



In Depth

Drought in the South

THE DROUGHT

Since 1988 Southern England has suffered some of the severest droughts this century. Parts of East Sussex and Kent have experienced one of the driest periods since records began.

The Environment Agency's Southern Region covers the counties of Kent, Sussex, Hampshire and the Isle of Wight, and is responsible for a wide range of activities to protect the environment.

Southern Region is one of the driest parts of the country. Rainfall averages 780mm annually and 75 per cent of our water for public supply comes from natural underground reservoirs called aquifers. The Agency monitors river flows, groundwater levels, rainfall and climate. Water abstraction is controlled by issuing licences, balancing the need to protect the environment with the demands of industry and the public.

DRIEST FOR 200 YEARS

One of the severest droughts in Southern England began in 1995. After an exceptionally wet winter, average rainfall showed steep decline over much of Kent, Sussex, Hampshire and the Isle of Wight. In fact, April 1995 to 1997 have been the driest for two centuries!

Between May 1995 and April 1996 Eastbourne in East Sussex experienced the driest period since records began in 1886. At Canterbury in Kent the same period was the driest since 1893.

Long droughts no longer seem to be rare events in the South. The period from April 1988 to March 1992 was previously the driest period since records began over a century ago. For over four years drought conditions persisted in the South. This resulted in long stretches of several rivers drying up and bringing in restrictions of water usage for long periods.

Some experts claim the lack of rainfall is evidence of global warming and climate change. However, most scientists say it is too early to reach this conclusion. There have been other dry years, 1976 for example was the driest and hottest summer for over 250 years.

WHAT IS A DROUGHT?

The strict definition of a drought is a period of 15 or more consecutive days with less than 0.25 mm of rain per day. However



generally a drought is regarded as a period of low rainfall which places a strain on water resources available for supply.

During a drought, river flows and groundwater levels steadily decrease putting the water environment under increasing strain. A summer drought has less effect on groundwater resources because they are normally replenished during the winter. But during the last two winters vital rainfall has failed to occur across much of the South.

RAINFALL

Britain's weather patterns bring rain from the Atlantic with most of it falling over the west of the country. The eastern side of the country lies in the rain shadow of the hilly regions to the west. Rainfall in the Southern Region reflects this trend with more rain on average falling in Hampshire than in East Sussex and Kent.



WATER SOURCES

Nature itself provides two kinds of water storage and man has added a third in the form of **reservoirs**.

Firstly there is **soil water** which is used by the roots of plants and trees through the summer.

Secondly is **groundwater storage**. This is natural underground water held in rock such as chalk and sandstone which retains water in pores and cracks. These natural underground reservoirs are known as aquifers.

The chalk aquifers of the North and South Downs and the Hampshire Downs provide natural long term storage of rainfall, producing good quality water which requires minimal treatment. In Southern Region 75 per cent of the water supply comes from groundwater.

But groundwater storage can only start to refill when the soil is saturated. The long, hot summer of 1995 meant the soil became extremely dry. During September 1995 there was above average rainfall across the region. However, the beneficial effects of the rainfall were almost entirely wiped out by a dry and exceptionally warm October. During the winter rainfall was well below average across most of the region.

In summer, at times of low flow, reservoirs such as Bewl Water may be used to add to river flows to allow large abstractions from the river downstream to continue. This also benefits the river between the reservoir and the abstraction point. Some rivers such as the Itchen in Hampshire can be augmented by pumping water from groundwater sources during severe drought. In Kent a multi-million pound joint

partnership scheme between the Environment Agency and Thames Water on the River Darent has meant the creation of a series of artificial springs which operate during dry spells. These springs keep the river flowing even during the worst of the drought.

when river flows reach the minimum desirable level.

The rivers may only be taken below this minimum level after a Drought Permit has first been obtained from the Agency or a Drought Order from the Department of the Environment.

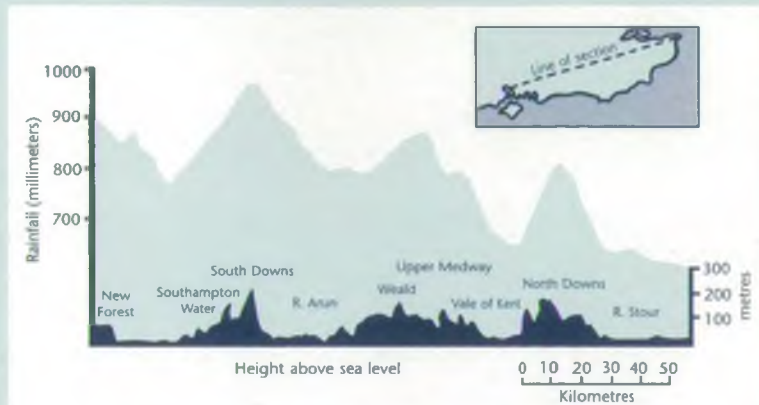
Groundwater also has to be protected. If levels in the natural underground reservoirs or aquifers drop too low in coastal areas, sea-water may be drawn into the surrounding rocks, this will taint the aquifers and make the water it contains unusable. Inland springs which supply groundwater-fed rivers will begin to dry up, and flows in chalk streams such as the Test and Itchen will fall.

SURVIVING THE DROUGHT

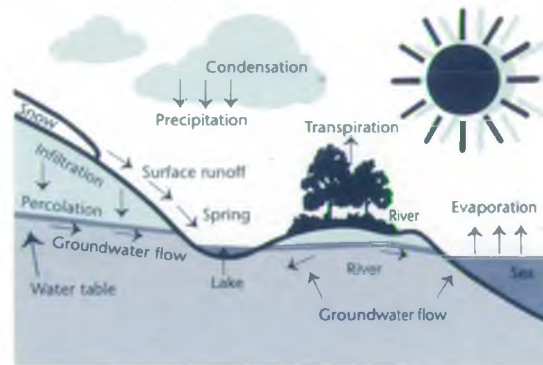
Hot, dry weather leads to a large increase in the demand from the

public water supply. Over a typical hot weekend in summer, the use of garden hosepipes alone can raise water consumption by 20 per cent or more. A garden sprinkler can use as much water in 1 hour as an average family uses in a day.

The Environment Agency plays a key role in guiding the water companies in the allocation of water resources and ensuring a consistent approach to any restrictions which may be imposed. The Agency has a duty to protect the water environment and objects if water conservation measures, such as leakage control and bans on the use of hosepipe, are not in place before Drought Orders and Drought Permits are sought. The Agency also provides regular, detailed reports to the Secretary of State for the Environment about the drought.



Decrease in rainfall from West to East across Southern Region



The water cycle

MANAGING THE DROUGHT

A drought can be extremely harmful to the whole water environment. If river flows fall too low, wildlife and fish start to suffer. Healthy river flows are needed to dilute pollutants, to prevent sea water pushing too far into estuaries and to provide wet areas for water life to breed and flourish. Such life is an essential part of the food chain. In times of summer drought river temperatures rise, fish become overcrowded and there is an increasing risk of disease to all wildlife.

The Environment Agency sets a minimum flow for each major river in the Southern Region. Water users, such as water companies and farmers, have conditions built into their licences which ensures that their abstractions from rivers stop



With a few exceptions, abstractions from rivers and groundwater sources requires a licence from the Environment Agency. Most licences carry specific conditions preventing abstraction at times of low river flow. Some old spray irrigation licences do not however carry these conditions and at times of severe drought the Agency has special powers which allow it to reduce the authorised abstraction in order to conserve resources and protect other users. This restriction does not apply to farmers who abstract from their own winter-filled reservoirs.

Anyone who abstracts water either from a river or from underground sources must have a licence issued to them by the Environment Agency. These licences prevent the abstractors taking water during periods of drought. For example arable farmers often have a high demand for spray irrigation in dry, hot periods. This kind of irrigation can cause local water resource problems. If this does happen the Agency has the power to ban or reduce this form of irrigation. Many farmers have their own reservoirs which are filled during the winter. If a water company asked the Agency to ban spray irrigators who were affecting public water supply abstraction, the Agency would first require the company to implement a hosepipe ban.



WHAT THE AGENCY IS DOING

- Pressurising the water companies to meet leakage targets, launch public awareness campaigns, install water meters in selected areas, impose supply restrictions where necessary
- Holding regular meetings with the water companies to ensure they are following the best environmental options
- Using Drought Permits to ensure there is minimum damage to the water environment
- Enforcing licence restrictions on abstractors where river and groundwater levels are below normal
- Policing and tightening the controls on sewage works and other dischargers to prevent river quality falling and affecting wildlife
- Spearheading innovative schemes to bring new life to low flow rivers
- Rescuing fish where water falls below an acceptable level
- Issuing weekly "Droughtwatch" reports on the state of the region's resources
- Promoting and educating industry in the recycling and efficient use of water



WHAT WE ASK YOU TO DO

FARMERS Observe abstraction licence conditions. Consult with your local Environment Agency staff about the most sensible way to use water. The Agency promotes the careful control of spraying operations by avoiding applications during the middle of the day or at other times when evaporation losses are likely to be exceptionally high.

INDUSTRY Recycle water where possible, check consumption and leakage. In recent years whenever there has been an exceptional shortage of rain, it has been common practice for water companies to obtain special "Drought Orders" which allowed them to continue pumping from rivers even when flows were already severely reduced. These measures will now be used much less frequently and the Agency will oppose relaxation of any summer restrictions on abstraction if there is a clear risk to water resources or the river environment.

GENERAL PUBLIC Conserve water, consider alternative garden plants, remember that lawns will recover quickly after rain. Remember – all the water that we use is taken from the environment.

THE FUTURE If there is a real climate change then decisions about the use of water resources will have to be taken by politicians.



THE DROUGHT IN KENT

The long dry summer of 1995 was followed by two winters which produced barely half of the normal seasonal rainfall. As a result, river flows and groundwater levels in many parts of the county reached the lowest ever recorded for the time of the year.

There was virtually no replenishment of reserves in some parts of the North Downs chalk aquifer and this had a direct effect on the operations of those water companies who rely heavily on borehole supplies from this source.

The county's spring fed streams draining the North Downs are particularly vulnerable and dry

summers have brought a general depletion of flows in the Stour, Little Stour, Darent and Dour with long sections of the headwaters running dry.

Soil moisture was also severely reduced and for many farmers and vegetable growers meant an earlier than normal start for spray irrigation operations and at relatively high rates of application.

Agency environmental protection teams will ensure that all abstractors taking the water from rivers, wells and boreholes - this includes farmers, industries and companies - comply fully with the terms and conditions of their licences. The Agency will take

action against anyone found to be abstracting or using water unlawfully

THE DROUGHT IN SUSSEX

In the west of the county river and groundwater levels have been consistently below average for the time of the year since the drought began. The main problems are in the east of the county. The successful promotion of winter Drought Orders mean that in the east of the county reservoirs will start the summer of 1997 at near full capacity. However many of the boreholes are below levels experienced during the 1990-92 drought.

Groundwater Situation For Main Aquifers In Southern Region



THE DROUGHT IN HAMPSHIRE & THE ISLE OF WIGHT

In Hampshire, some of the chalk streams had begun to dry and die by April 1997 as groundwater levels continue to fall, although the county has not had such severe problems as Kent and Sussex. On the Isle of Wight, sites of special scientific interest are also threatened as valuable marshes begin to dry out.

Other education factsheets in the series:

For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

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