

WETTEST DROUGHT EVER!

Owen Gaffney met the head of the National Hydrological Monitoring Programme Terry Marsh to discuss drought, floods and what's in store for the UK.



The River Thames in flood at Chiswick.

Thomas Eskine / Alamy

In his cramped office close to the river Thames, Terry Marsh has blu-tacked a cartoon above his desk. It reads, 'Apparently, this is the wettest drought since records began.' This sums up Terry's frustration at the tabloids' misperception of floods and droughts in the UK.

What is the purpose of the National Hydrological Programme?

What we aim to provide is authoritative and impartial information on hydrological conditions and water resource variation across the country. In the UK we have the best climate records in the world. They extend back around 250 years, providing a lengthy historical perspective to assess the significance of recent trends in droughts and flood.

Where do you get the information from?

Principally from the environment agencies which maintain comprehensive river flow and groundwater monitoring networks. Data are forwarded to the Centre for Ecology & Hydrology (CEH), which maintains the National River Flow Archive, and the British Geological Survey*, which maintains the National Groundwater Level Archive.

**Also with offices in Wallingford.*

Who uses the information?

Everyone. Our website is the most visited of all CEH's scientific websites – apart from in the spring when we've got Tim Sparks' Springwatch! Our main outputs are the monthly Hydrological Summaries and a range of briefing documents and reports to government and the water industry. In 2005 and 2006 these provided objective assessments of drought severity*. On a broader front we take a lead in identifying and interpreting medium- and long-term trends in river flows and groundwater levels; last year we provided substantial input to the Intergovernmental Panel on Climate Change's Fourth Assessment.

**For example, as supporting evidence for Drought Order applications where a water company wants to take additional water from a river during drought conditions.*

Last year it seemed that every day the media ran a drought story. What was it like facing that kind of media barrage?

It can be quite difficult dealing with the tabloids. Because the National River Flow Archive is a public database we have an obligation to provide data and information in response to all

kinds of enquiries. The media are often keen to use direct quotes rather than rely on material featured in our Hydrological Summaries. It can be challenging, given copy deadlines and journalistic licence, to ensure that quotes are used in an appropriate context. Too often, the material is used to reinforce a strong media perception that floods and droughts have become more extreme and that things are set to get worse in a warmer world. I think the evidence for that is weak. That's not to say they won't get worse. I'm just saying the evidence from the observed data is unconvincing and that too little attention is directed to the UK's resilience to drought and flood stress.

How do you mean?

Let's look at the 2003 drought. It had a massive impact across much of Europe leading to major reviews of water management in many countries. The drought was of the classic type, with very low summer rainfall and extremely high temperatures. Just the type of conditions that most climate change scenarios indicate that we'll see more of the future. And what impact did the 2003 drought have on water resources in the UK – precious little.

Why did the 2003 drought have so little impact on water resources?

Two reasons. The previous winter was very wet so all the reservoirs were full. More importantly in the English lowlands where water demand is heaviest, groundwater levels were also extremely healthy in early 2003.

Second reason. We always moan about the water companies but by any international yardstick water management in this country is pretty good. I'm not talking about water company profit margins here, I'm talking about the way water is managed and the effectiveness of the regulatory framework in which it operates. This greatly reduces the vulnerability of public water supplies to dry summers particularly when they are preceded by a wet winter. And what are we told is the most likely impact of global warming on UK rainfall patterns?

Models say we will get wetter winters, drier summers.

Precisely. So I think we have to be careful about any message implying that things are inevitably going to get worse.

But there is a different and rather neglected side to this discussion; it concerns climatic variability. The importance of this was heavily underlined during the drought of 2004-06. This could be termed a 'non climate change compliant' drought: the summers weren't particularly dry but, crucially, the winters were. This led to significant water shortages: 13 million people were affected by hosepipe bans. We haven't seen many pairs of extremely dry winters in the recent past but they were substantially more frequent prior to the First World War. In the nineteenth century summers were often wetter than the winters and clusters of dry winters were common. Any repetition of the run of dry winters during the Long Drought of 1890-1910 would represent a very real challenge to the water industry given modern water demand patterns.

Climate change is clearly not the only challenge. Population growth must be as big an issue.

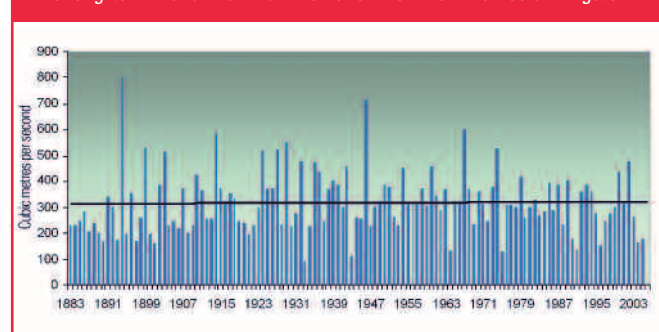
It could well be that demographic changes, in the English

lowlands particularly, and the associated increases in demand patterns will be more important than climatic changes over the next 20 years. At NERC, our contribution will be to provide the science that underpins more efficient water management. We can say how much water can be taken from a river for public or agricultural use without affecting water quality or damaging diversity.

There is a perception that floods are increasing in frequency. Is this accurate?

There is plenty of evidence to suggest that high flows are more frequent than they were in the 1970s but if you focus on long term trends in notable flood events a somewhat different picture emerges. Our longest continuous flow record is for the Thames and a plot of the annual maximum flows over the last 120 years shows no overall trend. This is characteristic of most long-term records in the UK, and looking worldwide, it would be true to say that convincing observational evidence of trends in major floods remains elusive. (See graph).

No long-term trend: maximum flows for the River Thames at Kingston.



The largest Thames flood in the last 100 years was in 1947. Could we see a repeat of that?

We've got to look at the causes of it? In early March 1947 much of southern Britain was carpeted in a thick blanket of snow. Weather conditions then changed abruptly and a warm, moist airflow triggered a surge of meltwater across still-frozen ground, resulting in extremely extensive flooding.

Today, there is substantially more development on the floodplain, and more people vulnerable to a flood of that magnitude. However, though the Thames is perhaps a less romantic river than in the past, it is hydraulically more efficient. Improvements in weir design, channel re-alignment and bed re-profiling mean that substantially more flow can be contained within the banks than 60 years ago. Flood defences are now very much better and, importantly, in a warmer world snowmelt is much less likely to be such an aggravating factor as it has been throughout the history of Thames flooding. This is one of the few predictions that can be made with some confidence about the impact of climate change on river flows. ❖

Terry Marsh has been closely associated with the National River Flow Archive for over 35 years. He is based at the Centre for Ecology & Hydrology, Wallingford, Oxfordshire. Email: tm@ceh.ac.uk
Owen Gaffney edits Planet Earth, email: editors@nerc.ac.uk