Flow m3/sec
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
January
February
March
April
May
June
July
August
September
October
November
December
Notably High < 1: 8
Above Normal < 1:4
Normal + or - 1:4
Below Normal > 1:4
Notably Low > 1:8
Exceptionally Low > 1:20
Current Year
Historic minimum
Historic maximum
Historic Mean

Appendix J: Drought permit and drought order proposals

Proposed drought permit and order sites

The following table outlines where potential drought permits or orders have been identified in water company draft drought plans. These are subject to change with the publication of water company final drought plans, and we will update this table accordingly. The table does not include any drought permits or orders for Anglian Water as the company had not submitted its draft drought plan at the time of publication of our drought plan.

Drought team	Water company	Application	Location	Licence number	Comments
Eastern	Essex and Suffolk Water	Environment Agency Drought Order	Stour Augmentation Groundwater Scheme (SAGS)	8/36/11/*G/066	Increase 15 year rolling quantities in respect of SAGS boreholes 1 – 8, 11, 12, 15 and 16. Environmental impacts to be considered include localised lowering of water levels in pounds and streams and longer term impacts of reducing groundwater levels and baseflow contribution to the River Stour. There are also potential effects on two SSSIs.
Eastern	Essex and Suffolk Water	Drought permit	Sandon Brook	8/37/37/*S/0025	Application to reduce the compensation discharge from Hanningfield reservoir to Sandon Brook. Possible environmental impacts include reduced water level and flow in Sandon Brook, and associated impacts on fish, invertebrates and aquatic habitats.

Eastern	Essex and Suffolk Water	Drought permit	Coldfair Green and Leiston Borehole	7/35/03/*G/0044 / 7/35/03/*G/0072	Application for Coldfair Green to stop compensation discharge and maintain daily licence, or stop the compensation and increase the daily licence, or retain the compensation discharge and increase the daily licence. Application for Leiston Borehole to Reduce or cease compensation flow to Sizewell Beck. Possible environmental impacts of the former include reduction of levels and flows in Hundred river, Leiston Stream, River Alde, potential effects on North Warren grazing marshes, Leiston-Aldeburgh SSSI, Thorpeness Marshes and Sizewell Marshes, increased potential for saline incursion in the Crag aquifer. Possible impacts of the latter include reduced water level and flow in Sizewell Beck, and associated impacts on fish, invertebrates and aquatic habitats.
Eastern	Essex and Suffolk Water	Drought permit or drought order	Wortham Borehole	7/34/16/*G/0048	The application would reduce or stop compensation discharges from Wortham borehole during peak demand periods to Hall Farm Meadows, Hall Farm stream and Hall Farm pond, and potentially allow abstraction of the volumes earmarked for compensation discharge purposes. Possible environmental impacts include reduced flows and levels in the sites mentioned above, impact on aquatic environment.

Eastern	Essex and Suffolk Water	Drought permit or drought order	Redgrave Group Licence	7/34/16/*G/0048	The application would seek to increase the annual quantity of the group licence from 2500Ml/yr to 3000Ml/yr. The sources used would be Mendlesham, Eye and Wortham. This annual licensed quantity has previously been approached or exceeded during the drought periods in the early 1990s. Impacts on the environment include reduced flows and levels in Rivers Dove, Waveney, Deben, Gipping, depletion of groundwater, and potential effects on Redgrave and Lopham Fen SSSI and Ramsar.
Eastern	Essex and Suffolk Water	Drought permit or drought order	Bedingfield	7/34/17/*G/0073	Increase the annual quantity of the licence (daily licensed quantity would remain unchanged). There may be reduced baseflows to and level/flows in River Waveney, River Done and River Deben and depletion of groundwater.
Eastern	Essex and Suffolk Water	Drought permit or drought order	Bedingfield and Redgrave Group Licence		Combine annual licensed quantities with the Redgrave Group. This would allow the additional annual licence quantity secured under the Redgrave Group licence action above to be utilised at Bedingfield. This would avoid impact on Redgrave Fen.
Eastern	Essex and Suffolk Water	Drought permit or drought order	Benhall Group Licence	7/35/04/*G/0067	Increase annual licensed quantity from 1546Ml/yr to 2000Ml/yr. Additionally, an increase in daily licensed quantity from 0.91Ml/d to 1.2Ml/d at Saxmundham may be sought via a drought permit. Potential impacts include reduced baseflows to and level / flows in Rivers Alde, Fromus, depletion of groundwater, and potential effects on Gromford Meadow SSSI, Cransford Meadow SSSI.

Eastern	Essex and Suffolk Water	Drought permit or drought order	Lound	7/34/19/*S/0060	Application to increase the licensed annual quantity of water that can be abstracted from Lound Ponds by maybe 10 per cent, and increase the quantity that can be abstracted during the period April to October inclusive. Potential environmental impacts include a reduction in water levels in Lound Ponds and Fritton Lake.
Eastern	Essex and Suffolk Water	Drought permit or drought order	Ormesby / Bure	7/34/9*GS/0054	Increase the licensed annual quantity of water that can be abstracted from Ormesby Broad and the River Bure, and increase the quantity that can be abstracted during the period April to October inclusive. Potential effects in Trinity Broads System SSSI, Burgh Common SSSI, Hall Farm Fen SSSI, The Broads SAC, Bure Broads and Marshes SSSI, Broadland SPA and Ramsar.

Other information:

River Slea - The flows in the River Slea are supported by an augmentation borehole which was commissioned to alleviate low flow problems in the river as a result of abstraction from the Central Lincolnshire Limestone. The Slea augmentation procedures refer to a drought order application in a prolonged dry period when the annual licensed quantity is insufficient to keep the augmentation going through the year. Review of our operational experience to date shows that we have been able to support the river over an extended period by reduction of pumping rates or daily hours run and manage within current licence quantity. The need for a drought order is remote.

River Trent - Under the Trent-Witham-Ancholme Scheme (TWAS) water is abstracted from the River Trent at Torksey and pumped into the River Witham via the Fossdyke. This water is then re-abstracted at Short Ferry on the River Witham and pumped via pipe to Toft Newton Reservoir where it is released into the Ancholme to support water abstraction. Planned contingency measures in a drought are detailed in the TWA Scheme Drought Plan TWA Drought plan reviewed 2010. These measures include a series of licence restrictions as well as a drought order to increase the peak transfer from the Trent.

We would only consider a drought order in extreme circumstances when the maximum licensed transfer rate from the Trent is likely to be insufficient to support Anglian Water's abstraction from the River Ancholme at Cadney after agricultural abstraction has been restricted. As required under water resources legislation we would have special regard for the duties imposed on the water company.

TWAS was used successfully in the droughts of 1988-92 and 1995-97 without the need for contingency measures although there were periods during the 1995-97 drought when the Trent to Witham transfer at Torksey was operating at the full licence quantity in order to meets demands. It is therefore expected that a drought order will not be required except in an exceptional drought when we might wish to apply for a drought order for the benefit of a third party (Anglian Water). In this circumstance the third party would be expected to provide significant input to the process.

The following staff will be involved in dealing with drought permit / order applications. Please refer to the operational instructions How to deal with a water company drought permit application and How to respond to drought order applications.

Application	Team	Job title	Responsibilities
Drought permit	Anglian environment planning team	Water company lead	• Lead on pre-application phase; • Support PSC on formal application process; • Support NPS on determining drought permit; • Provide technical information to PSC in objection / hearing process; • Arrange hearing if needed; • Lead on extension of drought permit if needed.
	Anglian environment planning team	Team leader	• Review decision on whether hearing needed.
	Anglian drought team	Anglian drought coordinator	• Coordinate liaison with virtual permit team.
	National permitting service	NPS drought lead	• Determine drought permit; • Support Anglian environment planning team if extension of drought permit needed.
	Permitting support centre	PSC drought lead	• Support Anglian environment planning team with pre-application; • Lead on formal application process; • Once determined, send documents to water company; • Coordinate objection / hearing process.

	Area Environment Planning team		• Support PSC on formal application process; • Support NPS on determining drought permit.
	Anglian legal team		• Review decision on whether hearing needed.
Drought order	Anglian environment planning team	Water company lead	• Lead on pre-application process and notice of application process.
Environment Agency drought order	Anglian environment planning team		• Lead on application.

Appendix K: Communications plan and actions

Plan owner:	**Anglian SEP Water Manager**
Corporate Affairs lead:	**Communications Manager**
Circulation:	**External on Environment Agency website**

Situation and background

Our region is one of the driest in the country and all users rely heavily on storage provided both underground and in reservoirs.

Prolonged periods of low rainfall, especially in winter, can mean that normal replenishment of groundwater supplies and reservoir stocks may not occur, reducing the supplies available for summer. Low groundwater levels can also impact significantly on environmental features such as rivers and wetlands.

Whilst managing water resources, we have a duty to conserve and enhance the environment, and properly provide for the needs of all abstractors.

Through the issue and regulation of abstraction licences, we aim to maintain the right balance to protect and provide for the needs of both the environment and abstractors. During times of drought we have powers to place restrictions on some licences, or grant further permissions on others (for example, drought permits). If circumstances require a tighter management of water resources, water companies may apply for drought orders. We can also apply for drought orders, and comment on applications by water companies.

Communications

Communications need to be carefully timed and managed to ensure that our role is promoted and understood. We must ensure that we gain maximum impact and action at the right time by coordinating our message with others when encouraging water efficiency awareness among public supply customers, industry, business, farmers and other groups.

Roles & Responsibilities

Water companies are responsible for maintaining supply to meet the needs of customers, whilst protecting the environment. They have a legal obligation to promote water efficiency and to encourage the adoption of appropriate measures by their customers.

We are responsible for safeguarding water resources in Anglian and protecting the environment. We plan and manage how much water is taken from rivers and underground through a system of licences. We have a role in making sure that water

companies can secure public water supplies, but must also ensure that they cause no unacceptable environmental damage. Other water users (agriculture and industry) make use of raw water directly from rivers or underground strata and we have a duty to ensure that they too avoid causing environmental damage. We must ensure that water is used efficiently by water companies and other users.

Key Messages (in line with national messages)

Use water wisely - it's a limited and valuable natural resource. We are the independent authority working with water companies to make sure they have effective plans in place to maintain public water supply during a drought without damaging the natural environment.

Water is a finite resource. All the water we use is taken from streams, rivers or from water-bearing rocks below the ground, known as aquifers. If too much is taken our rivers and wetlands will be damaged, affecting plants and wildlife as well as river users like anglers, boaters and, ultimately, abstractors themselves.

We plan and manage how much water is taken from rivers and the ground through a system of licences. Our aim is to make sure that enough water is available to everyone without damaging the environment, now and for future generations.

Our restoring sustainable abstraction (RSA) programme is a scheme of work that identifies, investigates and solves environmental risks or problems caused by unsustainable licensed water abstraction throughout England and Wales. Restoring water levels in these areas will improve the environment for wildlife, help protect endangered species, and provide beautiful places for people to enjoy.

Heavy rainfall can cause floods even when overall water resources are short. Gentle rain will normally be absorbed into the ground. However, in more intense storms the ground's capacity to absorb the water becomes overwhelmed and water will run off into rivers and streams. The drier and more compacted soils seen during a drought can cause greater water run-off, resulting in less water being absorbed into the ground to replenish aquifers and more flowing into rivers and streams.

Water is a precious resource and we can all do more to make sure we don't waste it. Turning off taps when brushing teeth; taking showers instead of baths; using a bucket to wash the car; or a watering can in the garden instead of a hose can all help.

Anglian issues

One of the key issues for us is balancing demand for a limited supply from various quarters, while being viewed publicly as arbitrators on behalf of the environment.

Anglian is a large region, with more than 1,400 staff located across the region.

We are limited in our powers and the position we can take in relation to some issues, like public water supply. Some communities and pressure groups can have an over-expectation of what we can achieve; for example anglers may have a perception that farmers and water companies have first call on limited water resources.

The public is often not clear of the distinction between our role and that of the water companies. In all messages to the public, we will endeavour to clarify our role.

The impact of drought on the water environment is highly visual to local communities, in particular when rivers run dry and there is a distressing impact (e.g. fish deaths) through low water levels. Although we cannot cover up these images, regular updates on the situation can help us to manage these messages and provide accurate updates to the media on the impact of the drought, before the media hears from someone else. It is recommended that regular updates are prepared and distributed.

It is also important to be aware of, and work closely with other key players, who have their own concerns about the drought and its effects. These will include water companies, farmers and growers, conservation groups, local community groups and anglers.

Anglian Area issues

In addition to these general issues, Area officers can identify specific local issues where PR support may be required. Data available from Drought Reports, detailing the impact of previous droughts, can provide an indication of the possible location and nature of future problems. These reports can be used to recommend action in advance of likely problems.

Positive action since the last drought

Positive action undertaken directly, or supported by us, can be built into briefing materials to support key messages and actions.

Key actions

More precise details of how, when, to whom and by whom these communications will be made are given in 'Key communication activities' (below) and in tables D1 and D2.

Spray Irrigators:

- Timely issue of guidance such as 'Prospects for Spray Irrigation' and early warnings of and communications about the need for restrictions;
- Continue to keep customers and the media informed of the current situation, with the issue of press releases as necessary. The timing of releases should be co-ordinated with any personal notification to abstractors;

- Placement of articles in farming press; local NFU/CLA columns with endorsement/support from NFU/CLA, if appropriate; warning letters and notices of restrictions direct to licence holders;
- Support liaison with farming groups as necessary;
- Provide help and guidance, through the National Customer Contact Centre helpline (08708 506 506) or, where appropriate, through local arrangements.

Water companies:
- Continue close liaison with water companies at all levels to ensure that we receive and provide notification of action, incidents (e.g. scheduled or unscheduled interruptions to public supplies) and public / media statements issued (e.g. announcement of hosepipe ban).

CCWater (East):
- Provide information on current situation;
- Obtain feedback on customer perceptions;
- Planned shared strategies.

Local communities:
- Review the provision of literature and update existing resources as appropriate, to include background on the drought, outline our role and emphasise what individuals can do to protect the environment;
- Consider use of local radio phone-ins and interviews to explain the role we have in managing water resources, what is a drought, what we can all do - and encourage personal responsibility;
- Arrange local public meetings in hotspot areas;
- Display posters in local libraries, tourist offices and schools giving key messages on the drought, our role and a National Customer Contact Centre number 08708 506506 for enquiries;
- Display material at local shows;
- Provide help and guidance, through the National Customer Contact Centre helpline (08708 506 506) or, where appropriate, through local arrangements;
- Identify opportunities to show the positive action taken by us to minimise the impact of the drought, including photo opportunities where possible to combat the common drought photos of dried up river beds, e.g. fish rescues/restocking, refurbishment of pumping plant on Ely-Ouse scheme;
- Maintain a Drought Update on our website.

Conservation groups:
- Provide advice and support to conservation groups;
- Place articles with conservation and wildlife magazines;
- Establish a drought contact at Area level, through drought co-ordinators;
- Revise literature on why certain rivers run dry; consider the provision for additional drought related literature.

Anglers:

- Provide practical advice to fishery owners about coping with low water levels;
- Place articles in angling press with advice to fishing and pond owners;
- Place articles in angling press about positive action taken to protect fish.

Navigation:
- Liaise with waterways teams regarding water levels which may stop navigation and particularly risks of incidents of grounding of boats;
- Advise marinas / boating clubs through established communications networks;
- Use local radio to provide updates.

Key communication activities

- **Direct mail**
  Letters written to spray irrigators, Local Authorities, licence holders, MPs and other key stakeholders as required.

- **Media Relations**
  National and regional press releases are issued as well as providing effective spokespeople for media enquiries. A drought media log is maintained by the regional press office.

- **Website**
  Drought updates and plans are available on our website.

- **Publications**
  Articles on issues in suitable and appropriate well targeted publications.
  Contributions to local newspaper supplements.

- **Internal communications**
  Easinet briefing materials updated. Key messages communicated by spokespeople;
  Cascade brief (monthly briefing to all staff);
  Email of water situation/ drought reports;
  Our place (internal publication) features and articles;
  Regional and Area notice boards;
  The briefing zone;
  Presentations/literature/displays;
  Briefing packs.

- **External Relations / Stakeholders**
  Committee papers, stakeholder briefings and correspondence. Regular updates given to Member's of Parliament (MPs) whose constituencies will be affected by drought.

- **Briefing materials**

Questions and answers available for spokespeople as well as key messages and briefing notes.

Corporate guidelines:

Our corporate guidelines apply to all publications, exhibitions, signage and web site materials.

It is essential that the style of our communications is readable and not too technical to ensure that audiences will understand and take action.

Spokespeople:

It is important to respond to all requests, especially media requests, quickly and effectively. Environment Managers and drought team specialists have been identified as spokespeople to respond.

Monitoring and evaluation

A variety of monitoring and evaluation techniques are used including:

- Media cuttings including key messages;
- Feedback from staff regarding briefings;
- Number of requests for publications and further information;
- Hits on our web pages;
- Feedback from stakeholders.

Table K1 – External communications actions for Anglian drought teams

Interested Parties	Objective / Information Required	Owner of communication with interested party	Priority	Channels	Anglian drought team member responsible
General public: - Affected by drought - Potentially affected by drought - Not affected by drought	Encourage water companies to communicate with customers to: - Provide information on current status and explain - Encourage customers to use water wisely	Water companies, influenced by regional WR planning team and comms team	High	- Water companies - Regional media - Social media	Anglian drought team comms lead
MPs and MEPs: - Affected by drought - Potentially affected by drought - Not affected by drought	- Provide update on current situation - Any forthcoming restrictions in constituency - Any locally specific issues / concerns	Area Managers	High	- Press releases - MPs briefings	- Anglian drought team comms lead - Area drought team comms business partners
Defra	Update on situation	Head Office drought team	High	- SITREP - Briefings	Anglian drought team
Water companies: - Anglian Water - Cambridge Water - Essex and Suffolk Water - Veolia Water East	Exchange of information including: - Current situation - Key issues and risks - Specific company issues - Communication with customers / restrictions - Monitoring requirements - Prospects for drought	Director – Anglian with MDs	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		EPT Manager with	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		SEP Manager with	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		Regional water resources team	High	- Phone calls / meetings - Letters / emails - Briefings / requests for information on prospects	Anglian drought manager / coordinator
		Area technical staff with technical staff	High	- Exchange of hydrometric information - Phone calls / meetings	Area drought coordinators
Natural England	Environmental requirements and situation	Director – Anglian with equivalent	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		EPT and SEP Managers with equivalents	High	- Phone calls / meetings - Letters / emails	Anglian drought manager

Interested Parties	Objective / Information Required	Owner of communication with interested party	Priority	Channels	Anglian drought team member responsible
		Anglian drought manager	High	- Meetings - Briefings	- Anglian drought manager - Anglian drought coordinator
Broads Authority	Environmental requirements and situation	Director – Anglian with equivalent	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		EPT and SEP Managers with equivalents	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		Anglian and Area drought teams with local teams	High	- Meetings - Briefings	- Anglian drought coordinator - Area drought coordinators
NFU	- Provide update on current situation - Understand agricultural requirements - Coordinate joints comms - Provide prospects for spray irrigation report	Director – Anglian with equivalent	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		EPT and SEP Managers with equivalents	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		Anglian drought manager and coordinator with Environment Advisers for East of England and East Midlands	High	- Phone calls / meetings - Letters / emails - Briefings - Articles in newsletter - Joint press releases	- Anglian drought coordinator - Area drought coordinators
CLA	- Provide update on current situation - Understand agricultural requirements - Provide prospects for spray irrigation report	Director – Anglian with equivalent	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		EPT and SEP Managers with equivalents	High	- Phone calls / meetings - Letters / emails	Anglian drought manager
		Anglian drought manager and coordinator with equivalents	High	- Phone calls / meetings - Letters / emails - Briefings	Anglian drought coordinator
UKIA	- Provide update on current situation - Understand agricultural requirements - Coordinate joints comms - Provide prospects for spray irrigation report	Anglian drought manager and coordinator with equivalents	High	- Phone calls / meetings - Letters / emails - Briefings - Conferences	Anglian drought coordinator

Interested Parties	Objective / Information Required	Owner of communication with interested party	Priority	Channels	Anglian drought team member responsible
Agricultural abstractors: - Affected by drought situation - Potentially affected by drought situation - Not affected by drought situation	- Provide update on current situation - Understand agricultural requirements - Warn of potential restrictions - Inform when cessations are in place / not in place	Area drought coordinators	High	- Phone calls / meetings with individuals and abstractor groups - Briefings - Letters	Area drought coordinators
Business / industrial abstractors: - “Top 10” abstractors - Garden centres - Golf courses - Car washes - Power generation	- Provide update on current situation - Provide information on water saving tips	Area drought coordinators	Medium	- Briefings	Area drought coordinators
Navigation authorities: - British Waterways - EA Waterways teams	- Provide update on current situation - Warn of potential restrictions	Drought manager in liaison with waterways managers	Medium	- Briefings - Meetings	Anglian drought manager
Angling Trust: - Angling clubs - Fish farmers	- Provide update on water levels and quality	Area drought team conservation leads	Medium	Briefings	Area drought coordinator
Wildlife and conservation groups: - Wildlife Trusts - Rivers Trusts - WWF	Environmental requirements and situation	Area drought team ecology leads	Medium	Briefings	Area drought coordinator
RSPB	- Provide update on current situation - Discuss concerns when arise	Director – Anglian with equivalent	Medium	- Phone calls / meetings - Briefings	Anglian drought manager
Local Authorities	Update on current situation	Area managers with elected members	Medium	Phone calls / meetings	Area drought teams
		Area sustainable communities project managers with officers	Medium	- Meetings - Briefings	Area drought teams

Interested Parties	Objective / Information Required	Owner of communication with interested party	Priority	Channels	Anglian drought team member responsible
Local resilience forums	Update on current situation	Area managers	Medium	- Meetings - Briefings	Area drought teams
Recreational water users: - Royal Yacht Association	Update on current situation	Area drought managers	Medium	- Meetings - Briefings	Area drought teams
Regional media / social media	Update on situation.	Anglian communications manager	High	- Press releases - Briefings	Anglian drought team comms lead
National media	Update on situation in Anglian	HO press team	High	- Press releases - Briefings	Anglian drought team comms lead
CCWater (East)	- Provide update on current situation - Obtain feedback from water users	SEP Water manager	Medium	- Meetings - Briefings	Anglian drought manager / coordinator
Trade and industry associations: - Carrot growers association - Potato council Horticulture Trade Association - Minerals and aggregates association - Leisure and tourism	- Provide update on current situation - Provide warning of likely restrictions	Anglian drought manager in liaison with Head Office	Medium / high	- Meetings - Briefings	Anglian drought manager / coordinator
Committees	Provide update on current situation	Director - Anglian	Medium	- Meetings - Briefings	Anglian drought manager
River Basin Liaison Panel	Provide update on current situation	Director – Anglian	Medium	- Meetings - Briefings	Anglian drought manager
Ofwat	Provide update on current situation	Head Office drought team	Medium	- Meetings - Briefings	Anglian drought manager
IDBs	Provide update on current situation	Area drought coordinators	Medium	- Meetings - Briefings	Area drought coordinators

Table K2 – Internal communications actions for Anglian drought teams

Interested Parties?	Objective / Information Required?	Channels	Anglian drought team member responsible
Head office drought team	- SITREP - Updates on current situation - Water company prospects report	- Meetings - Briefings - SITREP	Anglian drought coordinator
Head office press office	- Updates on current situation - Notify of planned press releases	- Press releases - Briefings	Anglian drought team comms lead
Anglian Leadership Team / Environment and Performance Management Team	Updates on current situation	- Meetings - Briefings	Anglian drought manager
Midlands / South East drought teams	- Updates on current situation - Notify of planned press releases which may have implications for neighbouring regions	- Briefings - Correspondence	Anglian drought coordinator
Teams involved in drought management	Updates on current situation	Briefings	Anglian and Area drought coordinators
Teams whose work impacts on drought	Updates on current situation	Briefings	Anglian drought manager

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