



British  
Hydrological  
Society

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From the President

To

Institution of Civil Engineers

14<sup>th</sup> February 2012

Dear Sirs

### **State of the Nation Report on Water**

The British Hydrological Society is pleased to be invited to contribute to the ICE State of the Nation report on water. BHS is an associate body of ICE and its membership includes academics and practitioners, both in the public and private sector. It therefore represents a cross-section of all those interested in hydrology and its practice in the UK.

Hydrology is central to the management and use of water. A detailed understanding of British hydrology is necessary for the continued supply of water to society, the management of flood risk and the protection of the aquatic environment. These have largely been successfully managed in this country to date because of the long term investment of time and money in hydrological science. However, they are under considerable pressure in the UK, and population growth and the expected impacts of climate change will increase these pressures in the future.

We are therefore keen to ensure that the study and practice of hydrology in the UK remains strong and that the past investment of time and money is maintained and improved in the future to match these rising pressures. However, the BHS committee feels that investment in hydrology is under threat despite the increasing need. Our ability to continue the past achievements of British hydrologists into the future is not guaranteed. After consideration the BHS committee therefore decided to concentrate its evidence on four key issues which we feel will underpin the country's ability to successfully manage water resources, flood risk and the aquatic environment in the future. These issues are:

- 1. Development of the future skills base (including education at all levels)**
- 2. Development and maintenance of a hydrological research programme**
- 3. Maintenance of a long-term hydrological database**
- 4. Public access to hydrological data**

We have expanded on these issues in our evidence presented below.

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**President Bob Sargent**

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### ***Development of the future skills base (including education at all levels)***

Hydrology is not a specific undergraduate degree qualification, with students only specialising in Hydrology at post graduate level. We are therefore particularly concerned that NERC have ceased to fund taught postgraduate studentships. This comes at a time when students are graduating with a considerable and increasing personal debt and find themselves coming under increasing pressure to end formal study in order to start earning. The BHS is concerned that NERC's action poses a serious threat to the supply of new hydrologists available to address the country's growing need for water management.

We have, to a limited extent, attempted to maintain funding for hydrology studentships by offering some financial assistance to promising students, aided by the private sector. We have done so in order to maintain some throughput of new students, but it is not really our role and is not a long-term basis for ensuring a supply of scientists in such a vital area.

At school level, generating an interest in hydrology is still likely to come primarily from geography courses, rather than through physics or mathematics, which are still the essentials for those considering a career in engineering. The public interest in "Environment" ought to be good for Hydrology, but it can lack a degree of depth and scientific rigour, and is more issue-based. Hydrology will always have solid foundations in science and engineering.

We therefore need to consider how to focus effort at raising awareness in schools and tertiary institutions in hydrology/water resources as a career. This has to be aimed as much towards the teachers/lecturers to raise their awareness of career opportunities and choices, as to the pupils/students, to increase the supply of science-based hydrologists for the future.

### ***Development and maintenance of a hydrological research programme***

Whilst there is still some very good hydrological science being undertaken in the UK we do not feel that there is a clear, agreed research programme. Successful research programmes in the past, such as the catchment research undertaken at Plynlimon and the work behind the Flood Studies Report were aimed at solving national problems and masterminded by the then Institute of Hydrology. That Institute was subsumed into the Centre for Ecology and Hydrology (CEH) with the result that national articulation of hydrological issues has been reduced, and inevitably funding of hydrological research has reduced also.

One of the consequences of this was well illuminated by one of our members in response to our request for evidence:

"As research funds are extremely limited, one would hope that both the funders (government and industry) and the supervisors could exert some influence on research having a practical focus. I get the feeling however that here is still an academic, or at least a theoretical bias. This may of course be a reflection of shortage of funds that makes field experimentation and observation difficult. In recent weeks I attended meetings where two presenters, covering catchment and climate projects both made similar statements with regard to their research investigations. These were to the effect that: "We didn't have enough equipment/money/time to carry out long-term observations, so we developed a model, which we know has produced very approximate results, but we went ahead anyway."

The lack of co-ordination, and lack of a basis in expensive observation, limits the value of any research produced. The development and maintenance of a national long-term co-ordinated programme is beyond individual Universities, which are designed and structured towards targeting specific research questions. Whilst some interesting work may be done and high quality training provided, it is often without building up collective and referable experience and/or datasets, to take us forward in a common understanding of the nation's hydrology.



### ***Maintenance of a long-term hydrological database***

CEH and the Environment Agency now hold a considerable quantity of data that is accessible to the public, but this expansion of availability has been very slow compared to many other countries. The websites of both organisations tend to be a little cumbersome to navigate: sometimes knowing what you want does not necessarily match with how the “search” features are set up. From using these sites to obtain background information for technical work, it appears that some data sets are not kept up to date, e.g. HiFlows series.

Historical responsibility for the collection, processing and publishing of data has changed over time, and successive authorities have obviously had to rationalise data holdings. Changes in instrumentation, data collection, and opening and closing of stations means that single location, long period records are very scattered. The above-mentioned problems of un-coordinated research adds to this problem, with many research programs being short-lived and data held in many departments.

Various attempts were made in the past to co-ordinate a stable reference database, e.g. the Water Data Unit under the one time Water Resources Board, and the short-lived responsibility of the Met Office for British Rainfall. It remains, however, a significant issue and is getting worse with the need to access data on more hydrological parameters, including sub-daily data which is required to assess changes in rainfall intensity arising from climate change, and information on artificial influences on river flow and groundwater level which is needed to assess data trends

Recently, processed datasets are becoming increasingly available, e.g. the Met Office National Climate Information Centre (NCIC) data sets from 1910<sup>1</sup>, but their application clearly will have limitations to use. Hopefully, the need to maintain processed data sets will mean that the responsible agencies will have a driver for maintaining an adequate data-gathering network. To an extent, this driver has to recognise an end-user need, and more to the point be recognised as worthwhile public service undertaking.

### ***Public access to hydrological data***

Public access to data is fundamental to an increased understanding of and interest in hydrological matters. The EA provision of data has improved in recent years, particularly with publication of near real-time river level data at gauging structures (SEPA has provided these data for some years). Whilst this information is available it is not easy to locate, currently buried in the “home and leisure” pages. With rainfall being the driver of river flow, it is regrettable that there is not a similar source for rainfall data or, even better, a single source for both datasets. The Met Eireann (Irish Meteorological Service) has excellent and simple interrogation facilities for key observations from all their main observation stations, and it is not clear why such information cannot be obtained in Britain. The NOAA website facilities for hydrological and meteorological information still remain significantly more informative than anything the Met Office and Environment Agency can provide. The Australian BoM site is also comprehensive and informative.

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<sup>1</sup> [www.metoffice.gov.uk/climate/uk/datasets](http://www.metoffice.gov.uk/climate/uk/datasets)

Public access to water resources information (river flows, water quality indices, water usage data, leakage rates etc) needs to be extended so that public understanding of, and engagement with, water management issues, can become more productive. It is important that independent, long-term national repositories of all core hydrometeorological data are maintained to provide centralised sources of information upon which authoritative assessments of the current state of the the UK's water environment can be based. Crucially, to facilitate better characterisation of artificial disturbances on flow regimes, there is a need for greater access to datasets on artificial influences (abstractions, discharges, reservoir releases etc) on river flow and groundwater regimes.

Whilst public access to hydrological information is important if society is to understand and appreciate the issues underlying water management, general access to data is fundamental to hydrological research and practice. Without simple, easy access routes to comprehensive data hydrological research will be hampered. In summary, a single clear co-ordinated source of hydrological data is required, providing real-time datasets, but also data at a range of resolutions and timescales.

We hope these observations are useful in compiling the State of the Nation report, but if we can be of more assistance please contact the Society.

Yours sincerely

A handwritten signature in black ink, appearing to read "Bob Sayer". The signature is fluid and cursive, with a long horizontal stroke extending from the end of the name.

President, BHS