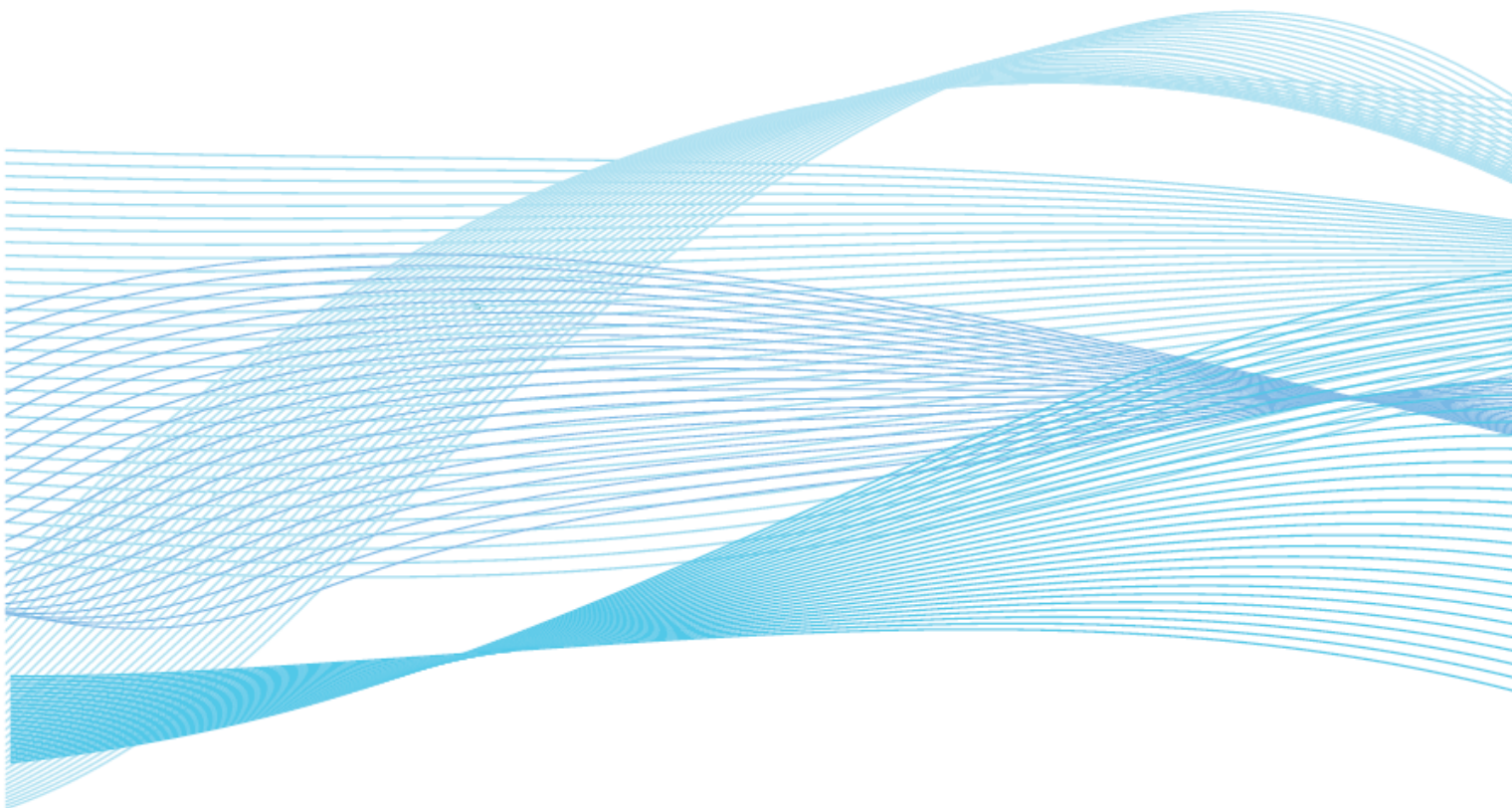


Water resources in England and Wales - current state and future pressures

December 2008



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Contents

1	Introduction	3
2	Available water	4
2.1	Freshwater resources	4
3	Using water in England and Wales	5
3.1	Using freshwater resources	5
3.2	Available water resources	6
3.3	Abstraction uses	6
4	Supplying people with water	10
4.1	Current pressures	10
4.2	Household water use	11
4.3	Household metering	12
4.4	Leakage	13
4.5	Supply demand balance	14
5	Future pressures and trends	15
5.1	Water Framework Directive	15
5.2	Pollution pressures	15
5.3	Water for wildlife	16
5.4	Water for wetlands	16
5.5	Population growth	17
5.6	Trends in household metering and water use	18
5.7	Climate change	19
6	Future strategy	21

1 Introduction

Water is essential for human life and to sustain a diverse and thriving water environment. It is important to our economy as an essential requirement for industry, power generation, commerce and agriculture. We need it to support our growing population and to maintain and improve our standard of living.

There are significant pressures on water resources which affect both the water environment and water supplies. There are many catchments where there is little or no water available for abstraction during dry periods.

Pressures are greatest in South East and Eastern England because of them being the driest parts of England and Wales, coupled with the highest population density and household water use. The demand for water to irrigate crops in East Anglia also adds to the pressure on resources during the driest times of the year.

Over the next 30 years, there will be increasing pressures from the rising population and associated development. Looking further ahead, the impact of climate change could have a major impact on the water that will be available for all uses.

This report summarises our work which has assessed the current and future pressures on water resources in England and Wales. This has included our Catchment Abstraction Management Strategies, Water Resources Management Plans produced by water companies, river basin and other studies to support the Water Framework Directive and the Habitats Directive, plus work to assess the possible impacts of climate change. This is in addition to our routine monitoring and work by other organisations that helps to establish the state of the water resources in England and Wales.

This report brings together this work to present information on the state of water resources and to put the current and future pressures into context. It does not explore the actions that we believe need to be taken to manage water resources in a sustainable way to ensure that there is enough water for people and wildlife. These will be covered in our Water Resources Strategy for England and Wales which we will publish early in 2009.

We intend to update this report from time to time to monitor how water resources are used, actual and potential impacts on the water environment from abstraction and how the pressures on future water resources may be changing.

2 Available water

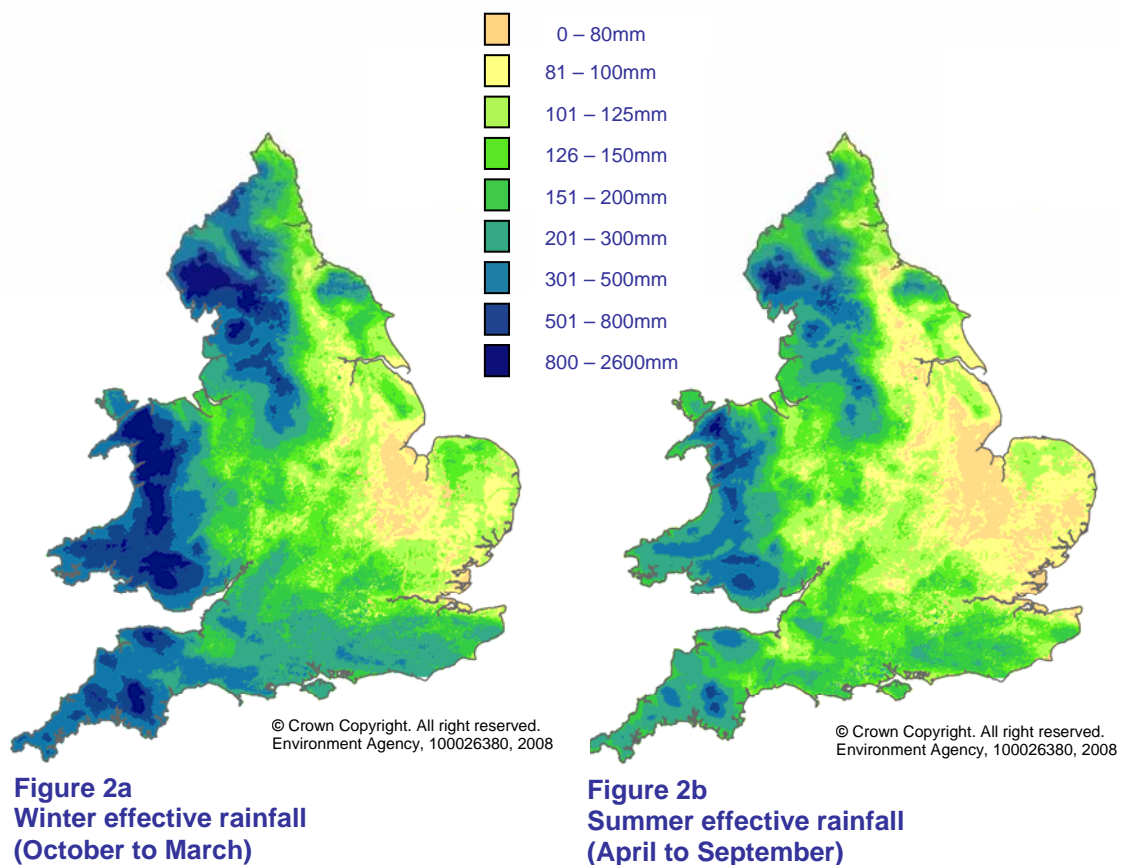
2.1 Freshwater resources

The amount of water available in England and Wales to meet the needs of people and to sustain the water environment varies greatly between different places and seasons, and from one year to another.

Annual average rainfall over England and Wales is 890 mm. Nearly half of this is lost by evaporation leaving an average of 465 mm for runoff to rivers and streams or for percolation to groundwater. This amount remaining is known as effective rainfall.

There is a large variation in effective rainfall over England and Wales ranging from more than 2500 mm in parts of Wales and the English Lake District to less than 200 mm in parts of Eastern England. There is much less in summer than in winter (Figures 2a and 2b).

There is usually sufficient water to meet the needs of people and wildlife apart from during prolonged periods of dry weather. It is crucial to manage water resources carefully during these dry periods. We plan to make sure that there is enough water for people and the environment during droughts and that appropriate action is taken when there isn't enough to go around.



3 Using water in England and Wales

3.1 Using freshwater resources

One way to consider how much we use water resources in England and Wales is to assess how much effective rainfall we abstract. Over England and Wales, we use only about 10 per cent of our freshwater resources for abstraction (excluding abstraction to support power production, which is often returned directly to the environment). This measure is known as the Water Exploitation Index. Water resources are considered to be 'under stress' or over stretched if this index is more than 20 per cent. When we look at England and Wales in more detail, we find that South East and Eastern England can be classified as an area 'under stress from water abstraction', with more than 22 per cent of freshwater resources abstracted (Figure 3a). Compared to the rest of Europe, water resources are under greater stress only in drier countries such as Cyprus, Malta, Spain and Italy.

This measure provides a simple indication of how the pressures on water resources vary from place to place. It does not, however, take into account the complexities of how we manage water resources, including how water is stored for use in the future, and how, after it has been used, water is treated and returned to the environment potentially to be used again downstream.

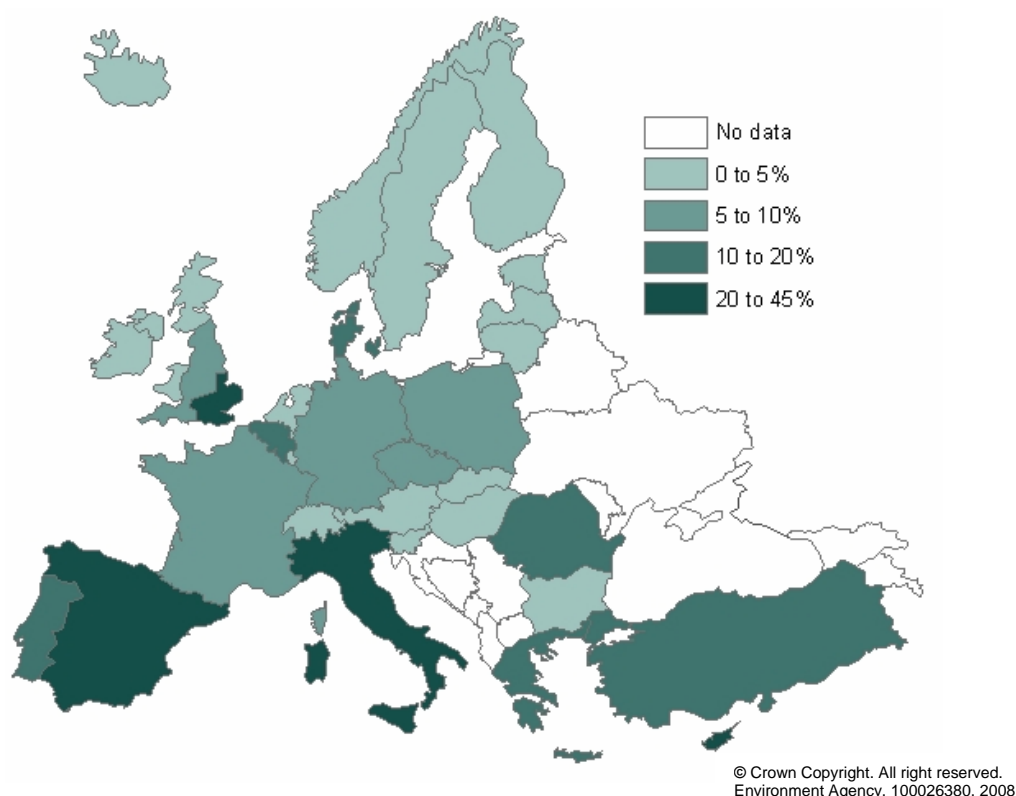






Figure 3a Water exploitation index
(actual abstraction as a proportion of effective rainfall)

3.2 Available water resources

We assess the water resources that are available for abstraction through our Catchment Abstraction Management Strategies (CAMS). CAMS consider how much freshwater resource is reliably available, how much water the environment needs and the amount of water already licensed for abstraction. This shows us where water is potentially available for abstraction. We have recently completed the first cycle of 119 CAMS, which has for the first time provided us with a comprehensive baseline for all catchments in England and Wales.

The results show that there are considerable pressures on water resources throughout England and Wales, not just in the drier South East and Eastern England. Our water resources availability maps (Figures 3b and 3c) show that there are many catchments where there is no water available for abstraction at low flows. In addition, some catchments are over licensed or over-abstracted, and we need to restore a sustainable abstraction regime.

Resource availability status	Licence availability
 Water available	Water is likely to be available at all flows, including low flows. Restrictions may apply.
 No water available	No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions, or through licence trading.
 Over-licensed	Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions, or through licence trading.
 Over-abstracted	Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions, or through licence trading.

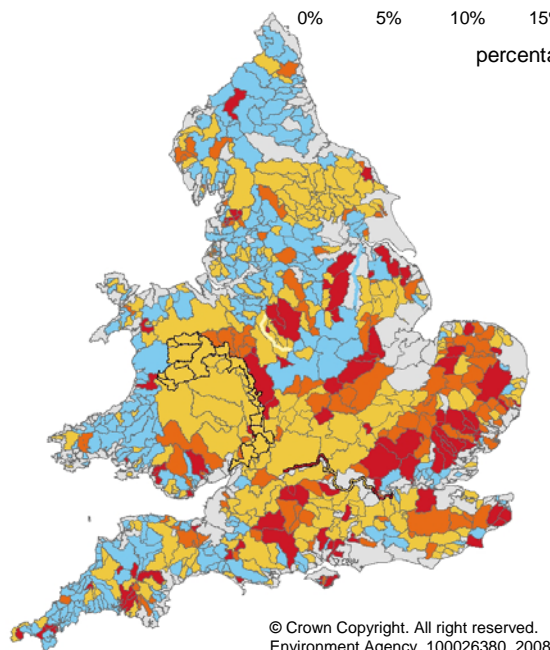
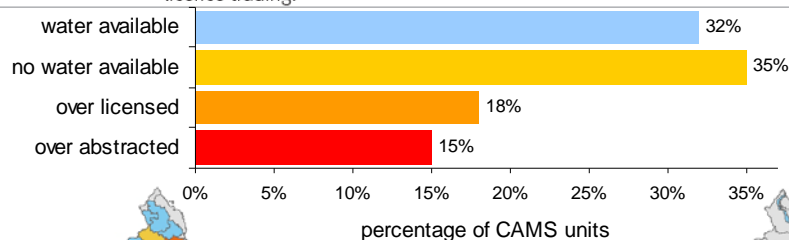


Figure 3b Water available for abstraction (surface water combined with groundwater)

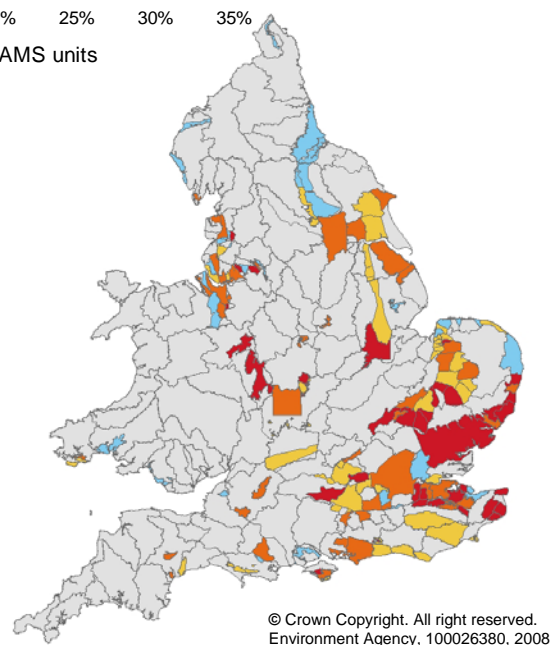


Figure 3c Water available for abstraction (groundwater)

3.3 Abstraction uses

The total amount of water abstracted from all sources in England and Wales in 2006/07 averaged almost 60,000 megalitres (MI) per day. This is about half the amount licensed for abstraction. There has been little change in the total abstracted over the period 2000/01 to 2006/07 (Figure 3d).

The proportion abstracted from non-tidal surface waters has declined from almost 60 per cent in 2000/01 to just less than 50 per cent in 2006/07.

Abstraction from groundwater has remained fairly constant over that time, at around 10 per cent of the total. Over three quarters of the total abstracted from groundwater is used for public water supplies.

The amount abstracted from tidal waters has increased over the period with most used to support electricity generation.

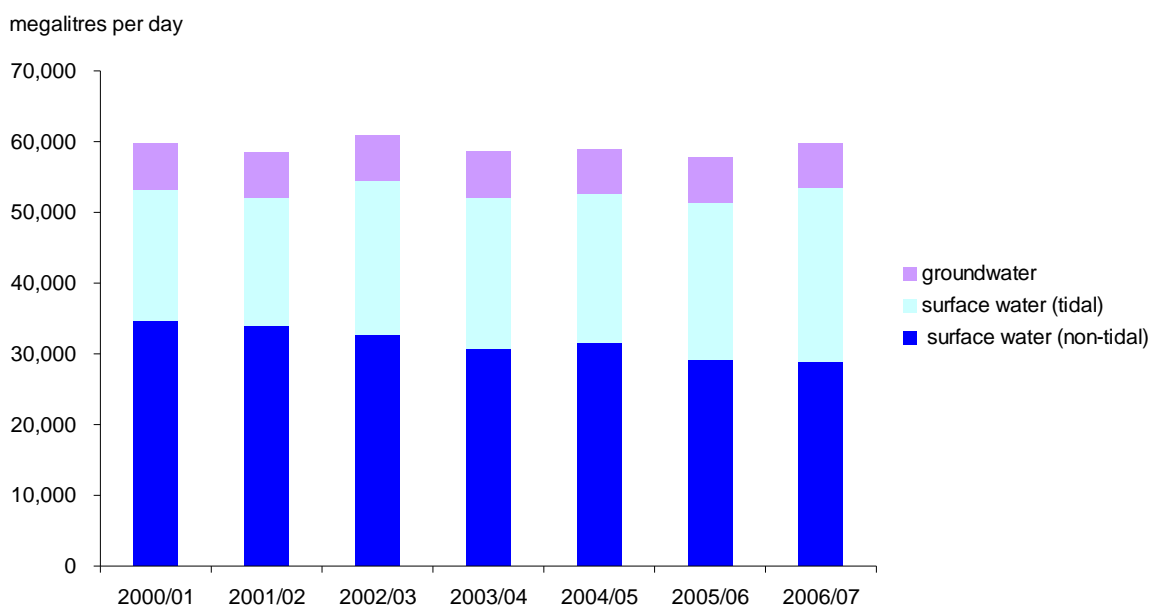


Figure 3d Water abstraction in England and Wales

Water is abstracted from freshwater sources for a wide range of uses in England and Wales (Figure 3e). In 2006/07, more than 73,000 MI was licensed of which approximately 35,000 MI was abstracted.

Water companies abstract almost half of the total amount taken from non-tidal waters in England and Wales, but return over 70 per cent as treated effluent which, unless it is discharged to the marine environment, enhances river flows. The annual amount abstracted for public water supply has not varied much between 2000/01 to 2006/07 (Figure 3f). In contrast, abstraction from freshwater sources to support electricity generation (hydropower and power station cooling water) has declined significantly. Water abstracted for other industrial uses has fluctuated over the same period, but has shown a steady decline since 2003/04.

There are differences between different parts of England and Wales. For example, around 75 per cent of water abstracted in Wales in 2006 was to support electricity generation with 20 per cent taken for public water supply.

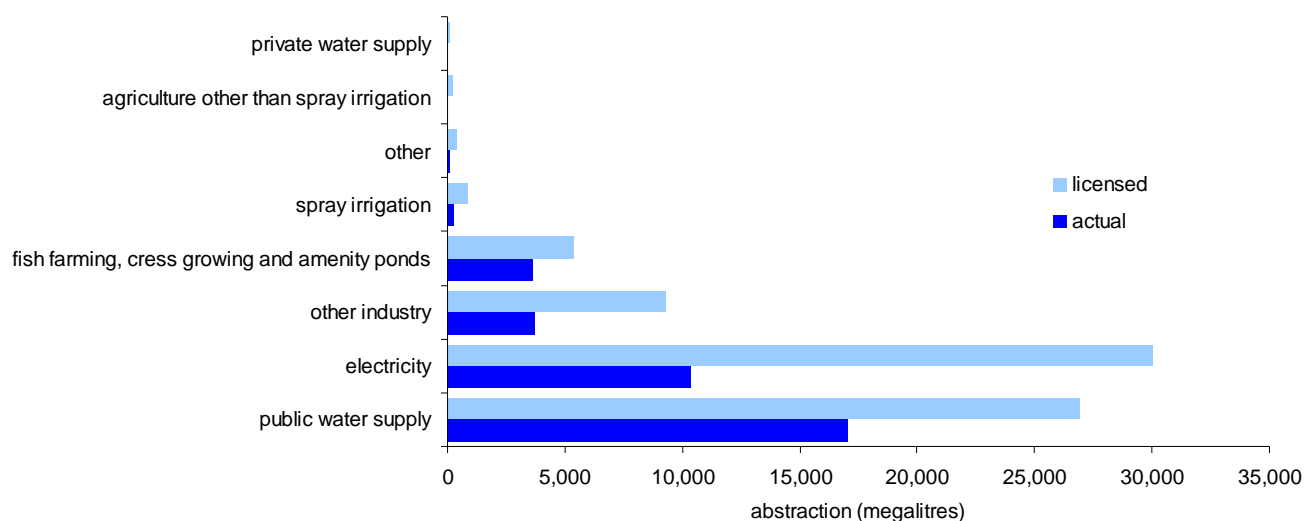


Figure 3e Water abstraction (non-tidal) in England and Wales (2006/07)

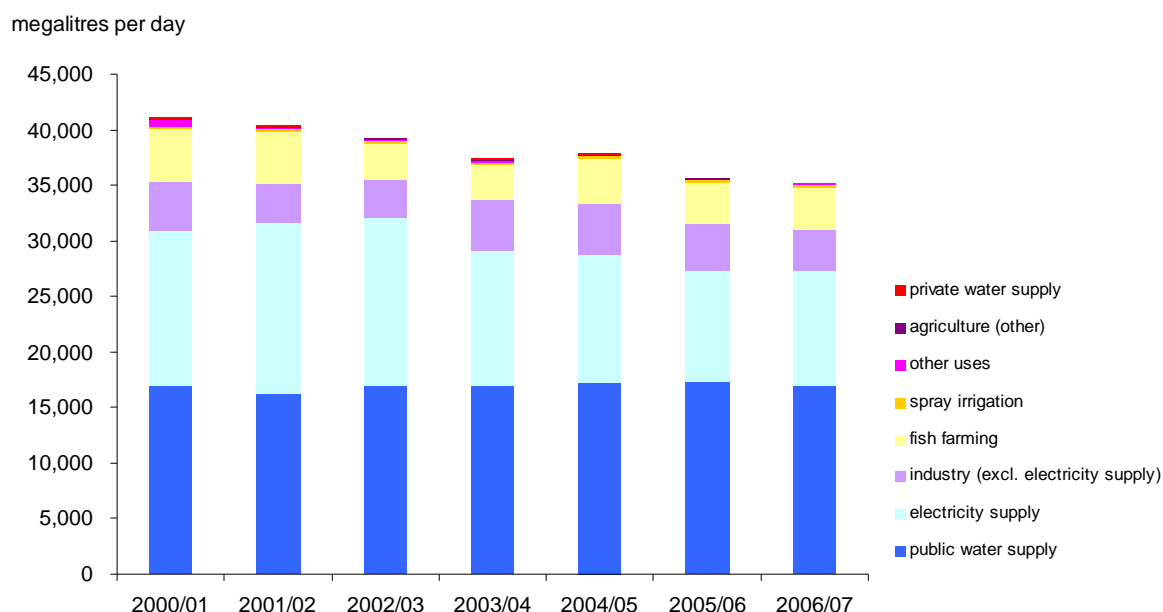


Figure 3f Water abstraction (non-tidal) in England and Wales

Farmers use less than one per cent of the total amount of water abstracted in England and Wales for spray irrigation. The biggest demand for spray irrigation is in East Anglia, where abstraction can average 20 per cent of the total for all uses over a typical summer (when water resources are most scarce). Sometimes more water is used on a hot dry day for spray irrigation than for public water supply. Nearly all the water used for spray irrigation is used by crops or lost by evaporation and can therefore have a much greater impact on the environment compared to other forms of abstraction where water is returned after it has been used. The quantities abstracted for spray irrigation vary from year to year depending on how dry it is over the summer growing season (Figure 3g).

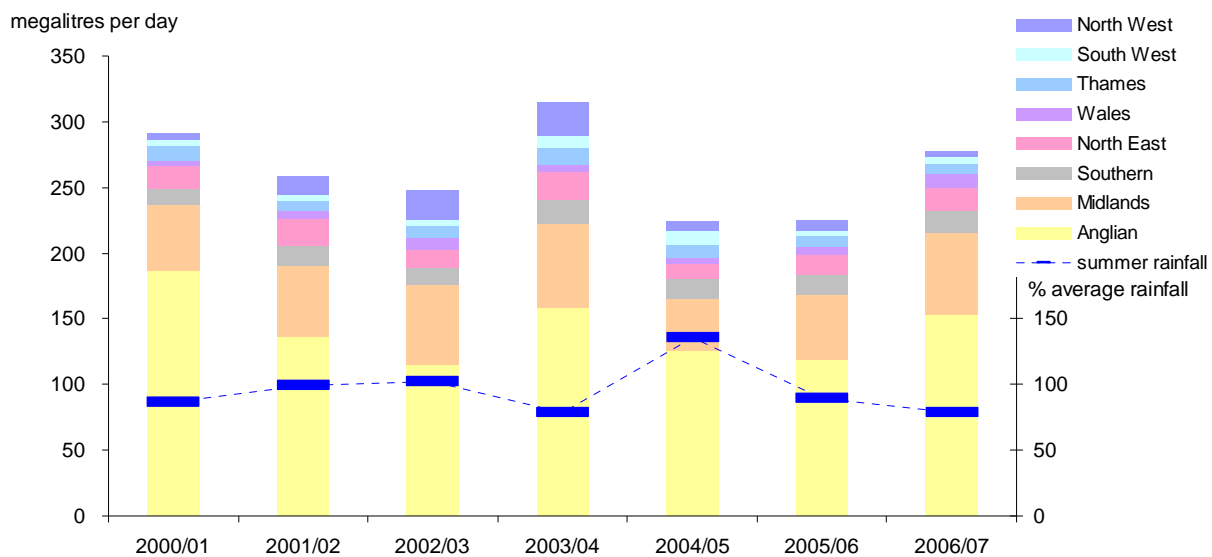


Figure 3g Abstraction for spray irrigation in England and Wales

There are currently just under 20,000 abstraction licences (Figure 3h). In 2005, because of changes brought in by the Water Act 2003, abstractions of less than 20 cubic metres per day no longer needed a licence. This allowed us to reduce the number of licences in 2005 by about a half. Currently, 20 per cent of all licences have an expiry date (time-limited licences). This proportion has gradually increased year by year, reflecting the impact of our policy since 2001 to time limit new licences and changes to legislation which have subsequently made it a legal requirement. This allows us to be more flexible in how we manage abstractions to protect the water environment in response to future pressures, by being able to review licences as the time limits expire.

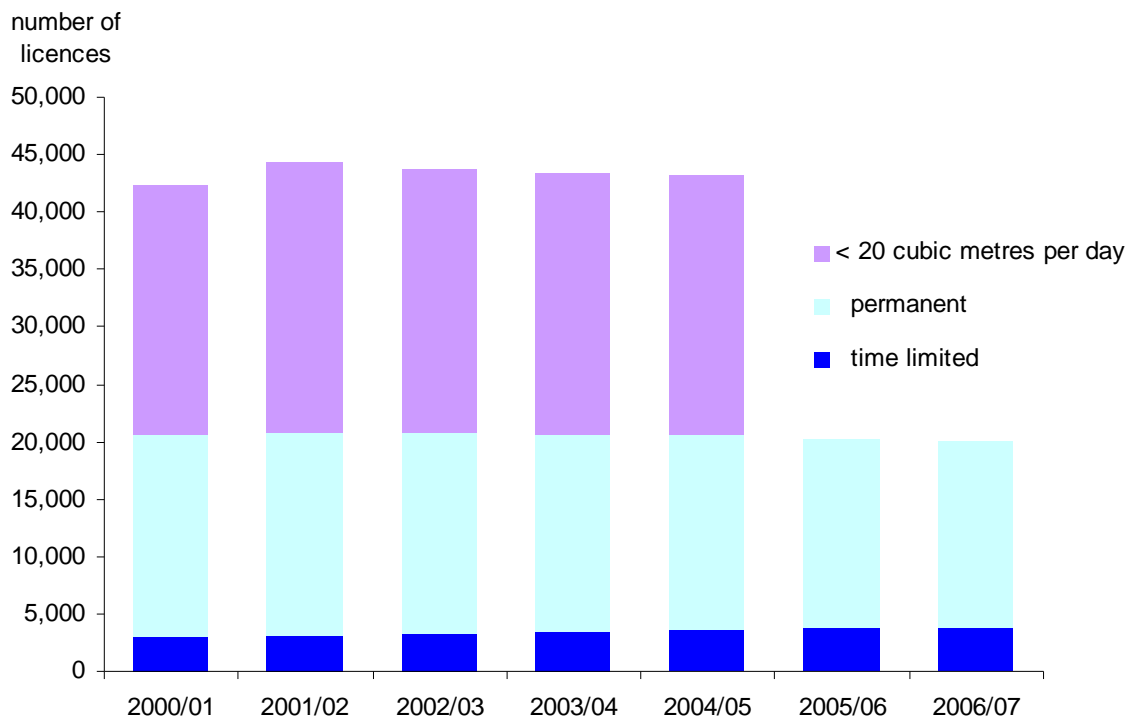


Figure 3h Number of abstraction licences in England and Wales

4 Supplying people with water

4.1 Current pressures

Where people live in England and Wales is not always where water resources and supplies are most plentiful. In section 3.1, we showed that freshwater resources are most heavily exploited in South East and Eastern England and can be considered to be under stress by international standards. When we take population density into account (Figure 4a), we actually have less water per person in South East England than many hotter, drier countries such as Morocco and Egypt.

We have a dual responsibility in managing water resources in England and Wales to ensure that people have adequate supplies of water whilst minimising the impacts of abstracting water on the environment.

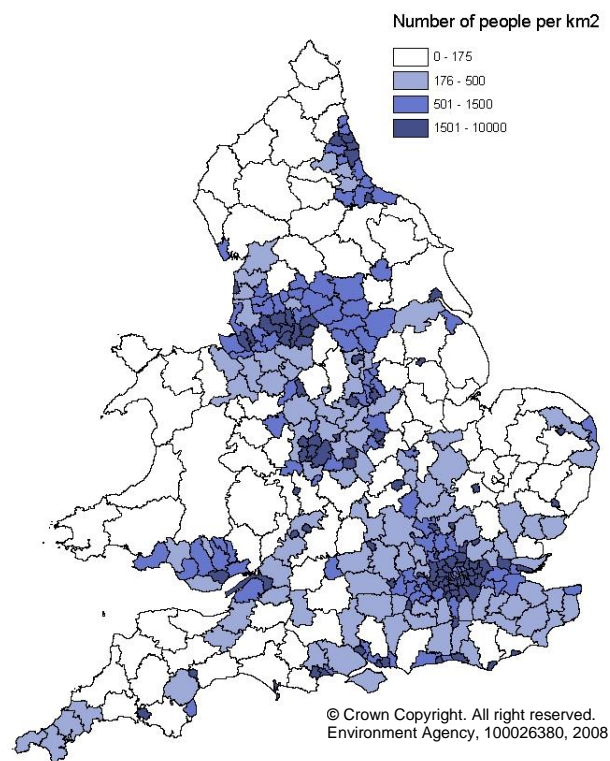


Figure 4a Population density 2006 (source ONS)

We have advised Defra which areas of England we consider to be seriously water stressed by assessing where current and future household demand for water is a high proportion of the available freshwater resources (Figure 4b). This indicates that most of South East and Eastern England is seriously water stressed and highlights where there is the greatest need to target water efficiency measures. This work was used to inform decisions on where to consider the need for higher rates of household metering in England.

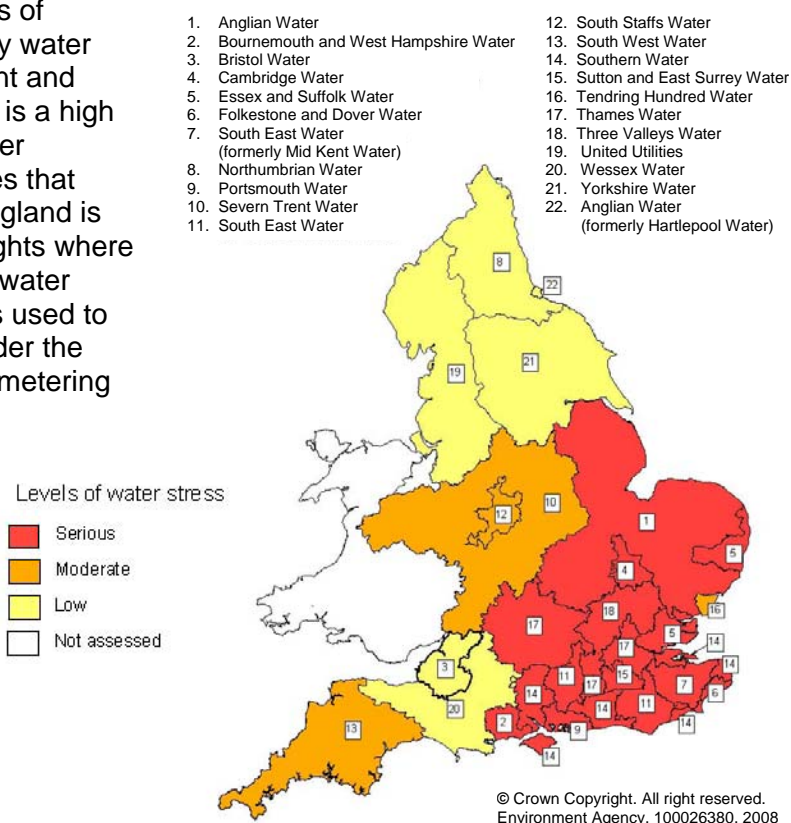


Figure 4b Levels of water stress