



Drought response: our framework for England

June 2015

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

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

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

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

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Executive summary

Droughts are natural events which occur when a period of low rainfall creates a shortage of water. They reduce water supplies to different users. Droughts can also affect rivers or aquifers, depending on when the lack of rainfall occurs. Some droughts affect a large area of England while others are concentrated in a few catchments.

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

It is the role of the Environment Agency to monitor, report and act to reduce the impact of drought on the natural environment. We take specific actions to manage environmental droughts, where low river flows and lake levels have the potential to cause damage to the natural environment and ecology. Water companies are also responsible for maintaining supply while protecting the natural environment.

This framework tells you how drought affects England and how the Environment Agency works with government, water companies and others to manage the effects on people, business and the environment. It aims to ensure consistency in the way we co-ordinate drought management across England.

It sets out:

- how drought affects different parts of England
- who is involved in managing drought and how we work together
- how we and others take action to manage drought
- how we monitor and measure the impacts of drought to advise senior management and government on the prospects and possible action
- how we report on drought and communicate with others

This national framework aligns with our operational area drought plans to provide a strategic overview for how we will manage a drought to minimise damage to the environment and to secure essential public water supply. It also provides information for our staff, government departments and the main stakeholders to use in planning for and managing drought which should complement their own drought plans and procedures.

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1. Overview of drought in England

A drought is a natural event that we can't prevent. Short spells of hot, dry weather can cause a drought. Established drought conditions normally take time to develop.

1.1. Definition of drought

There is no single definition of drought. All droughts are characterised by some degree of rainfall shortage. Each drought is different, with the nature, timing and impacts varying according to location and which sectors are affected such as public water supply, agriculture, the environment or industry.

We identify 3 main types of drought which may occur separately or together:

Environmental drought

This happens when a shortage of rainfall is having a detrimental impact on the environment. It is likely that there will be reduced river flows, exceptionally low groundwater levels and insufficient moisture within soils. These conditions often result in signs of stress for wildlife, fish and habitat. We normally take action to reduce environmental impact by restricting the amount of water taken from rivers and groundwater when these sources are at low levels.

Agricultural drought

This happens when there isn't enough rainfall and moisture in soils to support crop production or farming practices such as spray irrigation. Irrigation may also be constrained by environmental conditions on abstraction licences or statutory restrictions. These drought conditions often happen alongside an environmental drought but usually before public water supplies are affected.

Water supply drought

This happens when a shortage of rainfall is causing water companies concern about supplies for their customers. It tends to take longer to develop than environmental or agricultural drought because water company supply systems are developed to cope with dry weather. Water companies affected by drought will manage the impacts by following their drought plans. These plans set out a range of short-term actions to monitor and manage the impact of drought on customers and the environment. Some water companies in England use reservoirs in Wales to supply some of their customers so could be affected by a drought in Wales.

1.2. Drought responsibilities

The Cabinet Office identifies drought as a civil emergency within the National Risk Register of Civil Emergencies (2015 edition). In England, the main organisations responsible for managing water resources during drought are:

- the Environment Agency; provides strategic oversight and responsible for monitoring, reporting, advising and acting to reduce the impact of a drought on the environment and water users
- water companies; responsible for managing water supply for their customers and taking a range of measures to maintain supplies whilst minimising environmental impact
- government; responsible for policies relating to water resources.

A number of other organisations and groups also play an important part in managing drought, including Natural England, Canal and River Trust, local councils and representative bodies such as National Farmers' Union (NFU), UK Irrigation Association and environmental charities. All those involved in dealing with the effects of drought plan their activities in case a drought occurs and ensure that the responsibilities of different parties are clearly defined and understood.

1.2.1. Environment Agency

We have a duty to safeguard water resources in England and make sure there is enough water available for people and the environment. We do this by regulating the abstraction of water, monitoring the environment and working closely with the water industry and other abstractors to ensure they manage their water supplies sufficiently.

During drought, we carry out a range of actions at local and national level depending on the scale of the drought. Our drought incident teams will decide whether action is needed and what actions are most appropriate at the time. Local expert judgement is an important part of drought management. Some of the actions will include:

- identifying and categorising droughts in England using a range of hydrological, environmental and socio-economic indicators which cover the different impacts and the geographic areas affected
- assessing the short and long term prospects of the drought escalating using weather forecasts and historical trends; this will take account of the duration and the season that the drought developed in
- convening strategic drought management groups such as the National Drought Group - which groups we convene will depend on the scale of the drought and what stage the drought is at
- reporting on the situation and impacts to government, partners, abstractors and the media
- providing clear advice to government
- responding to and advising on environmental incidents
- dealing with drought permit and order applications
- implementing environmental restrictions on abstractors - these restrictions will either be by [conditions on their licence](#) or, for spray irrigation we can also use [Section 57](#) of the Water Resources Act 1991
- maintaining communication with Natural Resources Wales (NRW), particularly with regard to cross border catchments

More information on the actions we may take are explained in chapter 4.

1.2.2. Defra

The Department for Environment, Food and Rural Affairs (Defra) is responsible for the policies relating to water resources in England. Defra ensures the legislative framework for water resource management is fit for purpose. It directs water companies on the development and content of their water resources management and drought plans.

During drought, Defra works closely with the Environment Agency and water companies to ensure that public water supplies are maintained and damage to the environment is limited.

1.2.3. Water companies

Water companies are responsible for managing their public water supplies and it is essential that they prepare for prolonged periods of dry weather. Their drought plans must complement their long-term strategic water resources management plans. The drought plans set out short-term actions to monitor and manage the impact of drought on their customers and the environment.

These actions range from publicity campaigns and changes in normal operations, to customer restrictions and drought permits or orders. It is their responsibility to decide when and how best to implement these actions and they need to plan in advance so that they minimise the impact on the environment and other water users. For more information on water companies' role in drought see the [Water UK](#) website.

1.2.4. Local councils

It is the duty of local councils to take a lead role in local resilience forums and preparing for severe drought impacts within their emergency plans. They may also help water companies implement emergency drought measures in an exceptionally severe drought.

Local councils work with the local water company and the Environment Agency to encourage water efficiency in their local communities and will seek to conserve water in their own operations. They also provide support to private water suppliers when domestic supplies, such as for drinking, cooking, food preparation and cooking, become insufficient.

1.2.5. Natural England

Natural England (NE) provides advice to government on the natural environment. During drought it provides expertise on how the drought is affecting protected habitats, species and our natural environment. NE also provides advice to industries, farmers, local communities and interest groups on how their actions during drought can affect the natural environment.

NE manages many National Nature Reserves. During an intense drought it may need to manage habitats differently to protect vulnerable species. NE may also have to restrict access to some areas if there is a risk of fire caused by the dry conditions. It will carry out drought monitoring and issue regular updates on the impact of fires on protected areas. For more information see the [Natural England](#) website.

1.2.6. Natural Resources Wales

[Natural Resources Wales](#)' (NRW) role is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future. NRW manages drought in Wales in much the same way that the Environment Agency manages drought in England and we work with them on any droughts that affect both England and Wales. We consult with each other on any drought permits or orders that affect water resources in both England and Wales.

For drought planning in catchments that cross the border with Wales, the Environment Agency and NRW work closely together. Planning activities are led by the organisation that the majority of the catchment sits in, while delivery is done on a country basis. This means that for the River Severn the Environment Agency leads on drought planning, and for the River Wye and River Dee NRW leads. When a drought develops this close consultation continues, but a drought can be declared according to each country's situation.

1.3. Links to other plans and documents

1.3.1. Environment Agency drought plans

We have plans for each of our 16 operational areas that our operational response teams use to plan for a drought incident within their area. The area plans describe the different operational responsibilities, the steps we will take to recognise, monitor and where possible reduce the effects of a drought at a local level. They set out the actions we will take at different stages throughout the drought and detail the indicators that will determine these various actions. They also give details on our arrangements for reporting and communications.

We review our drought plans annually. We will also update our drought plans following major droughts to implement our lessons learnt. However, unlike water company drought plans, there is no legislative requirement for us to consult on and publish our drought plans.

1.3.2. Water company drought plans and water resources management plans

All water companies must prepare and maintain a drought plan under the provisions of the Water Industry Act 1991 as amended by the Water Act 2003. These complement the 25-year water resources management plans that water companies have a duty to prepare to show how they will

manage their water resources into the future. In these plans, companies show how they will collect, store and transport water to meet demand in a dry year. They also set out the different actions they can carry out at the different stages of a drought and what restrictions they may implement on their customers.

The Environment Agency acts as a technical advisor to government and as such, advises government on the water companies' drought plans and publishes technical guidance on preparing drought plans in the [Water Company Drought Plan Guideline](#) (Environment Agency, 2011).

1.3.2.1. Emergency plans

Droughts are not emergencies unless there is a serious threat of restrictions to public water supply using standpipes or rota cuts, or a major environmental or other acute incident requiring activation of multi agency major incident response arrangements. Water company drought plans cover the actions required up to the classification of an emergency. At this stage water companies will activate their own emergency plans to deal with a loss of supply and maintaining essential water supplies. The water companies will communicate in advance with local councils, emergency services and local resilience forums about how best this is co-ordinated in a major drought emergency. This level of detail will not be in their drought plans.

During a drought emergency in addition to our responsibilities for monitoring, reporting and acting to reduce the impact of drought on the environment and people, we will also support any multi agency arrangements that are set up to deal with the wider impacts. We will do this through our established major incident response plan and will provide representation at all relevant multi agency meetings such as Strategic Coordination Groups. Our local drought teams work with local resilience forums to make sure that water companies and other responders have assessed the risk of drought properly and are taking the right steps to avoid or reduce emergency actions.

1.3.3. Strategic Environmental Assessment

Strategic Environment Assessments are not carried out on Environment Agency drought plans as our plans are not required under statutory legislation, or 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 or reduce negative impacts. Our responsibilities as set out in this framework include (but are not limited to):

- making sure that abstractors do not take too much water from our rivers and ensuring the environment is protected
- checking water companies are following their drought plans and taking action to protect water supplies without placing excessive adverse impacts on the environment
- promoting the need to conserve water, to reduce our impact on the environment and safeguard supplies for the future

Where actions in our drought plans 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. NE has responsibility for Habitats Regulations Assessments in England and NRW has the responsibility for any in Wales.

1.4. Climate change

Drought is a natural weather event. We do know that the climate is changing and sea levels are rising and the best scientific evidence suggests that severe weather events are likely to be more frequent and more intense in future, increasing the risk of droughts and flooding. However it is

currently not possible to attribute individual weather events to climate change as there is always natural weather variation and there have always been extreme weather events.

Many climate change models show an increased likelihood for hotter, drier summers and wetter, milder winters in the UK. Although public water supplies are now much more resilient to dry weather conditions than in the past, population growth and increased per person water use place a higher water demand on our water supply systems. This could mean we need to be more careful to manage demand particularly during summer months to ensure water restrictions do not need to be applied too frequently.

Extreme rainfall events during or ending a period of prolonged dry weather which may result in local or widespread flooding are a more likely occurrence in the future. These simultaneous extreme events are something we all need to be ready for and adapt to the uncertainties they bring.

2. Droughts in England

A number of factors, which include rainfall, geology, air pressure, population demands and water supply infrastructure, all combine to determine which areas are more susceptible to drought. This chapter explains how drought has affected England over the last 40 years.

2.1. Periods of drought

Over the past 40 years, we have experienced a number of droughts in England. The most recent notable droughts were in 1975 to 1976, 1989 to 1992, 1995 to 1996, 2004 to 2006 and 2010 to 2012. There were also widespread droughts in 1933 to 1934, 1920 to 1921 and throughout the 1880s; however there is much less hydrological data about these. All these droughts have been different as every drought differs in severity, length, spatial extent and the uses of water it impacts on most.

The experiences of stand pipes and rota cuts in the summer of 1976 had a significant impact on how water resources supply systems and drought resilience in England is managed. This has meant that since 1976 there have been very few emergency water restrictions, even when we have had intense spring/summer droughts, such as in 2003. Our drought plans and the actions we take reflect a lot of the lessons we have learnt and improvements from these more recent droughts.

2.1.1. Multi-season droughts

England's temperate climate means it frequently rains, but the weather is very variable, with prolonged dry spells possible at any time of year. Most groundwater and reservoir recharge usually occurs over the winter from November to April so successive dry winters deplete this water storage and can cause significant water resource issues particularly when there have been one or two dry winters. The east and south of England are most vulnerable to successive dry winters due to the dominance of groundwater to support river flows and provide a major source of public water supply. This means these areas are normally able to cope with short, intense droughts but more likely to be affected by multi-season droughts which also take longer to recover from.

2.1.2. Short droughts

Short intense droughts are more likely to affect localised parts of England such as the uplands of the north and west where impermeable geology is dominant. This means that water resources deplete relatively quickly after just 2 or 3 consecutive months of below average rainfall as there is little groundwater base flow to support the rivers. They are more susceptible to short intense droughts but less affected by longer droughts as they respond more quickly when there is some rain. Conversely, it is these areas that tend to experience flooding during a drought event due to the high rates of rainfall run off and steep landscapes associated with this geology.

2.2. Notable droughts in last 50 years

2.2.1. 1975 to 1976

The most severe drought in living memory occurred from May 1975 to August 1976. A dry winter in 1975 was followed by an intensely hot, dry summer in 1976, with this being the driest May to August 16 month period on record (based on data since 1766, from Marsh et al 2007). Many rivers experienced their lowest flows on record during this period and there were severe impacts on

surface water and ground water resources (Marsh et al 2007). Many restrictions on water use were introduced, including limited and localised use of rota cuts and standpipes in parts of England and Wales. Many trees were affected by moisture stress and the hot temperatures led to fires on moorland and heath land. The drought ended with early autumn rainfall in September.

2.2.2. 1989 to 1992

Large rainfall deficits in winter 1989 to 1990 led to a significant impact on groundwater and resulted in a drought that continued to the end of summer 1992. This had a major impact on water resources in the east of England. Spray irrigation restrictions were implemented and drought orders granted.

2.2.3. 1995 to 1996

The drought of 1995 to 1996 featured the third lowest rainfall figure over 18 months, (Whilby, Cole and Marsh 2007). The dry winter led to very low reservoir levels in parts of Yorkshire. Road tankers were used to bring water from Northumbrian Water's supply area to Yorkshire Water's. As a result of these drought actions, water supply networks in the north-east have been substantially improved to cope better with periods of low rainfall.

2.2.4. 2004 to 2006

The 2004 to 2006 drought showed a strong regional variation which was most severe in the south-east of England. Two relatively dry winters led to low groundwater levels in south-east England and low river flows in the many groundwater fed rivers in this area. This resulted in a number of drought actions being introduced and at the height of the drought, hosepipe bans affected over 15 million people. Four water companies made applications for drought orders to restrict the non-essential use of water; only one company implemented the drought order in 2006. Environmental impacts included fish deaths, reduced breeding of wading birds and outbreaks of poisonous blue green algae in rivers and lakes.

2.2.5. 2010 to 2012

From September 2010 to March 2012 many parts of England experienced the driest 18 months for over 100 years. The effect of 2 dry winters led to low groundwater levels across the majority of England, apart from the north-west, with many sites recording their lowest levels on record. Reservoir stocks were also low across much of south and central England, with a number at their lowest recorded levels for the time of year, with potentially significant effects on households and businesses. This resulted in 7 water companies in south and east England imposing temporary use bans on 20 million people in April 2012. This drought ended abruptly in summer 2012 with the wettest April to September on record, resulting in widespread flooding. The environment and farming sector that had initially been affected by the dry weather was then further affected by the heavy rain and flooding.

3. Drought impacts and actions

Droughts are a natural event that we cannot prevent but we can take measures before and during a drought to reduce the impacts on people, business and the environment. This chapter explains how drought affects different sectors and what we and others can do to help.

3.1. Public water supply

Water companies in England depend on adequate water resources to meet the needs of over 53 million people. The majority of this water supply comes from England but there are some areas that are supplied with water from Wales, so a drought in Wales can affect public water supply in England. Drought can significantly reduce the availability of water supply by reducing groundwater recharge and reservoir levels, with potentially significant effects on households and businesses. Multi-source supply systems, often using both surface and groundwater resources, have increased resilience to drought particularly to shorter drought periods.

Effective water resources and drought management starts with planning, both in the long-term and short-term. It is a requirement for all water companies to have a statutory drought plan which describes the actions they will take in the event of a drought. Most water companies will plan to carry out a wide range of measures to help reduce the risk of drought and to make sure supplies remain resilient. These include:

- investing in new sources and supply mains
- maximising river abstractions and conserving reservoir storage through drought permits and orders (see 3.1.2.)
- transferring bulk supplies between water companies
- using peak sources such as the Thames Water desalination plant
- moving water between supply zones to balance risk
- planning capital investment for severe drought scenarios
- working with other water companies and abstractors to identify new opportunities to share water

Managing demand is as important as increasing supply. There are number of measures water companies us to help manage demand:

- reinforcing existing water efficiency activities with new campaigns and improving communications with customers
- reducing leakage below target levels
- targeting domestic metering in areas of water stress as a long term plan
- managing water pressure in the supply system in drought affected areas
- working with business customers to help reduce their demand
- introducing temporary use bans (see 3.1.1.)

3.1.1. Temporary Use Bans

Water companies can implement temporary water use restrictions under their own powers in the Water Industry Act 1991 (as amended by the Flood and Water Management Act 2010). These restrictions are temporary measures that reduce the demand for water and are usually one of the

first steps a water company can take to protect its supplies during a drought. The water company does not require any approvals to restrict these uses of water but must run a period of public notice and allow for representation to be made before the restriction comes into force.

Further information can be found on the [Water UK](#) website.

3.1.2. Drought permits and drought orders

Drought orders and drought permits are legal mechanisms to allow more flexibility in managing water resources when there is an exceptional shortage of rain (Water Resources Act 1991 as amended by the Environment Act 1995 and the Water Act 2003). Water companies can apply to the Environment Agency for a drought permit. A drought permit may allow them to take water from specified sources or to modify or suspend conditions contained in their abstraction licences.

If the application is to abstract water from or discharge water at a point in Wales, the application should be sent by the water company to NRW to determine. Where the proposed drought permit has potential to impact across the border of England and Wales the Environment Agency and NRW work closely together. The lead organisation will issue the drought permit with close consultation with the other organisation.

Water companies or the Environment Agency can apply for drought orders. Drought orders are determined by the Secretary of State in England or Welsh Ministers for sites in Wales. Drought orders can go further than drought permits as they deal with discharges of water, abstractions and discharges other than by the affected water company, supply, filtration, and treatment obligations. They also allow water companies to prohibit or limit further customer uses of water which are detailed in the Drought Direction 2011.

Water companies can also apply to the Secretary of State or Welsh Ministers for emergency drought orders. Emergency drought orders go further than ordinary drought orders as they enable a water company to have complete discretion on the uses of water that may be prohibited or limited, and to authorise supply by stand-pipes or water tanks, however these types of order have not been used since 1976. Further information about drought permits and drought orders can be found on the [GOV.UK](#) website.

3.2. Agriculture and horticulture

Droughts can bring mixed fortunes to farmers depending on the type of farm, the location and the season the drought falls in. A prolonged period of low rainfall can severely affect agriculture through crop failure, reduced crop yield (quantity and/or quality), disrupted access to drinking water for livestock and increased fire risk (particularly in upland or heath areas). On the other hand, hot summers can be favourable for vegetable planting and the production of soft fruit as long as sufficient water is available for the crop.

At the onset of drought conditions, farmers can take early actions to improve their prospects for coping with a prolonged dry period. These include:

- improving irrigation efficiency, including using equipment effectively, science-based soil and water management, and best irrigation practice (see the [UK Irrigation Association](#) website)
- extending the period of winter water abstraction by applying to vary their licence and take advantage of 'high flows' to fill reservoirs when they are available
- contacting the water company about an alternative supply if livestock drinking water is supplied from springs or boreholes and there is no connection to the mains supply, and making sure that contingency plans have been made
- maintaining dialogue with the Environment Agency, and agree voluntary restrictions to delay or avoid formal restrictions

A number of our local teams communicate the prospects of drought and potential restrictions on abstraction to licence holders early in the year. If a drought develops, we will continue to have

frequent and early dialogue with abstractors to inform them of the possibilities of abstraction restrictions. Where abstractions do not have licence conditions to curtail abstraction during low river flows, we can implement Section 57 (Water Resources Act 1991) as a last resort to restrict the abstraction for the purpose of spray irrigation. We recognise that this can affect agricultural business and production, so we take all steps to reduce the use of this legislation. Section 4.4.4. explains our Section 57 procedures.

Outside of drought periods, there are a number of actions which can help farmers and growers to improve their business's long term resilience to water stress (see our advice published by the Campaign for the Farmed Environment: [Key actions for farmers relating to water management](#)).

3.3. Private water supply

There are in the region of 1 million users of some 40,000 private water supplies from streams, boreholes and springs, of which just over half are domestic supplies. Many landowners supply domestic customers and commercial businesses, such as holiday cottages, rented office space, industrial units and growers.

There is a legal obligation for water companies to provide limited drinking water to domestic properties for essential purposes if their private supply runs dry due to drought. This service can be subject to a charge. Suppliers of water for commercial purposes normally have to meet the costs of providing an alternative supply to the businesses they serve.

It is important for all businesses and owners of domestic private supplies to review and, if needed, improve their resilience to drought. Local councils and Drinking Water Inspectorate can provide guidance and support. For further information on this see guidance on the [Drinking Water Inspectorate's website](#).

3.4. Environment

Although part of the natural water cycle, drought inevitably has an impact on ecosystems in England. Healthy ecosystems are usually resilient to drought and will recover. Recovery from a one-season drought tends to be rapid, while it is likely to take time to recover from consecutive or multi-season droughts. The aim, therefore, should be on minimising the impacts of human activities which may prevent or slow subsequent recovery.

We will work with NE, environmental NGOs and local conservation groups to protect animals and habitats at risk. For any cross-border catchments we will work closely with NRW to protect the environment in these catchments. We also work with these organisations to collect evidence about the impacts of drought, and how the environment is recovering after drought to inform future management plans

3.4.1. Fisheries

Low winter rainfall causes low flows in rivers and low levels in still-waters, at the time when some fish rely on flows being both variable and sufficient to allow upstream movement (for example for fish migration). In drought conditions, migratory fish are likely to pool up in estuaries and the lower reaches of river systems where they may become vulnerable to legal fishing and illegal activity. Over a period of time, if flows continue to reduce or remain low, especially when combined with high temperatures leading to low oxygen levels in the water, fish may die.

3.4.2. Wetlands and habitats

Many wetlands (particularly grazing marshes in the south and east) can dry out and the usual wet pools will either dry or reduce. In hot dry summer conditions fire can also devastate vulnerable areas of heath land and moorland which is home to some of England's most exceptional wildlife. In addition to these short-term effects, the longer term impacts of drought can become more severe.

3.4.3. Wildlife and plants

When droughts occur during warmer than normal conditions, higher water temperatures present an extra problem. Some aquatic plants will no longer grow in warmer areas of standing and flowing water. This can have major long-term effects on the animals and plants that live in water, and also on animals that depend on water. As a drought develops there is also the risk that particular local species may die out where they are unable to move to areas that retain a suitable habitat. Whereas they may be able to survive one season of drought, several poor breeding seasons could threaten some vulnerable species with extinction.

3.5. Navigation

The responsibility for navigable waterways in England rests with a number of bodies, primarily the Canal and River Trust (CRT) and the Environment Agency. You can find out who the navigable authority for a waterway is on the [Inland Waterways Association](#) website.

During a prolonged dry period managing the available water resources can be a challenge to navigation authorities. We work with CRT to ensure boaters and river users are kept informed of any restrictions in place. Navigation authorities operate locks, weirs and sluices on their waterways to maintain adequate depths for boating, as well as to achieve environmentally acceptable flows and depths. Low flow restriction on navigation may occur for 2 reasons:

- there may be insufficient depth of water to allow boat passage or access to the river at very low flows, and so the risk of boats grounding
- the opening of lock gates could be reduced or stopped during drought conditions to help reduce drainage and maintain water in the channel

In the most recent drought, of 2010 to 2012, a number of actions were taken to try and reduce the impact of the drought on navigable waterways. These included options to manage the supply (for example pumped reservoir refill) and water demand (for example lock gate relining).

3.6. Infrastructure

Extreme heat and dry ground can cause some roads and parts of the rail network to be affected by ground shrinkage. Ground shrinkage over the summer regularly affects the south-east of England where there are extensive alluvial clay formations and embankments. Uneven changes in the ground affect the geometry of the track above it. The widespread drought of 2012 caused rail track geometry to deteriorate to its worst levels since 2003.

3.7. Industry

As with all water users there is a risk that prolonged dry conditions and drought will have an impact on the availability of water and how it is used in industrial purposes. The power and electricity generation sector is generally more resilient because of the flexibility of alternative supplies and the national electricity grid but individual plant operation can be affected depending on where the effects of a drought are felt.

As a drought escalates and becomes more severe, industrial manufacturing and food processing with water supplied by abstraction licences could be affected. This is because the Environment Agency and water companies can apply to government for a drought order to stop any unlicensed or licensed abstraction with no low flow control conditions that is having a severe impact or is threatening to impact on the environment or public water supply. The Defra Secretary of State will make a decision to grant such orders for reasons based on the predicted impacts and the prioritisation of water for people, industry and the environment. You can find more information on the use of drought orders at the [Defra](#) website.

During times of drought, we work closely with the main sectors to provide current information on the impacts of drought and the prospects for a drought continuing. In 2012, the National Drought Group (NDG) was set up by the Secretary of State (Defra) to bring together government and the main

sectors to plan and manage strategic drought actions. Wider stakeholder groups convened to consider specific areas of risk such as water supply and economic and social issues. The NDG and cross sector stakeholder groups will be convened in future droughts.

Each sector should plan to understand the risks of drought and encourage putting contingency plans in place for individual sites at risk of drought. This should include the effect other abstractions may have on the availability of water, engagement with the main partners, and considerations for adapting operations to the level of risk to both water supply and the environment.

4. Our drought teams and actions

Our role in drought is to manage and coordinate the response to drought and its impacts. We plan and manage drought using dedicated incident management drought teams and procedures.

4.1. Defining drought stages

Droughts often take time to develop. Different actions are needed at different times as droughts escalate. The sequence of actions will not always be the same: each drought is unique and is managed individually.

We decide when a drought is happening and what needs to be done by setting up and monitoring drought indicators. These indicators are often called drought triggers; a range of different triggers are used to identify if a drought is happening. Triggers can be based on:

- meteo-hydrological thresholds (such as rainfall, river levels and flows, reservoir storage and groundwater levels)
- environmental indicators (such as water quality and ecology)

When a trigger is approached or crossed, local and national drought response teams decide what to do next from a range of predefined drought actions and measures. Each team considers present and forecast weather conditions before choosing a course of action.

4.1.1. Stages of drought management

We plan and manage drought using a green, yellow, amber and red colour code system to illustrate the worsening or improving situation. The primary hydrological indicators, possible impacts and main actions for each stage are set out below, these are indicative and are not exhaustive. The timing of actions will be based on local expert judgement which our drought teams advise on.

Normal stage (green)

- **Indicators:** all indicators within normal ranges for the time of year.
- **Possible impacts:** small incidents during a short summer heat wave, for example fish kills
- **Main Environment Agency and water company actions:** 'peace time' preparation of drought plans and staff training

Developing drought stage (yellow)

- **Indicators:** established period of low indicators for the time of the year
- **Possible impacts include:**
 - a heightened risk of environmental damage
 - short term risk to wildlife and plants
- **Main Environment Agency actions:**
 - activate internal drought plans and teams
 - increase the number of abstraction cessation conditions in force for time of year
 - voluntary restrictions for some abstractions
 - limit restrictions on canal and river navigation
- **Main water company actions:**
 - using enhanced water efficiency messages

Drought stage (amber)

- **Indicators:** prolonged low and notably low indicators for the time of year
- **Possible impacts include:**
 - stress on public and private water supply sources
 - reduced agricultural and horticultural crop yields
 - localised wildfires
 - long term habitat and wildlife impacts
- **Main Environment Agency actions:**
 - impose prolonged restrictions on canal and river navigation
 - process and enforce drought permits and orders to protect public water supply
 - apply for and use drought orders to protect the environment
 - respond to multiple fish and pollution incidents
 - impose localised spray irrigation restrictions (using S57)
 - chairing of the NDG by the Chief Executive
- **Main water company actions:**
 - impose restrictions on non-essential domestic and commercial water use
 - apply for and use drought permits and orders to protect public water supply

Severe drought stage (red)

- **Indicators:** exceptionally low indicators over a long period of time
- **Possible impacts include:**
 - widespread long term environmental damage
 - widespread wildfires
 - failure of crops or plants and shortage of fodder and drinking water for livestock
 - failure of public and private water supplies
- **Main Environment Agency actions:**
 - move to category 1 incident response mode
 - government may activate Cabinet Office Briefing Room (COBR)
 - extensive working with abstractors and stakeholders
 - continuing to process and enforce drought permits and orders
- **Main water company actions:**
 - impose emergency restrictions on domestic and commercial water uses
 - continuing to apply for and use of drought permits and orders to protect public water supply

Recovering drought stage (amber)

- **Indicators:** returning within low or normal ranges for time of year
- **Possible impacts include:**
 - depends on the type and severity of the preceding drought
- **Main Environment Agency actions:**
 - identify lessons learned, review actions and plans

- **Main water company actions:**

- maintain water efficiency measures to keep demand low until resources are fully restored
- identify lessons learned, review actions and plans

4.2. Response arrangements

We manage droughts under our incident response arrangements. 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 most floods or pollution incidents, droughts take time to develop and once in a drought it is difficult to forecast when it will end.

Each of our 16 Operational areas and our National Office have identified drought technical teams who operate the day to day management of drought incident response alongside duty strategic managers. We convene our strategic management team (SMT) during drought to provide strategic governance and direction. This group feeds into the National Drought Group (NDG) which is an external stakeholder group that is activated at the developing drought or drought stage. Its role is to create a single coherent cross sector view which is able to manage coordinated delivery of drought management activities, communications and risks for England across all sectors. For any drought that occurs along the Welsh border the Environment Agency will work closely with NRW drought teams, and a drought will not be declared here without cross border discussions.

A severe drought is classed as an emergency that needs (or has the potential to need) a Category 1 incident response. In a severe drought we will activate our multi agency major incident procedure. The overall management of the situation will shift to government with expert advice from our strategic management team.

4.2.1. National Drought Group

The National Drought Group (NDG) was set up by the Defra Secretary of State in February 2012 to manage that drought. The NDG will meet in future droughts to provide a multi sector overview and strategic management of the drought. It commissions working groups to undertake specific pieces of work. The NDG includes senior decision makers from Environment Agency, government and principal drought stakeholders.

The terms of reference and members of the NDG are found in [appendix 7.1](#).

4.2.2. Environment Agency national drought team

During a drought the roles and responsibilities of the national drought team are to:

- provide regular progress, prospects and briefing reports for government and the Environment Agency Board
- report publicly on the drought situation and how it is affecting the environment, wildlife and public water supply
- tell the public how they can get advice on saving water and report environmental problems
- communicate with water companies, abstractors, navigation authorities, and others who manage drought to develop shared messages for the public and media
- work with abstractors to reduce the impact of drought on their businesses while balancing the needs of the natural environment
- support our teams to respond to drought across England

4.2.3. Responsibilities of local drought teams

During a drought local drought teams will:

- make sure abstractors do not take too much water from rivers
- make sure 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 water company drought order applications
- report on the state of water resources to local communities and local partners
- monitor hydrological and ecological parameters to assess local water situations and mitigate the impact of drought on the environment
- ensure the appropriate incident management structure is in place for dealing with potential or actual drought incidents
- drought teams responsible for the cross border catchments with Wales will liaise with colleagues in NRW

During an escalating and severe drought, if multi-agency co-ordination of the response is required we will send a Liaison Officer or Lead Officer to Silver or Gold Control as appropriate to provide detailed information to our professional partners and assist in implementing plans for managing impacts upon the community.

4.3. Drought actions and triggers

The impact of a drought can be minor to very severe. Here is a summary of the main actions we take.

4.3.1. Environmental incidents

Dry weather can cause low water levels in rivers, lakes and ponds causing overcrowding and vulnerability to disease and predators. Hot weather also increases the risk of algal blooms, which can lead to less oxygen in the water, which in turn causes fish to die. We aim to respond quickly to reports of dead, dying or distressed fish in rivers, streams and lakes. In some circumstances we may consider an emergency fish rescue.

4.3.2. Drought permits and orders to increase water supply

In an escalating drought, water companies can apply to us for a drought permit. For every site where a drought permit could be applied, we form a team dedicated to comment and input on the specific application.

We do not normally grant drought permits where a water company has not included the proposal as an option in its drought plan. The water company will also need to demonstrate that it has implemented additional water conservation measures before making an application. This could include publicity campaigns, temporary use restrictions, leakage control and mains pressure reduction.

Water companies can apply to the Secretary of State or Welsh Ministers for ordinary drought orders and emergency drought orders. Our role is to provide information to the Secretary of State for applications in England. NRW will provide information to the Welsh Ministers for applications in Wales. We do not usually support requests for drought orders to abstract more water unless the water company demonstrates that it has implemented additional demand management measures before making its application. This could include publicity campaigns, bans on non-essential water uses, leakage control and mains pressure reduction.

More information on drought orders and permits can be found in our [joint report with Defra and Welsh government](#).

4.3.3. Drought orders to protect the environment

We set abstraction licence conditions to protect the environment during a range of conditions including drought so we do not usually expect to use drought orders to protect the environment. We can apply for a drought order if the environment is suffering serious damage because of abstraction during a drought. If we were applying for an ordinary drought order, we would need to satisfy the Secretary of State that:

- 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
- 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 would work with other stakeholders such as NE and abstractors to identify where and when an environmental drought order would be necessary and its potential effects on any essential public supplies or infrastructure.

4.3.4. Spray irrigation restrictions

The Environment Agency can restrict spray irrigation during periods of drought. Most abstraction licences for spray irrigation now contain hands off flow conditions where the licence holder has to reduce or stop abstracting water when flows or levels fall below a certain threshold. However, some older licences do not have these restrictions and in these cases we can use [Section 57](#) of the Water Resources Act 1991 to impose restrictions when there has been an exceptional shortage of rainfall or other emergency. This is a main part of the staged approach in the legislation to limiting water use in exceptionally dry conditions to protect public water supply and other needs.

This means we can stop or reduce all abstraction licences for spray irrigation within a water catchment. We can only restrict abstraction from groundwater if abstraction is likely to affect the flow, level or volume of an inland water such as a river or stream. Where there is more than one abstractor from the same source of supply, we must treat all licence holders equally. However, we will work with abstractors (not just spray irrigators) to explore the benefit of voluntary restrictions to avoid or delay the use of Section 57 restrictions. If a licence includes 'hands off flow' conditions, then it is likely these would already be operating before we introduced a Section 57 restriction.

Restricting spray irrigation can seriously disrupt a business so these restrictions are only implemented when the environment is threatened. The Environment Agency works with abstractors to keep them informed about possible restrictions, seeking voluntary reductions in water use first. We explain what will trigger Section 57 restrictions in our local drought plans. If we have to impose one, we will serve notice by email and letter in advance (usually at least 2 weeks) before an abstractor has to stop or reduce abstraction. We may be able to phase-in restrictions, starting at a mandatory 50% reduction, increasing to 75% then 100% if conditions don't improve. In some cases, this may not be possible.

4.4. Drought monitoring

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

- rain gauges
- indicator flow gauging station network
- groundwater level monitoring network
- national ecological drought surveillance network
- surface or ground water quality monitoring networks
- water companies (eg reservoir storage data)

We will also collect additional hydrometric, ecological or other data during a drought when appropriate. Within our areas, our operational environmental monitoring teams are responsible for collecting and analysing the data. They use the information to decide how to manage the effects of drought and recovery. All local monitoring plans and data are found in area drought plans.

4.4.1. Ecological monitoring

Area teams undertake routine ecological monitoring for macro-invertebrates, macrophytes, diatoms, fish and nuisance algae. This monitoring is directed by national water quality and water resource strategies (for example the Water Framework Directive, Restoring Sustainable Abstraction and Catchment Abstraction Management Strategies) and locally identified priorities. We also carry out ecological monitoring to understand the impact of drought on the health of the environment. The ecological monitoring network ensures that we have reliable baseline data to determine the impact of the drought and assess recovery.

A national drought surveillance network is in place. This network brings together selected flow responsive ecology monitoring sites with flow gauging stations. The network covers different types of geology so that surface and groundwater catchments of different character are captured as well as a variety of habitats from near pristine to known flow impacted sites. This network is monitored twice a year in spring and autumn.

We may carry out additional monitoring during a drought to understand the full range of shorter-term impacts; this will be decided on a case by case basis. However the type and location of monitoring is unlikely to change significantly.

4.4.1.1. Environmental assessments

For drought management actions which require water companies to abstract more water, water companies must carry out an environmental assessment to determine the environmental sensitivity of the site and likely impacts from the implementation of the proposed action. This is particularly important for potential drought permit or drought order sites, alternative source sites and temporary transfer locations.

It is the water company's responsibility to decide whether the information available is sufficient for an environmental assessment of their drought measures or whether they should collect more data. If they need more data then it is the water company's responsibility to collect this.

Evidence or data to support the environment assessment can include historical records within the site or reach or in some cases can be part or entirely based on expert judgement due to the specific habitat type.

Water companies should identify the information they need to collect in their environmental monitoring plan. We will make data from our monitoring programme available to water companies when requested to inform baseline assessments.

4.4.2. Water quality

We carry out routine water quality monitoring to meet international and UK monitoring commitments including the Water Framework Directive, Harmonised Monitoring Scheme and Urban Waste Water Directive (91/271/EEC). The data is used for assessing compliance with European legislation and reporting environmental trends.

Routine local opportunistic environmental monitoring is useful but has limited use for monitoring the environmental impact of receiving waters during periods of low flow. However, continuous water quality monitoring using instrumentation has the potential to be very useful, especially when investigating the impact of drought conditions on water quality. Continuous monitoring data can also help us better understand and control the impacts on water quality. It allows for more pro-active management as live information on water quality can be used to enable a rapid response when water quality problems arise.

4.4.3. Algal monitoring

Blue green algal monitoring is normally carried out on a reactive basis when reports of incidents are received. When a bloom is confirmed, our Environment Management teams may take further action and notify relevant agencies (such as the local council's environmental health department and Public Health England) and provide guidance on how to respond -especially if it's above algal toxin threshold values and poses a risk to human health. Guidance on how the operator can manage risk includes warning the public with signage and restricting access to the water body.

4.5. Data and information

We rely on data and information to help us manage drought.

4.5.1. Weather forecasts

The Met Office has a statutory duty to provide forecast information on when and how much rain is expected; this helps us manage water resources. We use historical rainfall data held by the Met Office to set current periods of low rainfall within their historical context.

4.5.2. Water situation reports

We routinely measure, monitor and report on a range of hydrological parameters to assess the water situation across in England. We do this by using our own hydrometric data, together with data provided by the Met Office and water companies. We do this for:

- the amount of rain that falls
- how dry the soils are and how much rain they can soak up
- the amount of water flowing in rivers
- the amount of water stored below ground in aquifers and above ground in reservoirs

We publish this information in our [monthly water situation reports and weekly rainfall and river flow summaries for England](#).

4.5.3. Hydrological ensemble forecasts

We can provide a broad assessment of the likelihood of where river flows and groundwater levels may be in the future by running all available historical sequences of rainfall and evaporation through our models. Our [monthly water situation reports](#) contain the 6 month and 12 month river flow and groundwater forecasts.

4.5.4. Hydrological outlook

Working in partnership with the Centre for Ecology and Hydrology, the British Geological Survey, the Met Office, the Scottish Environment Protection Agency, NRW, and the Rivers Agency Northern Ireland, we have developed a forecasting service for river flows and groundwater levels.

The [hydrological outlook](#) brings together information on weather conditions, soil moisture, river flows and groundwater levels. It uses a number of modelling methods to explore possible future hydrological conditions. It uses hydrological models to project plausible river flows and groundwater levels at selected locations across the UK.

5. How we communicate with others

Drought is a natural hazard for people, water companies and government. It is also a risk to the economy, livelihoods and the natural environment. It is important that all affected groups work together to manage water supplies and safeguard the environment. This includes communicating the causes and impacts of drought and things we can do to reduce its impact.

5.1. Our role

We provide information to water companies, government, other external partners and the public to help them prepare and take appropriate action. We start formal reporting once a developing drought is identified, although informal reporting can happen during dry but normal conditions. Once a developing drought is established we will inform government, media, abstractors and the public on the situation, impacts and actions to take.

During a drought event, our communications will:

- establish good working networks with water companies to make sure they implement their drought plans and take adequate steps to maintain public water supplies, while avoiding damage to the environment as much as possible
- report to government on the state of water resources and advise on appropriate action
- support water companies in promoting water efficiency to consumers, business and industry
- work in partnership with abstractors and representative groups where possible or appropriate, to ensure that the main industry and business sectors are given advance warning of drought and likely impacts
- support abstractors by encouraging water efficiency and finding ways to reduce the impacts of drought - we'll make our role and responsibilities clear to the media, the public and other stakeholders
- co-ordinate drought management communications nationally and with areas, according to Environment Agency drought plans
- make sure all relevant staff are briefed on the situation and about any risks, issues or actions
- ensure our managers are aware of the resource commitments to drought response and that any issues are raised quickly
- communicate with NRW. The amount of communication will depend on which area of England the drought is affecting.

5.2. How we communicate

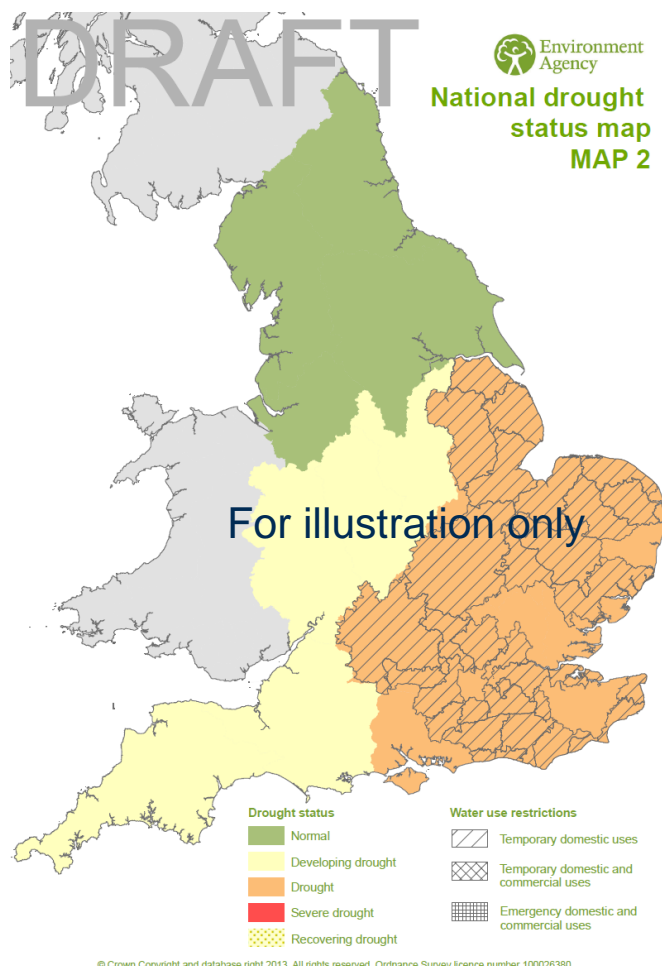
We use a range of tools to help us communicate with the right people about the latest water situation, its impacts and to make sure water users know how to prepare themselves for water shortages and associated impacts.

5.2.1. Communications plan

The drought communications plan will help direct national and local communications plans and ensure consistency in communication methods and messages. Our national drought communications manager prepares a national communications plan when our drought team moves into the 'developing drought' stage. The move into subsequent drought stages will prompt a review and update.

5.2.2. Drought maps

It is possible that different areas will experience different stages of drought, and different impacts, within the same drought event. Our drought maps aim to provide accessible information on drought status to explain the spatial coverage across England and how it affects people, business and the environment.



Once a developing drought is established, we produce the map based on the level of drought stage for each of our operational areas. Any restrictions on public water use will be illustrated on the map based on the water company supply zone affected by the restriction.

We will publish the maps on GOV.UK and use them in our press releases and drought briefings to explain any spatial and sequential changes of the drought.

5.2.3. Joint communication arrangements

Sometimes joint communication is a good way to target main sectors and reinforce messages. Commitment and effort is needed from all parties for a successful outcome but joint working arrangements shouldn't compromise our role as regulator of the water industry. We promote water efficiency where appropriate but water companies are responsible for educating their customers about using water wisely, particularly during drought. We lead on promoting water efficiency to non-water company abstractors as part of our abstraction permitting activity.

The NDG provides a cross-sector view of national drought issues and management. The NDG sub group on communications leads on a cross sector communications strategy. This communications group will meet as directed by the NDG and consists of representatives from the Environment Agency, NRW, water companies, Consumer Council for Water, NFU, CLA, UKIA, Waterwise, Blueprint for Water (or similar), Defra, and the Met Office. Their main priorities include:

- agreeing a common set of messages with main stakeholder groups
- determining opportunities for, and running joint local or sub-national campaigns

- monitoring how well the main customer groups understand the messages

Celebrating success

'Beatthedrought.com' was a website launched by the Environment Agency and water companies in south-east England during the 2004 to 2006 drought. It was hailed as a success by many parties including Ofwat, the Consumer Council for Water and non-government organisations.



5.2.4. Media

To communicate via the media it is important to provide the right messages to the right audience. During all stages of drought, we use press releases, drought maps and briefings (on GOV.UK) to inform the media and the public of the present and forecast situation and associated impacts.

All media appearances or enquiries are routed through our national press office. The national press office at Ergon House leads on enquiries from national print and broadcast media; area press offices lead on enquiries from local news media.

5.2.5. GOV.UK

We publish both up to date and general information about drought and the water resources situation on [GOV.UK](https://www.gov.uk). During a drought event, we publish:

- the latest drought situation and maps
- links to water situation reports
- the location of restrictions in place such as S57 restrictions, temporary water use restrictions and drought permits
- general information on drought
- links to water efficiency advice
- links to drought plans

5.2.6. Social media

We use social media to publish up to date warnings and information. Our national drought and communications teams use social media to promote drought status and to find out about related environmental incidents. During a drought we use Facebook, Twitter and Flickr to relay and source information.

5.2.7. Flood warnings during drought

Significant rainfall during periods of drought can lead to localised or even widespread flooding. This means that we may issue flooding warnings and take flood actions to areas that are within a drought status. Our [Flood warning service](#) will deliver warnings as normal.

In such an event, our drought and flood management teams will prepare messages to the government, media and local communities. This will include releasing updated maps, short term and long term forecasts and actions for people and business.

5.3. Drought briefings and reports

We use a variety of reports for our internal and external audiences to explain the current situation, risks, issues and prospects should the dry weather continue.

5.3.1. National drought brief

The national drought brief is a regular report produced by the national drought team with information provided by area drought teams. The decision to begin compiling the report is at the discretion of the national drought lead but will normally begin when we move to a 'developing drought' status. It is a concise report that summarises the drought situation across England. The weekly water resources situation report supports this weekly report.

5.3.2. Report to ministers and government departments

During a drought we keep government ministers and departments informed of the risk posed to the environment, the prospects for public water supplies and other water users (principally agriculture, industry including power generation and navigation). Reports to government departments and ministers address either specific requests for information, or report on the water resource prospects as a consequence of the drought.

5.3.3. Monthly water situation report

Our national hydrology team produce a monthly water situation report, which supports the national drought brief. This is produced during normal and drought conditions.

5.3.4. Weekly water situation report

Our national hydrology team produce a weekly water situation report, which supports the national drought brief. During normal conditions a weekly rainfall and river flow summary is produced. During periods of drought this is extended to include additional information on hydrological conditions and reservoir storage.

6. Recovering from drought

Our role in recovery covers both internal and external factors including support to partners and abstractors, monitoring the natural environment and prioritising work to return to business as usual. It is an important stage of our incident management cycle.

6.1. Drought recession

We cannot forecast when a drought will end. However many major droughts end with exceptional rainfall which will cause a risk of flooding for areas affected. That is what happened at the end of the 2010 to 2012 drought in south, central and east England.

Some droughts may recover over a longer duration and usually after 1 or 2 years of significant winter rainfall will have replenished depleted groundwater levels and reservoir stocks.

Flooding and drought 2012

The wettest April to September for over 100 years caused flooding to over 4,500 homes and businesses. Sewers overflowed, causing localised flooding and polluting rivers. Run-off from agricultural land and effluent from storm overflows on beaches led to low bathing water quality. Increased run-off of pesticides and fertilisers led to poor raw water quality and water companies found it difficult to meet drinking water standards.

The rain was so intense that we issued flood warnings in areas suffering from drought. In those areas, groundwater remained depleted and took some time to recover before the temporary use bans could be lifted.



Flooding in Loughborough in June 2012

6.1.1. Monitoring recovery

Once a drought recedes, it's important to continue environmental monitoring to assess recovery of sites and identify any long term environmental damage. Our area analysis and reporting teams are responsible for establishing and carrying out a drought recovery monitoring programme.

Drought monitoring will normally continue until the ecology has recovered to normal conditions. Alongside this, site specific LIFE targets at main 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.

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. It may take many years for some rivers to recover.

6.2. Learning from experience

After each drought we review the actions we took to see what went well so that we can share good practice. We also look at what did not go well so lessons are learnt and we identify improvements to managing future drought.

6.2.1. Reviewing our response

Our national and area drought teams will meet to review how we managed the drought and its impacts, what went well and where we can improve. We will share our lessons with government and members of the NDG. We will set up a recovery project to make sure all identified lessons and recommendations are built into our future response arrangements and plans. The national drought team is responsible for monitoring progress on the actions identified within the post drought review and providing regular updates on progress.

6.2.2. Working with others

The NDG has an important role in reviewing how all sectors worked to manage a drought incident. They will suggest ways we can improve plans to manage the consequences of a drought. Involving the public and communicating with them better will help to explain the challenges water managers face, as well as sharing practical ways in which everyone can use water more wisely.

The 2012 drought showed how all interested groups can benefit from working together to inform the public and water abstractors of the situation and what they can do to help reduce the impacts. Since 2012, we have formed a NDG to help secure safe and reliable water resources for the future.

As a result of the 2010 to 2012 drought, the 'Water for Food Group' was set up to progress agriculture actions from this drought, and collaboratively work on other water resource subjects. The group includes members from the NFU, Environment Agency and other organisations and trade associations from the agriculture, horticulture and water consumers sectors, as well as individuals who chair water abstractor groups or represent groups of farmers.

7. Appendices

7.1. National Drought Group

This Annex includes the membership, terms of reference of the group, as well as the NDG's primary recommendations and their action plan. The membership and purpose of this group will be reviewed at the start of each drought event to ensure it includes the appropriate members for the area affected by the drought.

7.1.1. Terms of reference

The terms of reference of the NDG agreed with Defra were:

The NDG will be chaired by the Chief Executive of the Environment Agency who will report to the Secretary of State. The group will provide a high level steer to drought management in England and commission working groups to undertake specific pieces of work. The NDG will include senior decision makers from the principal stakeholders who are able to take executive decisions for their respective organisations.

The NDG will be responsible for producing a cross-sector view of national drought issues. They will coordinate the delivery of drought management activities, communications and risk mitigation.

In particular, the group will manage and coordinate planning and responses on:

- the economic, social and environmental impacts of drought
- the development and communication of consistent messages, updates, advice and guidance
- contingency planning and action in relation to water conservation issues and resource sharing in the short and medium term
- scenario planning for drought escalation

The NDG will identify issues for decision; for example by Defra on policy matters, Environment Agency on regulatory issues and NDG on communications and contingency planning.

7.1.2. Membership

The group will be made up of senior level decision makers from across the sectors impacted by drought. The group will be able to extend its membership in response to changing circumstances such as an expansion of the drought-affected area. Membership of the group can be reviewed and changed by agreement of members:

Chair

- Chief Executive, Environment Agency

Central government

- Defra
- Cabinet Office
- Department of Energy and Climate Change (DECC)
- Department for Communities and Local Government (DCLG)

Water companies

- Water UK

Other groups

- National Farmers' Union (NFU)
- UK Irrigation Association (UKIA)
- Association of Drainage Authorities (ADA)
- Blueprint for Water
- Country Land and Businesses Association (CLA)
- Natural England (NE)
- Natural Resources Wales (NRW)

Other regulators included with escalation of drought

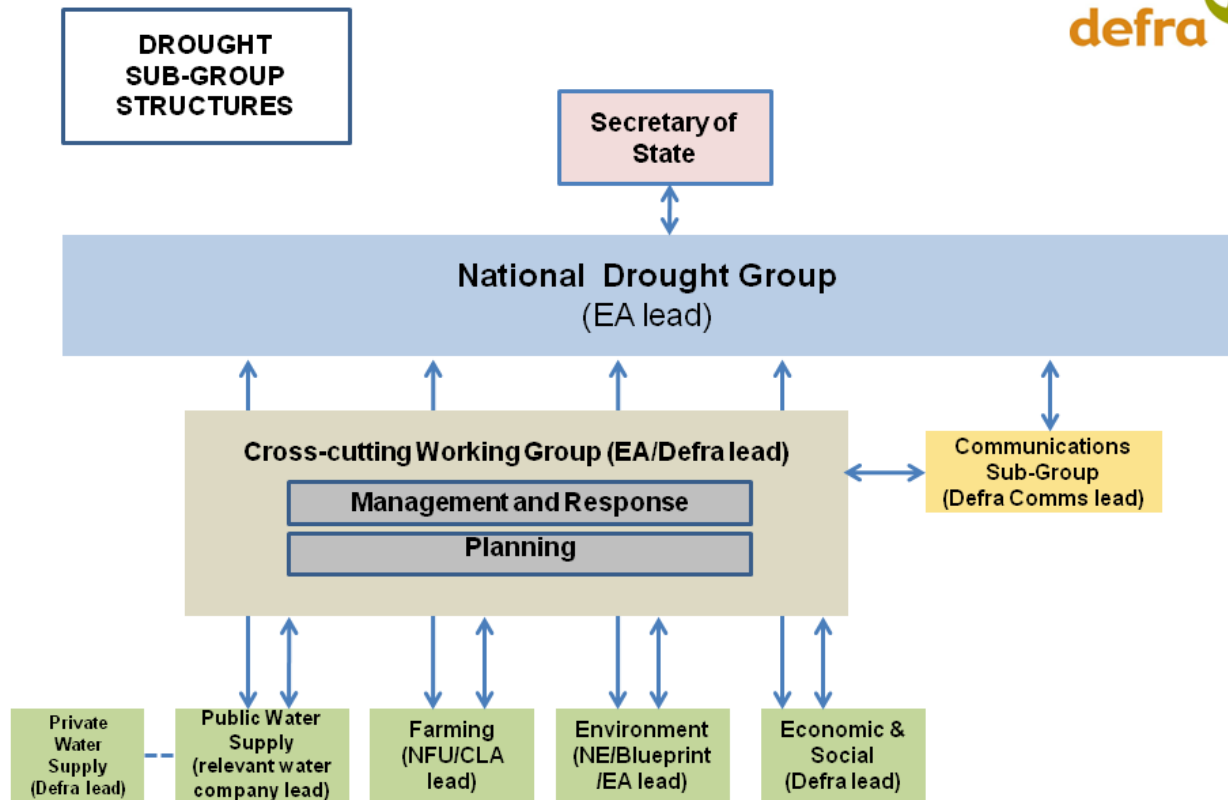
- Ofwat
- Consumer Council for Water (CCWater)
- Drinking Water Inspectorate (DWI)

The diagram below shows the links between the NDG and the various topic-specific working groups.

The Environment Agency will chair weekly meetings to allow rapid and frequent exchange of information, monitor progress by the task and finish groups, identify issues for resolution, and report to the NDG. Attendance at these will be by invitation to government departments and the interested groups.

A National Drought Stakeholder Group (NDSG) may also be formed to allow Defra and the Environment Agency to involve and brief more widely on the developing situation and the actions being taken.

Issues raised by interested groups that require a view or action from government will be referred to Defra. The Environment Agency will provide secretariat support for the NDG, the Birdtable weekly meeting and the NDSG.



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