



Drought: how it is managed in England

October 2024

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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Our vision

A nation ready for, and resilient to, dry weather and drought – now and into the future.



Haweswater reservoir in the Lake District showing low water levels from 1995. Photograph taken in 2010 by Richard Wood.

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Executive summary

Droughts are natural events which we cannot prevent. They reduce available water supplies and can have negative impacts on people, wildlife and the environment. Drought is featured as a risk facing England on the [National Risk Register](#), and we will likely experience more frequent and severe droughts in the future due to our changing climate.

The Water Resources Act 1991 places a statutory duty on the Environment Agency to secure the proper use of water resources in England, including protecting the environment. This framework describes how we meet these duties during dry weather and drought events, and how we work with all those involved in drought management. Our collective aims during droughts are to minimise impacts on the environment and society.

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.

As the water regulator, we also oversee the actions water companies take to secure public water supplies. Water companies are responsible for managing water supplies to meet the needs of customers while protecting the natural environment.

We cannot control when the next drought will be, but we can work together now to improve our preparation and resilience to dry weather and drought.

This document explains:

- the impacts of drought in England
- who is involved in planning, managing and responding and how we work together
- the actions we and others take to effectively manage droughts
- how we report on drought and communicate with others
- our role in recovery and learning from drought events

It provides the strategic overview of drought management in England and compliments our operational area drought plans as well as other organisations drought plans and procedures.

It also provides information for our staff, government departments and the main stakeholders to use in planning for and managing drought.

1. Drought in England: an overview

This section provides a definition of drought, describes drought duration and highlights notable droughts of the last 50 years.

1.1 Definition of drought

Droughts are natural events that we cannot prevent. All droughts are characterised by a period of low rainfall creating a shortage of water, but there is not a single definition of drought. Each drought is different – varying in nature, timing and impacts on people, the environment, agriculture, business and public water supply.

Droughts can be short and intense, such as the dry, hot summer of 2022; take time to develop and extend over multiple seasons such as in 2004 to 2006; or be anything in between.

We classify them as environmental, agricultural or water supply droughts, which may occur separately or together.

1.1.1 Environmental drought

Occurs 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 habitats. 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.

1.1.2 Agricultural drought

This happens when there is not enough rainfall and moisture in soils to support crop production or farming practices such as irrigation. Irrigation may be constrained by environmental conditions affected by drought such as low river or groundwater levels and statutory restrictions on abstraction licences. These drought conditions often happen alongside an environmental drought but usually before public water supplies are threatened.

1.1.3 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.

1.2 Duration

A number of factors such as rainfall, geology, pressure systems, time of year, population demands and water supply infrastructure, all combine to determine which areas are more vulnerable to periods of dry weather and how long a drought occurs for.

1.2.1 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 more serious flooding during a drought event due to the high rates of rainfall run off and steep landscapes associated with this geology.

1.2.2 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.

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.

1.2.3 Heatwaves

Though they can occur at the same time, droughts and heatwaves are not the same. [According to the Met Office](#), a heatwave is “an extended period of hot weather relative to the expected conditions of the area at that time of year”. A heatwave is declared when a temperature threshold in an area is met or exceeded for at least three consecutive days. This is most common in summer months when a slow-moving high-pressure system develops over an area.

1.3 Climate change

Our climate is changing. We are already seeing wetter winters and higher temperatures, and we know severe weather events such as droughts will increase in frequency and severity. We will also likely see floods and droughts happening at the same time more often.

Climate change projections such as the [UK climate projections](#) and the Met Office's [State of the UK Climate](#) 2023 show an increased likelihood of warmer, wetter winters and hotter summers.

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, adapting to the uncertainties they bring.

1.4 Notable droughts in the last 50 years

Over the past 50 years, we have experienced a number of droughts in England. The most notable droughts over that time were in 1975 to 1976, 1989 to 1992, 1995 to 1996, 2004 to 2006, 2010 to 2012, 2016 to 2018 and 2022 to 2023. 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 events. Each of these droughts differed in severity, length, spatial extent and the water uses they impacted most.

The experiences of standpipes 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 or summer droughts, such as in 2003 and 2022. Our drought plans, and the actions we take, reflect many of the lessons and improvements learnt from these more recent droughts.

Historic drought records enable us to manage future drought incidents more effectively. We can learn from our actions in previous incidents and use the data to inform part of the hydrological forecast.

1.4.1 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, one of the driest May to August 16 month periods on record. Many rivers experienced their lowest flows on record during this period and there were severe impacts on surface water and ground water resources. 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.

1.4.2. 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.

1.4.3. 1995 to 1996

The drought of 1995 to 1996 featured the third lowest rainfall figure over 18 months (June 1995 to November 1996). 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.

1.4.4. 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 several drought actions being introduced and at the height of the drought, hosepipe bans were imposed by 8 water companies affecting over 15 million people. Four water companies made applications for drought orders to restrict the non-essential use of water; only one company implemented a 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.

1.4.5. 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.

1.4.6. 2016 to 2019

This drought started with below average rainfall from the summer of 2016 in the south east resulting in low ground water levels with 1 drought permit issued but not used. The drought conditions moved to the north west in the summer of 2018 developing quickly following 2 months of low rainfall and above average temperatures. The below average rainfall continued throughout the summer and by the end of August much of the country was in drought or dry weather conditions. There were 6 drought permits issued in the north west and Yorkshire. One drought order was granted to the Environment Agency in the north west.

The autumn and winter of 2018 to 2019 was wetter in the north west with the reservoirs recovering and this part of the country moving out of drought, although Yorkshire remained in drought for longer. The soils were very dry in the south east and East Anglia so the groundwater was not able to fully recover by the end of the winter and in spring parts of the south east and East Anglia moved back into drought until they were able to recover later in the year following a very wet autumn and winter.

1.4.7. 2022 to 2023

Six consecutive months of below average rainfall across all regions from March to August and high temperatures saw much of the country in drought status by September. The summer was the hottest on record, with temperatures of 40 degrees Celsius recorded in July. The Met Office issued its first 'Red' warning for extreme heat.

The heat also increased water demand, and to protect water supply 17 of 18 water companies activated their drought plans during this period. Thirty drought permits were issued to help water companies protect or improve public supply – more than any other year. Five water companies applied temporary use bans in August covering 19 million people.

By August, soils were extremely dry, with some of the driest conditions on record for southern and central England. Reservoir storage levels nationally were down to 49 percent of capacity by September. Environmental impacts to habitat and species such as low flow incidents, algal blooms and fish kills were also observed. Thankfully, a wet autumn relieved the drought stress, but Devon, Cornwall and Isles of Scilly and parts of East Anglia remained in drought status into late 2023.

2. Drought impacts and mitigations

Droughts are natural events 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 section explains how drought affects different sectors and what we and others can do to help.

2.1 Public water supply

Water companies in England depend on adequate water resources to meet the needs of over 57 million people. Most 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 2.1.2)
- transferring bulk supplies between water companies
- using sources that can be activated to meet peak demands, such as the North London Artificial Recharge Scheme operated by Thames Water
- 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 several measures water companies use 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, and especially smart 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 2.1.1)

2.1.1. Temporary use bans (TUBs)

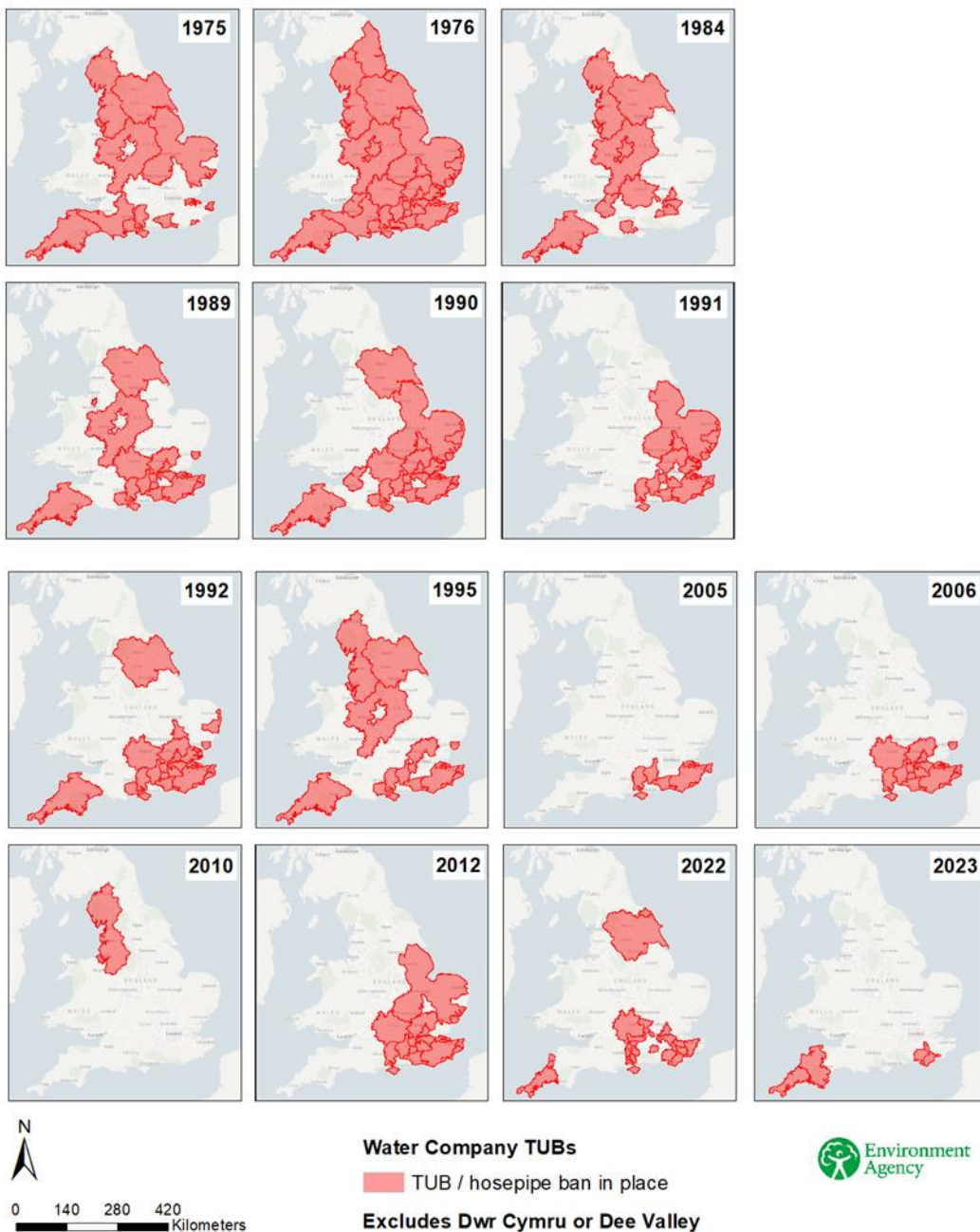
Formerly known as ‘hosepipe bans’, water companies can implement TUBs under their own powers, as per section 76 of the Water Industry Act 1991 (amended by the Flood and Water Management Act 2010). These measures temporarily restrict various water uses of their customers to help reduce demand for water 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. A water company should implement a TUB before a drought permit is issued unless it has clearly stated in its drought plan why a TUB is not applicable.

Figure 2.1 shows water company areas impacted by TUBs in the drought periods described in sections 1.4.1 to 1.4.7. Full details of what activities are covered under a temporary use ban are defined in [The Water Use \(Temporary Bans\) Order 2010](#).

Figure 2.1 Water company areas affected by Temporary Use Bans (TUBs) in England in drought years 1975 to 2023.

Temporary Use Bans (TUBs) in England



2.1.2. Drought permits and drought orders

[Drought permits and drought orders](#) 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). Because each drought and situation is unique, there is no set definition of an exceptional shortage of rain. A range of factors are considered in the assessment to agree the case.

Water companies can apply to the Environment Agency for a drought permit, which allows 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 Natural Resources Wales (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 after close consultation with the other organisation.

Both water companies and the Environment Agency can apply for drought orders. Drought orders are determined by the Defra Secretary of State in England or Welsh Ministers for sites in Wales. Drought orders have a wider range of available actions than drought permits: they can also allow a water company to change its own discharges and change someone else's abstraction or discharge licence. They also allow water companies to prohibit or limit further non-domestic customer uses of water which are detailed in the [Drought Direction 2011](#).

Water companies can also apply to the Defra 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 standpipes 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.

Figure 2.2 Total number of drought permits and orders granted per year since 1996

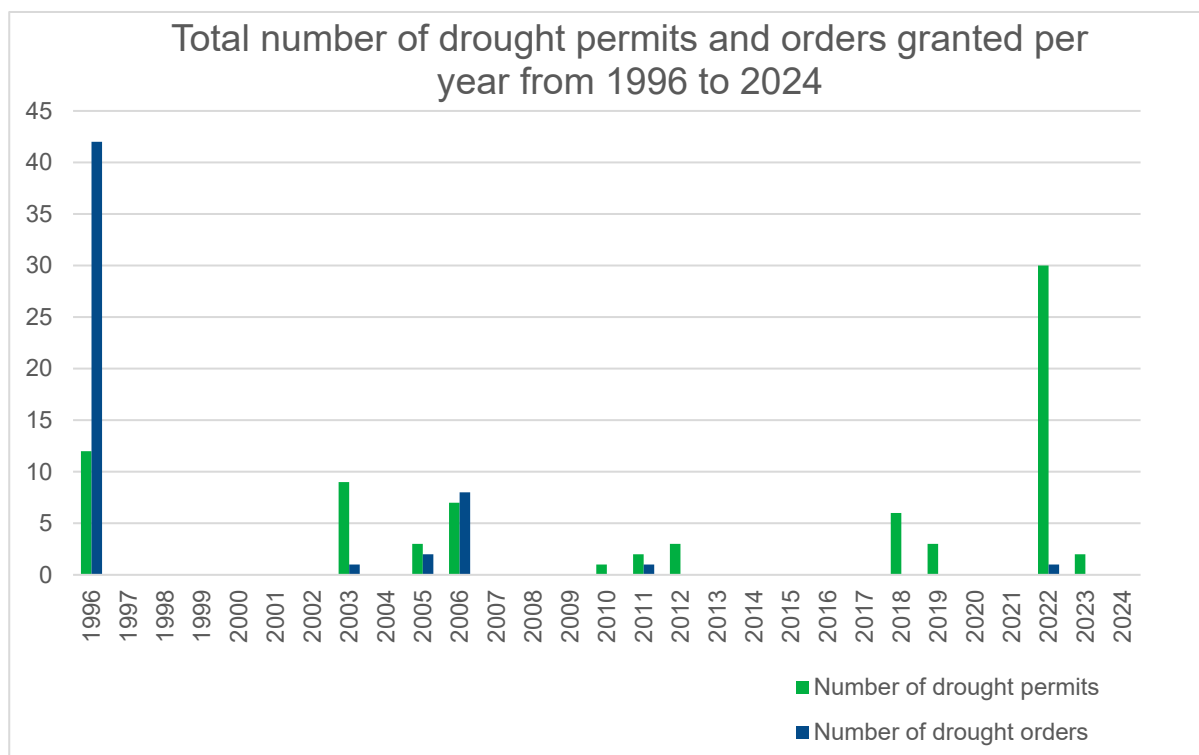


Figure 2.3 Table showing total number of drought permits and orders granted per year since 1996

Year	Number of drought permits	Number of drought orders
1996	12	42
1997	0	0
1998	0	0
1999	0	0
2000	0	0
2001	0	0
2002	0	0
2003	9	1
2004	0	0
2005	3	2
2006	7	8
2007	0	0
2008	0	0
2009	0	0
2010	1	0
2011	2	1
2012	3	0
2013	0	0
2014	0	0
2015	0	0
2016	0	0
2017	0	0
2018	6	0
2019	3	0
2020	0	0
2021	0	0
2022	30	1
2023	2	0
2024	0	0

2.2 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 or quality), disrupted access to drinking water for livestock and increased fire risk (particularly in upland or heath areas).

However, hot summers can be favourable for vegetable planting and the production of soft fruit if 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)
- continue to follow good irrigation practice such as prioritising night-time irrigation, reducing leaks and avoiding windy conditions
- 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. A regulatory position statement has been produced that allows abstractors to abstract water outside of licence conditions during one flood warning or severe flood warning event. For further information see our [abstracting flood water outside of licence conditions](#) during flood events guidance
- 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
- the Local Resource Option scheme which helps farmers and growers better understand their options to improve the supply or resilience of water
- maintaining dialogue with the Environment Agency and agreeing voluntary restrictions to delay or avoid formal restrictions
- setting up or joining an existing Water Abstractor Group where they operate in your area

Abstraction licence holders can now sign up to water abstraction alerts by email. This allows the Environment Agency to send alerts to licence holders quickly when a restriction on an abstraction licence is in force or when this has been lifted. Further information can be found on the [Manage your abstraction licence online](#) guidance.

Further information on [water abstraction during prolonged dry weather and drought](#) can be found on the GOV.UK website.

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 restrictions (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 4.8.4. 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](#).

2.3 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 the Drinking Water Inspectorate can provide guidance and support. For further information on this see guidance on the [Drinking Water Inspectorate's](#) website.

2.4 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 Natural England, environmental non-governmental organisations 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.

2.4.1 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. We work with fisheries to inform and support them in dry weather and drought.

2.4.2 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.

2.4.3 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. They may be able to survive one season of drought, but several poor breeding seasons could threaten some vulnerable species with extinction.

2.4.4 Groundwater

Chalk, sandstone and limestone are permeable substrates and provide water storage in aquifers throughout the year. This underground storage is an important and resilient part of the water supply. As groundwater levels are slow to react to changes in rainfall, aquifers can provide a buffer in periods of dry weather.

Aquifers typically recharge during the wetter winter months. Low rainfall over a prolonged period, especially during winter, can therefore lead to reduced water supply available for summer months. Droughts normally follow one or more consecutive drier winters when groundwater reserves have not been restored.

As drought progresses, soils become drier and groundwater levels and river flows fall. This can lead to obvious impacts on people and the environment, as outlined in this section.

There is no consistent way to characterise groundwater droughts. Each operational area has developed their own specific triggers related to environmental impacts such as fish kills, drying rivers and low reservoirs.

2.4.5 Surface water

Less permeable substrates such as clay limit natural water storage underground. Water supply in these catchments therefore relies more on seasonal rainfall than on the underground storage afforded by aquifers.

Rivers in clay catchments can have a 'flashy' nature as they respond rapidly to rainfall events, causing their flow to increase rapidly after heavy rain events. The reactive nature

of these areas means that in periods of low summer rainfall, rivers can suffer from low flows. The first impacts are likely to be in the headwaters, as these are generally supported by spring flows from groundwater.

Droughts in areas of primarily clay geology develop faster due to less base flow, leaving rivers more vulnerable to periods of low rainfall.

2.5 Navigation

The responsibility for navigable waterways in England rests with several bodies, primarily the Canal and River Trust (the Trust) and the Environment Agency. The Trust has statutory obligations under the [British Waterways Board \(Transfer of Functions\) Order 2012](#) to manage its roughly two thousand mile inland waterway network.

During a prolonged dry period managing the available water resources can be a challenge to navigation authorities. The Trust has non-statutory drought plans that set out their triggers and actions in these conditions and how they will ensure clear, effective and targeting messaging. The Trust also has emergency planning for environmental protection such as fish rescue arrangements, dissolved oxygen monitoring and aeration measures.

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 restrictions 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 there is 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

We work with the Trust to ensure boaters and river users are kept informed of any restrictions in place. You can find out who the navigable authority for a waterway is on the [Inland Waterways Association](#) website.

Visit the [Canal and River Trust](#) website to learn more about how they manage water.

2.6 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.

2.7 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.

As a drought escalates and becomes more severe, industrial manufacturing and food processing with water supplied by abstraction licences could be affected. 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 decide if 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](#) on the GOV.UK website.

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.

2.8 Energy

The power and electricity generation sector has a degree of resiliency to drought because of the flexibility of alternative supplies and the national electricity grid. However, individual plant operation can be affected depending on where the effects of a drought are felt. This is likely to increase as the sector moves to new technologies (that need more water) to meet net zero.

As with other industry, some energy plants and sources need considerable amounts of water which may become less available as a drought progresses. The energy sector needs to plan and understand the risk of drought and have contingency plans in place for sites that are most at risk of drought.

3. Planning, management and response

The Cabinet Office describes drought as a risk facing the United Kingdom in the [National Risk Register 2023](#). 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
- government; responsible for policies relating to water resources

- water companies; responsible for managing water supply for their customers and taking a range of measures to maintain supplies whilst minimising environmental impact

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 non-governmental organisations. 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.

3.1 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.

3.1.1. Our responsibilities in drought

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 (see 4.7.1) – 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 to limit water use – these restrictions will either be [conditions on their licence](#) or, for spray irrigators, we can also use [Section 57](#) of the Water Resources Act 1991
- maintaining communication with NRW, particularly regarding cross border catchments

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

3.1.2. Area drought plans

We have drought plans for each of our 14 operational areas. They are an essential document that tells our local operational response teams how to plan for and respond to a drought incident in their area.

Each area plan provides:

- a brief introduction to the area, including a summary of the most likely drought impacts
- a summary of the monitoring and indicators we use to understand the latest position
- the triggers used to determine when to take actions and move drought stage
- the actions we can take at each drought stage to recognise, monitor and, if possible, reduce the impact of the drought
- a drought communications plan, which explains the internal and external reporting and communication we'll do

We carry out a light touch review of our drought plans annually in the spring. We also carry out a full update to our drought plans every 5 years or 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.

3.1.3 Environmental Impacts

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 the actions included in our drought plans would benefit the environment or reduce negative impacts during stressed conditions. 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.

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 causing 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. Natural England (NE) has responsibility for Habitats Regulations Assessments in England and NRW has the responsibility for any in Wales.

3.2 Government and public bodies

3.2.1. Department for Environment, Food and Rural Affairs (Defra)

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, water companies, the National Farmers Union and Natural England to ensure that public water supplies are maintained and damage to the environment is limited. Defra are also responsible for granting drought orders, with the Environment Agency providing technical advice to Defra on the application.

3.2.2. Natural England

Natural England 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. Natural England also provides advice to industries, farmers, local communities and interest groups on how their actions during drought can affect the natural environment.

Natural England manages many National Nature Reserves. During an intense drought it may need to manage habitats differently to protect vulnerable species. Natural England 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.

3.2.3. Natural Resources Wales (NRW)

[NRW's 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 the Environment Agency leads on drought planning for the River Severn, and NRW leads for the River Wye and River Dee. When a drought develops this close consultation continues, but a drought can be declared according to each country's situation.

3.2.4. Local councils

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

Local councils work with local water companies and the Environment Agency to encourage water efficiency in their local communities and will seek to conserve water in their own operations. They should also provide support to private water suppliers when domestic supplies become insufficient.

3.2.5. Internal drainage boards

Internal Drainage Boards (IDBs) are local public authorities responsible for land drainage and water level management in areas where there are special drainage needs. They hold permissive powers to manage water levels within their drainage districts and play a regulatory role in keeping watercourses free of obstructions.

There are 112 IDBs in England that “operate and maintain over 500 pumping stations, 22,000km of watercourse, 175 automatic weed screen cleaners and numerous sluices and weirs” ([ADA 2024](#)).

The Environment Agency may work with IDBs during dry weather and drought to manage water, to provide both agricultural and environmental benefits.

To find out more and to view a map of the IDBs in England, visit the [Association of Drainage Authorities](#) website.

3.2.6. Planning Inspectorate

If objections are made to a drought permit or order application, then a hearing will normally be held. The Environment Agency will appoint a Planning Inspector to hold the drought permit hearing. Following the hearing the Inspector will submit a report to the Environment Agency findings of fact, suggested modifications or conditions and conclusions. The Environment Agency will then use this to determine the application.

Learn more about the [Planning Inspectorate on GOV.UK](#).

3.3 Water companies

Water companies are responsible for managing their public water supplies and it is essential that they prepare for extended 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, planning 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.

3.3.1. 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](#).

3.3.2. 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 or emergency drought orders. 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.

3.3.3. Regional groups

Regional groups are alliances of water companies, and other sectors with the aim to ensure a cross-sector and collaborative regional approach to managing water resources. There are five regional groups made up of 17 water companies and other water users that represent England by region: North, West, East, South East and West Country.

For more information on regional groups, see the [Water Resources National Framework Appendix 2: Regional planning](#).

3.3.4. Regional plans

Regional groups create regional plans that lay out the present and future water needs of different sectors, reflecting growth, a changing climate and environmental need. Key objectives of the plans include:

- increasing drought resilience
- pro-actively enhancing the environment and increasing ambition in this area
- identifying a diverse portfolio of supply and demand side options to help reduce household water use, reduce leakage and increase water supplies

For more information on regional plans, see the [National Framework for Water Resources](#) on GOV.UK.

3.4 Local responders

3.4.1 Local Resilience Forums

Local Resilience Forums are multi-agency groups made up of category 1 and 2 responders who are individually and collectively responsible for planning and response to civil emergencies such as drought. They do this by identifying potential risks and producing emergency plans to prevent or mitigate local impacts.

Find more information on [Local Resilience Forums](#) on GOV.UK.

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 prolonged dry weather escalates. The sequence of actions will not always be the same: each event is unique and is managed individually.

We decide 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:

- hydrological thresholds (such as rainfall, river levels and flows, reservoir storage and groundwater levels)

- environmental indicators (such as water quality and ecology)

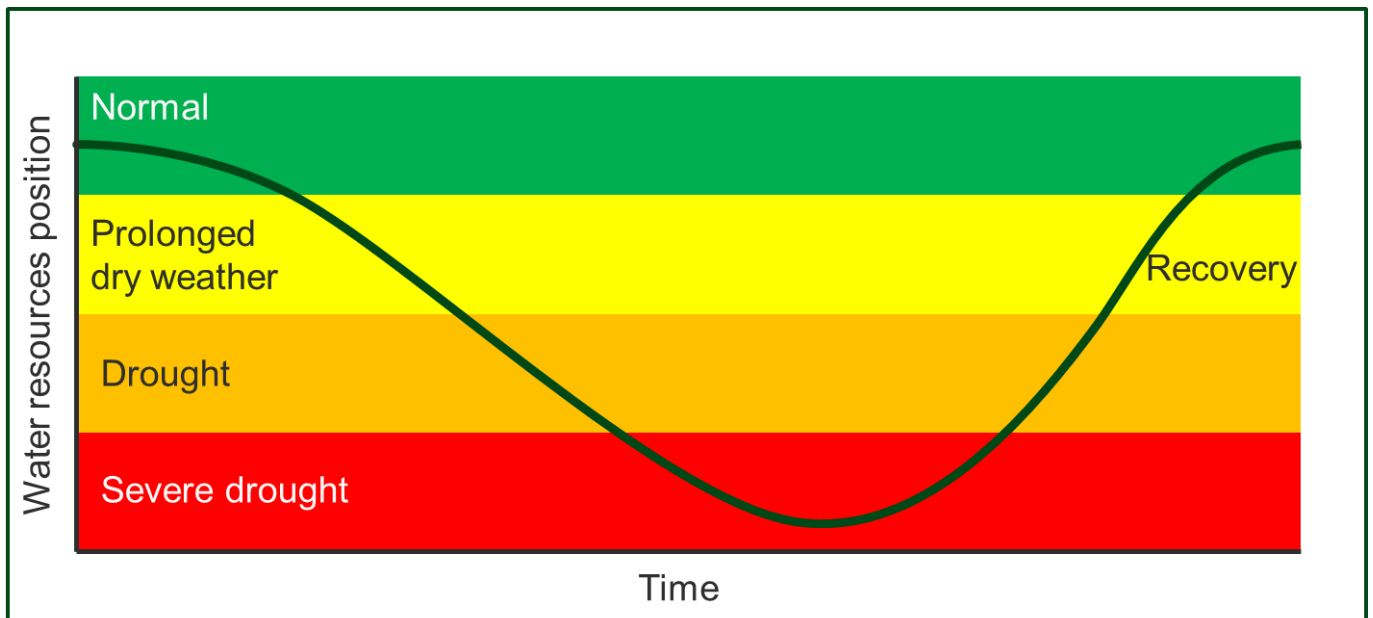
When a trigger is approached or crossed, local and national response teams decide what to do next from a range of predefined actions and measures. Each team considers present and forecast weather conditions before choosing a course of action.

4.1.1 Stages of drought management

We plan and manage drought using stages to illustrate the worsening or improving situation. The primary hydrological indicators, possible impacts and main actions for each stage are set out below in sections 4.2 to 4.6, these are indicative and are not exhaustive. The timing of actions will be based on local expert judgement which our drought teams advise on.

Figure 4.1 represents the development of the stages of drought management as the water resources position (represented by the curved line) worsens over time. As the water resources position slowly declines (worsens), the stage moves from normal through prolonged dry weather, drought, and to severe drought, as defined by the indicators of each stage. As the water resources position begins to improve (increases) and the appropriate indicators are noted, the recovery stage is reached. When the position is good and normal indicators noted, the normal stage is once again reached.

Figure 4.1 Drought stage development over time



4.2 Drought stage: Normal (green)

4.2.1 Indicators

Majority of indicators within normal ranges for the time of year.

4.2.2 Possible impacts

Localised environmental incidents during a short summer heat wave or dry spell, for example fish kills.

4.2.3 Main Environment Agency actions

Prepare, review and update drought plans; staff training; business as usual National Drought Group and other drought group meetings; monitoring of indicators.

4.2.4 Main water company actions

Same as Environment Agency actions.

4.3 Drought stage: Prolonged dry weather (yellow)

4.3.1 Indicators

Established period of low indicators for the time of the year.

4.3.2 Possible impacts

A heightened risk of environmental damage; short term risk to wildlife and plants.

4.3.3 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; place restrictions on canal and river navigation.

4.3.4 Main water company actions

Using enhanced water efficiency messages.

4.4 Drought stage: Drought (amber)

4.4.1 Indicators

Prolonged low and notably low indicators for the time of year.

4.4.2 Possible impacts

Stress on public and private water supply sources; reduced agricultural and horticultural crop yields; localised wildfires; long term habitat and wildlife impacts.

4.4.3 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 National Drought Group by the Chief Executive.

4.4.4 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.

4.5 Drought stage: Severe drought (red)

4.5.1 Indicators

Exceptionally low indicators over a long period of time.

4.5.2 Possible impacts

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.

4.5.3 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.

4.5.4 Main water company actions

Impose emergency restrictions on domestic and commercial water uses; continuing to apply for and use drought permits and orders to protect public water supply.

4.6 Drought stage: Recovery (hashed yellow)

4.6.1 Indicators

Returning within low or normal ranges for time of year.

4.6.2 Possible impacts

Depends on the type and severity of the preceding drought.

4.6.3 Main Environment Agency actions

Identify lessons learnt, review actions and plans.

4.6.4 Main water company actions

Maintain water efficiency measures to keep demand low until resources are fully restored; identify lessons learnt, review actions and plans.

4.7 Response arrangements

We manage droughts under our national incident response structure utilizing our Concept of Operations (ConOps) model. ConOps is a framework for how we prepare for, respond to and recover from incidents. It will ensure we operate clear command, control and co-ordination arrangements for all incidents and can be scaled according to the level of risks and impacts on the environment, public water supply and agriculture.

The principles of how we manage droughts relate closely to the incident management stages of understanding risk, mitigate, prepare, respond, recover, post incident review and feedback. However, unlike most floods or pollution incidents, droughts can take time to develop and once in a drought it is difficult to forecast when it will end.

Each of our 14 operational areas and our national team have identified technical drought teams who operate the day to day management of drought incident response alongside strategic duty managers. We convene various strategic teams and cells during drought to provide strategic governance and direction. These teams and cells feed into the National Drought Group (NDG), which is an external stakeholder group that is activated at the prolonged dry weather or drought stage. Its role is to create a single coherent cross sector view. This allows the NDG to manage a 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 to monitor and co-ordinate our response to dry weather and a drought will not be declared here without cross border discussions.

During a severe drought, 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 severe weather major incident 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.

The overall management of the situation will shift to government with expert advice from our National Information Liaison strategic support teams.

4.7.1 National Drought Group

The National Drought Group (NDG) was set up by the Defra Secretary of State in February 2012 to manage that year's drought. The NDG includes senior decision makers from Environment Agency, government and principal drought stakeholders, and provides cross-sector strategic steer on drought management in England.

The NDG meets biannually outside of a drought to collaborate on improving drought preparation, management and response across sectors, and to collate and act on data and lessons learnt from previous droughts to help improve readiness and resilience for the future. During a drought, meeting frequency increases to facilitate a joined up national response.

The NDG has three subgroups: Water Supply, Environment, Agriculture and Land Management, and Communications. The subgroups also meet outside of drought events and share evidence and learning to help inform best practice amongst their sectors.

The terms of reference for the NDG are available on request.

4.7.2 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
- inform the public on 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

4.7.3 Local drought teams

During a drought, local drought teams will:

- make sure abstractors comply with licence conditions and do not take too much water from rivers or groundwater.
- make sure water companies are following their drought plans and taking action to protect water supplies
- respond to 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 to allow teams to respond to potential or actual drought incidents
- be responsible for the cross-border catchments with Wales and liaise with colleagues in NRW, particularly in relation to releases of water to the River Wye and River Severn to support river flows

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

4.8 Drought triggers and actions

The impact of a drought can be minor to very severe. Each of our areas outline their specific actions and triggers in their area drought plans. Here is a summary of the main actions we take.

4.8.1 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. We can deploy aeration equipment to increase the dissolved oxygen in the water and may even consider water releases to alleviate low flows and to improve (cool) river temperature. In some circumstances we may consider an emergency fish rescue.

4.8.2 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 Defra Secretary of State or Welsh Ministers for ordinary drought orders and emergency drought orders. Our role is to provide information to the Defra 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 on the GOV.UK website.

4.8.3 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 Defra 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 Natural England 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.

4.8.4 Spray irrigation restrictions

The Environment Agency can restrict spray irrigation during periods of dry weather. Most abstraction licences for spray irrigation now contain 'hands off flow' conditions where the licence holder is required to reduce or stop abstracting water when flows or levels fall below

a certain threshold. However, some older licences do not have these conditions 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 most 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 first to avoid or delay the use of Section 57 restrictions. If a licence includes 'hands off flow' conditions, then it is likely restrictions on abstraction would already be in place before we introduced a Section 57 restriction.

Restricting spray irrigation can seriously disrupt a business so we need to use a cost benefit analysis when deciding to impose Section 57 restrictions. We need to balance the cost of restrictions on a licence holder with the benefits of protecting the environment when deciding on using the legislation.

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 a Section 57 restrictions, 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 do not improve. In some cases, this may not be possible. We encourage abstractors to set up Water Abstractor Groups to facilitate collaborative working and the sharing of water in a catchment or group of catchments.

4.9 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 (for example, 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.

4.9.1 Ecological monitoring

Area teams undertake routine ecological monitoring for macro-invertebrates, macrophytes, diatoms, fish and nuisance algae (for example, blue green 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.

4.9.2 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 length of watercourse or in some cases can be partly 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.

4.9.3 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.

4.9.4 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.

4.10 Data and information

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

4.10.1 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.

4.10.2 Water situation reports

We routinely measure, monitor and report on a range of hydrological parameters to assess the water situation across 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](#) available on GOV.UK.

4.10.3 Hydrological 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.

4.10.4 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](#) (available on [hydoutuk.net](#)) 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 and actions we can take to reduce its impact.

5.1 Our communication role

We provide information to water companies, government, stakeholders, other external partners and the public to help them prepare and take appropriate action. We start formal reporting once prolonged dry weather is identified, although informal reporting can happen during dry but normal conditions.

Once prolonged dry weather is established, we will inform government, our partners, 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 Tools

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 'prolonged dry weather' stage. The move into subsequent drought stages will prompt a review and update.

5.2.2 Joint communication arrangements

Sometimes joint communication is a good way to target main sectors and reinforce messages. Commitment and effort are needed from all parties for a successful outcome but joint working arrangements should not 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 Communications subgroup 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, Ofwat, NFU, Country Land and Business Association, UK Irrigation Association, 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

5.2.3 Media

To communicate via the media, it is important to provide clear and appropriate messages to the right audience. During all stages of drought, we may 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 enquiries are routed through our national news desk. The national news desk leads on enquiries from national print and broadcast media; area press offices lead on enquiries from local news media.

5.2.4 GOV.UK

We publish both up to date and general information about [drought and the water resources situation](#) on the GOV.UK website. 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

5.2.5 Social media

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

5.2.6 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 information 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 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 Water resources situation report

The national water resources situation report provides an overview of the latest situation with information provided by area teams. The decision to begin producing these reports will normally begin when we move to 'prolonged dry weather' status. It is a concise report that summarises the situation across England. The weekly water resources situation report supports this national report.

5.3.2 Report to ministers and government departments

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 either address specific requests for information, or report on the water resource prospects because of the drought.

5.3.3 Monthly water situation report

Our national hydrology team produce a monthly water situation report, which supports the national water resources situation report. 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. Recovery

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 bands 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 Lotic-invertebrate Index for Flow Evaluation (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 that lessons are learnt, and we can identify improvements to managing future droughts.

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.

6.2.3 Working with others

The NDG has an important role in reviewing how all sectors worked to manage a drought incident and will suggest ways the Environment Agency and others can improve plans to manage the consequences of a drought. Involving and communicating better with the public 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 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.

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.

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