No. 73 May 2002

Come to the BHS Birmingham Symposium *

THE NEWSLETTER OF THE BRITISH HYDROLOGICAL SOCIETY

Circulation

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Flood risk in a changing climate

Royal Society, London
21–22 November 2001

The floods in East Anglia in early November, following those of Autumn 2000 (the wettest Autumn for England and Wales since records began in the 1760s), could not have provided a more timely reminder of the importance of flood risk and concerns for the impact of climate change. A capacity audience attended the two-day discussion meeting on *Flood Risk in a Changing Climate* in November, opened by *Elliot Morley MP*, DEFRA's Minister for Floods. Speakers from the USA and Europe joined UK experts to review scientific progress and the outstanding challenges underlying flood risk management.

What is the reality of climate change? **Catherine Senior** (Hadley Centre) reminded us that while model uncertainty in the estimation of precipitation and sea level rise remains large, there is consensus between models that due to greenhouse gas emissions the UK can expect increased

There is no Circulation **PLUS** *section this time: please send your ideas for future articles to the Editor.*

* *8th National Hydrology Symposium, Birmingham, 8–11 September — please see the enclosed flyer.*

winter rainfall, probably of increasing intensity, and increasing sea levels. Evidence from the historical record is mixed. **Tim Osborn** (University of East Anglia) showed that the frequency of intense rainfall has indeed increased significantly over the last 40 years, as has the frequency of multiple days of heavy rain. However, **Alice Robson** (Centre for Ecology and Hydrology) found no clear evidence of longer-term trends in flooding: recent floods do not look outstanding compared with flood data from the last 120 years. We can conclude that clearly climate is varying, and in a way that is consistent with climate model predictions, but that there is no unambiguous observational evidence to prove that recent floods are due to climate change.

Papers on rainfall pointed to new developments in the use of radar for rainfall measurement (**Chris Collier**, Salford University), leading to improved accuracy and spatial resolution, and in the assimilation of observational data (from radar and satellites) with meteorological models, using neural nets, to improve rainfall forecasts (**Hoshin Gupta**, Arizona). Hence, for example, the University of Arizona produces global forecasts of tropical rainfall, available on the web. New developments in statistical approaches to floods were presented.

Duncan Reed (independent consultant) discussed UK experience and the recent (1999) *Flood Estimation Handbook* (FEH), and **Paul Northrop** (Oxford University) reviewed extreme value theory and presented new methods, including a Bayesian approach to use pooled flood data from several rivers to improve estimates of extreme floods at a given site. It was reassuring to note the similarity of results with the FEH, but the new method includes quantification of the uncertainty associated with the flood estimates.

Turning to rainfall-runoff modelling, **Peter Young** (Lancaster University) reviewed developments in modelling for the important operational problem of forecasting floods in real-time. Current data-based models are efficient in maximising the extraction of information from the available rainfall and flow data, and can readily incorporate techniques for adaptive forecasting, i.e. taking account of forecast errors in updating the model. Thus a model fitted to just 30 days of data for the River Hodder could provide a good forecasting tool for other periods and larger flows.

Howard Wheater (Imperial College, London) highlighted advances and limitations of rainfall-runoff modelling for flood planning and management. New methods have solved the problem of modelling continuous flows for ungauged catchments, and attention is focused on the need to incorporate the improved radar observations of spatial rainfall into models for long-term simulation. Research priorities include better understanding of the effects of changes in agricultural land management practice on flooding, and representation of both rural and urban land use change more effectively in hydrological models. Current computing power allows uncertainty in model estimates (for example inundation maps) to be evaluated, leading to a new generation of decision support tools. **Hans-Reinhard Verworn** (University of Hanover) developed further the issues of urban flood management. Advanced real-time control systems have been developed for urban centres, but not widely adopted in practice. New concepts of sustainable urban drainage systems have been developed to reduce the impact of urban development on flood runoff generation and mitigate pollution: examples now implemented in Germany include channelling roof and road drainage to engineered soakaways rather than piped drainage systems.

Turning to coastal and estuarine flooding issues, **Ian Townend** (Associated British Ports) described the linkages between tidal propagation and estuary form and hence the response to rising sea levels (estuaries moving landwards). These raise major management issues: do we protect our shorelines, or manage retreat? Improved conceptual models of geomorphological change, supported by numerical modelling, were being used to analyse management solutions, which included managed retreat. Results were reported from a major study of the Humber. Ian commented on the many practical problems associated with managed retreat, not least issues such as public perception, stakeholder participation and the constraints imposed by current conservation legislation. **Jurjen Battjes** (Technical University of Delft) reviewed the Dutch experience of safety standards for coastal protection, and the current state-of-the-art of hydrodynamic and statistical modelling for coastal flooding, including storm surge and wave effects. He presented as an example a recent Bay of Bengal cyclone that resulted in extensive loss of life. He also described new approaches to risk assessment of potential inundation due to dyke failure currently being developed in the Netherlands.

The concluding talks addressed broader perspectives of flooding. **LeRoy Poff** (Colorado State University) provided an extensive overview of the importance of flood regimes and floodplain inundation for ecosystem species diversity and productivity, and discussed the importance of major floods in re-establishing connections with severed floodplain and riparian wetlands in human-dominated river valleys. He introduced the concept of habitat templates to understand the ecological impacts of human-induced and climate-related change.

Edmund Penning-Rowsell (Middlesex University) discussed the socio-economic aspects of flooding. He presented survey evidence that the psychological impacts of floods were long-lasting, and undervalued, and argued that a cost-benefit approach to flood protection can lead to protection of the affluent (who live in expensive properties) at the expense of the disadvantaged (who do not). He produced a disturbing analysis of the location of key emergency facilities and vulnerable households on floodplains, with major implications for planning and emergency management.

Finally, **George Fleming** (University of Strathclyde, Past-President of the Institution of Civil Engineers) introduced the November 2001 Institution of Civil Engineers report to DEFRA on flood risk management. This wide-ranging report highlights technical issues, such as the need for better observational data on high river flows, improved decision support tools and the need for greater take-up of model-based risk assessment, manpower issues (shortages of trained manpower in the flood defence area), social impact issues (as noted above) and administrative barriers to more effective flood management. These latter include problems with the current system of local responsibility for river flood defence expenditure and in the diverse responsibilities for water management in urban areas.

In parallel with the main talks, some 40 posters were presented, ranging from an analysis of extreme floods in Venezuela to operational management of the Thames Barrier. A concluding discussion, led by **Lord Hunt**, was stimulating and wide-ranging, and included topics as diverse as the estimation of probable maximum floods and different perceptions of the role of the insurance industry in providing cover for properties at risk. Overall, there was a strong sense that the meeting had succeeded in identifying an important set of scientific, technical and administrative challenges at a timely moment to influence the national political and research agendas.

H.S. Wheater
Imperial College London

New email address

Because of all the junk emails being sent to him at *chris@oxscisoft.com*, **Chris Green** (Oxford Scientific Software) fears that he might delete or overlook an important message from a client or a fellow BHS member, so he has changed his address to *chris.green@oxscisoft.com*: he apologises for any inconvenience.

SUDS: principles and progress in Scotland

Scottish Hydrological Group meeting
University of Strathclyde
6 December 2001

The speakers at this meeting on Sustainable Urban Drainage Systems (SUDS) were *Dr Chris Jefferies, Adolf Spitzer* and *Wolfram Schlüter* from the Urban Water Technology Centre at the University of Abertay, Dundee.

The main point of **Chris Jefferies'** talk was to provide an overview of Sustainable Urban Drainage Systems (SUDS) and to describe the rationale of SUDS. He also described a recent research project, the Scottish University SUDS Monitoring Programme. The Scotland and Northern Ireland Forum For Environmental Research (SNIFFER) had issued an interim report on the first phase of this project (1997-2001).

Adolf Spitzer and Wolfram Schluter, who are carrying out field-work studies into the performance of SUDS in support of this project, later discussed the hydrological issues in more detail.

SUDS are drainage systems that have the capability of storing runoff, controlling flow velocity and reducing erosion, allowing primary treatment of runoff, and working with the natural environment. They also provide an alternative to the more traditional methods of drainage, where the rationale has been to remove rainwater as quickly as possible from land to rivers. These traditional methods are not satisfying the UK environment agencies from a flow and water quality point of view.

The Scottish Environmental Protection Agency (SEPA) has provided the following statistics regarding the 1200 SUDS sites in Scotland alone:

- 43% of these sites are filter drains and infiltration trenches, typically found alongside roads;
- 14% are made up of permeable paving (e.g. car parks);
- Around 14% are swales, channels normally found in the central reservation of carriageways with the purpose of storing road drainage;
- 10% are soakaway systems, designed to store water and release it slowly into the ground;
- 7% are retention ponds (permanently wet ponds), which are few in number, but are very significant because they serve large catchment areas;
- 6% are detention ponds (dry ponds);
- Smaller sites (such as wetlands, infiltration basins, and filter strips) make up the remaining SUDS sites in Scotland.

The 'SUDS triangle' summarises the three main aspects of these systems: Quantity, Quality and Amenity. Quantity concerns the amount of water that can be stored within the system, and the amount released into the natural watercourse. Quality concerns the amount of treatment that runoff would receive before it reaches the natural watercourse or groundwater system. Amenity is the marketing quality of SUDS, i.e. the fact that these systems work alongside the natural environment and can also promote wildlife, for example in a wetland system in Scotland less than a year old, swans have settled and bred.

After this overview, Chris described in more detail the Scottish Monitoring Programme, an ongoing research project into the SUDS phenomenon carried out jointly by four Scottish universities. The project is based on the performance of many of the SUDS systems in Scotland by coordinated assessments, its goal being the production of a new design manual - a more detailed version of the current CIRIA publication on the topic.

The Scotland and Northern Ireland Research Forum (SNIRF) which acts a research arm of the Scottish Water Authorities is funding the following research projects:

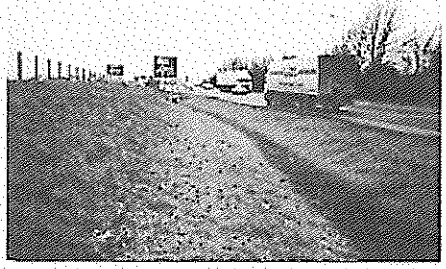
- The performance of SUDS in Scotland;
- Production of a sediment quality database;
- A survey of aquatic plants in SUDS ponds;
- Efficiency of stormwater infiltration.

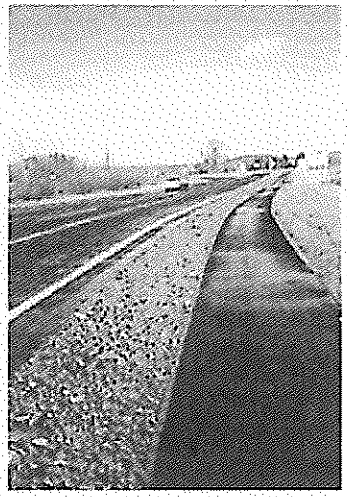
Some of the conclusions already reached are that flood storage ponds are generally well received by the public, but that detention basins and swales require better detailing in terms of their performance.

Adolf Spitzer and Wolfram Schlüter then described their research projects within the Scottish Monitoring Programme.

Adolf's project was at Duloch Park in Dunfermline, where he analysed the performance of two SUDS schemes within a new development, one being a retention pond, the other a 'train' of six detention basins. Their performance was analysed based on the measured properties (quantity and quality) of the inflow and the outflow, and the provisional conclusions were:

- Compared with the inflow hydrograph, the detention basins were more effective in reducing the outflow peak (~14%) than was the retention pond (~2%). In each case the outfall structure (whether a simple pipe, or hydro-brake system) was instrumental in flow peak reduction;
- The detention ponds were extremely effective in removing fine and coarse







sediments from the flow, although this led to unsightly deposits on the floor of the basins. They were also shown to remove viscous petrochemical substances from the road runoff. It was assumed that all pollutants in solution pass through the basin without attenuation, but metal pollutants and organic matter will generally bind to the removed sediments.

Wolfram described his research into the performance of a 0.62 ha porous pavement with sealed sub-base in Edinburgh's South Gyle and an infiltration trench on the A944 in Aberdeen and outlined his conclusions.

The pavement (a car parking area) was found to reduce the total outflow by an average of around 50%, but this depended on factors such as event duration, total rainfall, and the catchment wetness. The water quality of the outflow from the site was measured, and when compared to standard sanitary levels was found to have extremely low metal concentrations, comparable to the levels found in nearby service reservoirs. Hydrocarbon levels were found not to decrease as a result of passing through the porous pavement.

The outflow from the infiltration trench varied from 5% to 170% (the latter caused by excessive groundwater in the system), with a flow lag time of 0 to 12 hours.

The water quality of the system outflow was improved, with around 74% of suspended solids being removed. However conductivity increased, suggesting an increase in soluble salts.

In conclusion, Chris Jefferies summarised the current issues relating to SUDS:

1 The general public safety of SUDS schemes, especially wetland sites.
2 The importance of maintenance of SUDS to ensure a long and efficient life span.
3 There is a lack of operational and design guidance on SUDS schemes.
4 There is a conflict of importance between control of flooding and the quality of run-off.
5 There is some reluctance from roads authorities to take up SUDS schemes because of the need for maintenance.
6 A similar forum needs to be set up in England and Wales to promote and research SUDS.
7 There is a need to provide training on the design and maintenance aspects of SUDS.

David Crighton (insurance consultant) asked about research carried out on the performance of oil traps: Chris said that research was currently going on in that field. **David Martin** (Babtie Group) asked the speakers what their results were compared to. Adolf Spitzer had used basic rainfall measurements to record inflow to compare with the directly measured outflows, and water quality measurements were compared to spot samples, which would normally go straight into the watercourse via a traditional stormwater sewer system. **John Riddell** (independent consultant) inquired about the importance of obtaining quality run-off from an innocuous location such as a housing estate, compared to that from a main road or industrial estate. Chris agreed that it was indeed a hierarchical selection process, although in both cases water quantity was the common issue, and the effects can be reduced by SUDS schemes. Attitudes to such schemes were changing where building regulations were beginning to incorporate SUDS. **David Price** (Babtie Group) asked about the performance of SUDS in extreme flood events. Chris told him about ongoing work into the extrapolation of collected information to determine extreme event performance. **Kirsteen Macdonald** (Euan Associates) commented that during an extreme event, which had resulted in extensive flooding of the Edinburgh area, the porous car park (described by Wolfram) was one of the few locations completely unaffected.

On behalf of the Scottish Hydrological Group, **Steve Wallis** thanked Chris and his co-speakers for a very interesting and informative talk on a new and developing topic.

Douglas Armour
Babtie Group, Glasgow

The snakes and ladders of water resources development in England and Wales:

Throw double six to start

by Prof. D.H. Newsome CBE,
Foundation for Water Research, Marlow, Bucks., SL7 1FD

Based on David Newsome's presentation to the BHS Annual General Meeting in Bristol last September.

In the 1700s, Britain was a rural community with some market towns and a few cities. (In 1801, for example, the population was still less than five million.) Industrial production was carried out in cottages, water was obtained from springs, shallow wells or rivers, and waste was scattered on the land, where it was readily assimilated.

In 1760, **James Watt** invented a steam engine that would drive machinery directly, and, for the first time, this made it economic to employ people in factories: the industrial revolution had started.

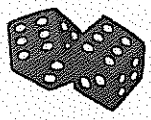
In the 1800s the revolution had gathered pace, new machines were produced, existing towns grew and new towns were developed. Waste was thrown into the street for the rain to wash away causing pollution of the local sources of supply. The water suppliers, who originally managed springs, wells and fountains, had to move away from towns and "took to the hills". Water pipes were laid from these remote locations to the towns and, later, sewage pipes began to be laid in the towns themselves.

In 1900 a Royal Commission was established to examine river pollution and, after thirteen years of deliberation, came up with the 20/30 standard for BOD and suspended solids, provided there was an eightfold dilution in the receiving water. This standard is, of course, still in use today.

In 1934, **Captain William Newsham McClean** was appointed as Secretary to the British Association for the Advancement of Science's Committee on water which, because the then Minister of Health (**Sir Hilton Young**) refused to move on the recommendations of the Committee on the grounds of cost, formulated an Appeal to the Prime Minister. The actual Memorandum of Appeal was signed by the Presidents of the Institution of Civil Engineers (**Sir Henry Maybury**) and the British Association (**Sir James Jeans**). It is believed that, because they were near neighbours in the north of Scotland, McClean approached **Ramsay**

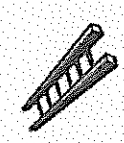
Macdonald, the then Prime Minister, and discussed informally with him the appeal to set up a survey of the water resources of Great Britain. As a result of the appeal, the Inland Water Survey was formed in 1935 and the work it started is still continued today, through the Environment Agency in England and Wales and the Scottish Environment Protection Agency in Scotland. The actual appeal letter, each paragraph initialled by Ramsay Macdonald, can be seen at the National Hydro-Sciences library at the Centre for Ecology and Hydrology (CEH), Wallingford.

(That was the throw of double six)



The next major step forward was contained in the 1945 Water Act. For the first time it was made the duty of a Minister *'to promote the conservation and proper use of water supplies in England and Wales and to secure the effective execution by water undertakings under his control and direction of a national policy relating to water'*.

(big ladder)



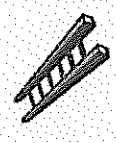
Despite this, water supply authorities still tended to develop resources to meet only local needs and perhaps did not pay sufficient attention to all the necessary and desirable factors.

(medium snake)



They did, however, amalgamate into larger units, so that from about 1400 undertakings in 1945 there were fewer than 200 in 1970.

(medium ladder)



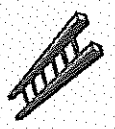
Wastewater treatment authorities, however, remained at about 1400, and no amalgamations took place over the same period.

(medium snake)



To accelerate these amalgamations, the Water Resources Act was introduced in 1963. It created 29 River Authorities, working on a catchment basis, that were to be responsible, *inter alia*, for water supply to meet the needs of domestic, industrial and agricultural users, covering England and Wales, and a national planning body — the Water Resources Board.

(big ladder)



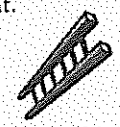
The sewage authorities still remained at about 1400 until the passing of the Water Act 1973.

(medium snake)



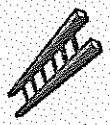
The Water Resources Board (WRB) formulated regional plans for the rational development of water resources in the different regions of England and Wales (South East, North, Wales and the Midlands) and finally produced an over-arching national plan. The feasibility of building a barrage to store freshwater in Morecambe Bay was investigated. WRB also had a research division that identified common problems and instituted research programmes to find solutions. There was a liaison and promotion division, whose duties included working with the river authorities to ensure that the national viewpoint was taken into account in the formulation of plans for water resources development.

(medium ladder)



Section 15 of the 1963 Act established hydrometric schemes and authorised grant-aid for schemes approved by WRB's hydrometric division, which also introduced the first automatic streamflow data processing system outside the USA.

(long ladder)



The planning and management of water resources on a very large scale to meet multiple objectives was, however, beyond the experience of most people in the industry.

(big snake)



Therefore, use was made of mathematical models to simulate the river systems to investigate alternative planning and operational strategies. These models were constructed on three separate levels: planning, design and operation. To be effective, they required many data and this led to the development of a whole new range of instruments, such as: recording rain-gauges, automatic weather stations, automatic water quality monitoring stations and fish counters.

(medium ladder)

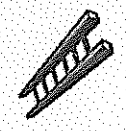


The largest freshwater research programme of this era was the Trent Research Programme undertaken by the Research Division of WRB using nine expert teams from government, universities and the Trent River Authority. It incorporated the three levels of modelling already mentioned (planning, design and operations). The objectives of the research programme were:

1 To determine the different ways in which the River Trent, its tributaries and other waters in, and which could be brought into, the area, could be used to satisfy the expected demand in that area, or elsewhere, for water for domestic, industrial, agricultural and amenity use of a quality suitable for each;
2 To evaluate the costs and benefits of each of these ways as a guide to determining the most efficient solution.

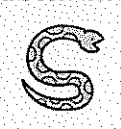
It was a highly successful and pioneering project, as acknowledged by **Geoff Woodward** of the Trent River Authority in his paper *'The Trent Revisited'* some ten years later. He recorded that he was astonished at the accuracy of the predictions of the model. Some ten years after Woodward's paper, **Professor Bruce Beck** of Atlanta, Georgia, having read in detail about the Trent model said that he was surprised how little progress had been made in the years since the Trent model's completion.

(very long ladder!)



It is an unfortunate fact that the Trent Economic Model was never used in practice, because of the changed political situation that arose almost immediately after it had been tried and tested.

(big snake)



Other achievements of WRB included the introduction of precipitation-measuring radar that is now becoming increasingly important in the quantitative forecasting of precipitation some hours ahead. The radar network now covers the UK, the Channel Islands and the Republic of Ireland and has links into Europe.

WRB was responsible for initiating research into new technology for stream gauging and stage measurement, e.g. the ultrasonic and electromagnetic techniques and the Braystoke current meter. The Water Data Unit continued this and all are now commercially available products today.

The Water Act 1973 abolished WRB (a statutory body).

(big snake)

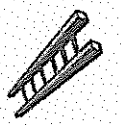


It created ten large, independent water authorities covering England and Wales, to be responsible for water resources development and also for everything 'watery' including water treatment to potable standards and

supply, sewerage, wastewater treatment and its disposal to receiving waters, which had to meet standards laid down by the water authorities. All abstractions of water and disposal of treated effluent were licensed by the water authorities and, in cases of disagreement, were the subject of appeal to the responsible Minister.

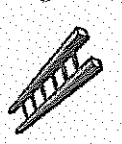
It also established the National Water Council, a small body whose objectives were to control the water authorities and promote common standards for drinking water quality and operations.

(long, but wobbly ladder!)



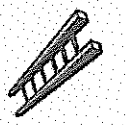
And established two new, non-statutory bodies in place of WRB: The Central Water Planning Unit (CWPU)

(medium ladder)



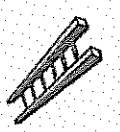
and the Water Data Unit (WDU)

(slightly longer ladder – it lasted two years longer than CWPU!)



CWPU carried on the planning functions both regionally and nationally, it arranged for a trial barrage for the storage of freshwater to be built in the Wash, and investigated the transfer of water from the Severn to the Thames.

WDU kept an eye on the maintenance and accuracy of all flow measurement stations; processed centrally every month all punched paper tapes from the level recorders at these stations and converted them to flows; published the Surface Water and Groundwater Yearbook series and the River Pollution Survey, and it provided the government with all the information about water that it required.



(long ladder, but, with hindsight, perhaps a medium snake!)



WDU also investigated the use of satellite technology for hydrological purposes (e.g. remote sensing of the water content of snow lying on the ground and data collection from remote sites). These are now commercially available.

The rest, up to the present, included the privatisation of the ten water and sewerage operators in 1989, the establishment of Ofwat (the economic regulator) and the National Rivers Authority (NRA) to be the independent regulator (replaced by the Environment Agency in 1995). You all know the details of these changes probably better than I do, so I propose not to talk about them. Also, I acknowledge that, in this presentation, because time did not permit, I missed out some of the milestones in the development of water resources that you might consider should have been included, and for this I apologise.

The message I want you to take away from this presentation is **not**, however, that I was telling you how clever and farsighted we were in *"the golden age of hydrology"* (as **Professor Brian Wilkinson**, then the Director of CEH Wallingford, described it), or that I was saying we did all this before you came on the scene (though, of course, we did!). Rather my message is that you should use our experience and transform and build on it to meet present day needs, and then, in turn, it will be your duty to pass on your knowledge and experience to the next generation coming along.

EGS 24th General Assembly report

Nice, France
21–26 April 2002

Thanks to the award of a BHS Travel grant, I was able to attend the 24th General Assembly of the European Geophysical Society in Nice, France, and deliver a paper in the 'Open session on eco-hydrology'. My paper detailed an investigation into the reliability of point estimates of evaporation over wet grassland in southeast England, and was among others focusing upon evaporation from wetland areas.

Four meteorological stations were placed over different surface 'types' of the wetland (wet grass, open water and reeds) and the variables temperature, relative humidity and windspeed were examined to determine any variance caused by the heterogeneous surface. Little variance was found, with the result that evaporation computed with data from any of the four meteorological stations would be representative of the wetland as a whole. This result is thought to be due to effective mixing and turbulence from the product of high windspeed and pronounced microtopography over this particular wetland.

M. C. Acreman *et al.* (CEH Wallingford, UK) compared evaporation rates from wet grassland and reed beds using eddy correlation methods in the Somerset levels and moors, south-west England. Following years of destruction, wetlands areas are now being restored, but as wetland areas evaporate high volumes of water, it is necessary to compute the demand upon the catchment water resources. This study revealed that evaporation rates are linked to soil water status and the phenological stage of the plants. Overall the wet grassland study site evaporates up to 10 % more than 'normal' grassland areas and the reed bed areas evaporates up to 25% more.

The 'Eco-hydrology' session was followed by 'Wetland management', in which **R. J. Harding** *et al.* (CEH Wallingford, UK) presented preliminary results of energy and CO_2 fluxes from the CarboEurope Wetland site at Tadham Moor, part of the Somerset levels and moors. In order to investigate the interaction of the water table and soil moisture with local energy, water and carbon fluxes, continuous eddy correlation measurements were begun in June 2000. Radiation, water table depth, soil moisture and soil temperature were also measured. The net CO_2 flux changes over the year, from near zero CO_2 balance during winter, to rapid assimilation during the spring, and then high levels of efflux from the soil after harvest. Overall there is a zero net exchange of CO_2 with the atmosphere, but a net loss of CO_2 in the order of 200 g m^{-2} is produced through the cropping/harvesting of the grass, which is exported out of the catchment. Future research will examine the energy balance over the wetland and the overall carbon balance between CO_2 and methane.

S. Duvail (Département de Géographie, Université Louis Pasteur, Strasbourg, France) gave an international perspective in a paper that addressed social and environmental considerations in the water management of a dam-regulated river. The Diama dam was built in 1986 on the Senegal River to provide irrigation water for large-scale rice farms. However, the practice of maintaining

high water levels within the dam caused soil salinity problems, decline of the water table in downstream areas, and a negative impact on local communities' traditional economic activities.

Sluice gates were installed so that freshwater releases could be made from the dam in order to support local economies in addition to rice farming, but questions had to be addressed about how much water should be released, and the effects of an artificial flood release. Hydrological data were measured and socio-economic factors were considered by taking into account the different potential users of the flood release (fishermen, livestock keepers, gatherers and wildfowl), all of whom have different requirements as to the volume, water level and duration of a desirable optimal flood.

Using the hydraulic model Mike 11, maps of optimal vegetation zones and socio-economic factors, several flood scenarios were evaluated to improve downstream water needs. A consensus scenario was devised that optimised the requirements of all users. This scenario involved releasing dam water to produce a small flood over April and May, then maintaining the maximum flood over July and August, and allowing the floodwater to dissipate thereafter. The flood release increased vegetation and pasture quality in the region, in addition to increasing fish populations, and caused a concomitant increase in economic productivity.

In the session 'Urban meteorology and urban air pollution', **W.E. Garland** (FOCAS Dublin Institute of Technology) gave an interesting talk about urban ozone levels over Dublin. Using differential optical absorption spectroscopy over three different transects over Dublin, the study showed a diurnal ozone trend of 20-100 mg m^{-3}, which is below the EU threshold of 110 mg m^{-3} (8-hour mean). A case study of extreme levels of ozone experienced over May 2000 showed that levels exceeded the EU threshold reaching 140 mg m^{-3} over the period 12–6 p.m.

Data from a rural Irish site also showed high levels of ozone, despite a lack of nearby ozone sources. Analysis of the synoptic wind pattern showed that the predominant airflow passed over the south-eastern UK and northern Europe before reaching Dublin, because of the presence of a high-pressure system. Local measures (such as traffic restrictions) to mitigate or lower ozone levels would therefore be ineffective under such circumstances, since the sources of ozone originate elsewhere, and a Europe-wide strategy needs to be adopted in order to maintain ozone levels below those considered injurious to human health.

Dr Helen Gavin
University of Manchester
(helen.gavin@man.ac.uk)

New members

A warm welcome to the following new members of the Society:

Dr Tony Warn	Environment Agency, Bristol
Paul Taylor	BMT Information Systems Ltd, Southampton
Dr Thomas Kjeldsen	JBA Consulting, Coventry
Melanie Dinnis	JBA Consulting, Coventry
Victor E. Conduit	Environment Agency, Camberley, Surrey
Eliot Simons	Entec UK, London
Amy Hensler	WS Atkins, Epsom, Surrey
Matthew Surman	Hyder Consulting Ltd, Cardiff
Matthew J. Foote	Intermediary Systems Ltd, Brierley Hill, W. Midlands
Tim Palmer	Binnie Black & Veatch, Chester
Peter I. Wade	Parsons Brinckerhoff Ltd, Cardiff
Sonja S. Folwell	CEH Wallingford
Rebecca L. Humphrey	Bangor University
Dr C. Toff Andersen	Met Office, Bracknell
Lynn A. Swanson	Heriot Watt University, Edinburgh
Bryan A. Robinson	Water Management Consultants Ltd, Shrewsbury
John Fullwood	Met Office, Bracknell
Donald N. Moore	Mott Macdonald, Cambridge
Peter Dunn	Knight Piesold Ltd, Ashford, Kent
Joanne C. Robinson	South West Water, Exeter
Jacqueline Diaz-Nieto	King's College London
Matthew J. Fry	CEH Wallingford

Committee nominations

Three Committee members will be standing down at the AGM in September. Nominations are sought for the post of Hon. Secretary and two other members. The Committee has unanimously nominated **Prof. Bruce Webb** (Exeter University) as President-Elect: further nominations may be made for that position. The forms enclosed should be sent to **Tim Fuller** at the ICE by **1st July**. The health of BHS relies on introducing new faces onto the main committee and these posts are an excellent opportunity for energetic members to influence the course of the Society and to develop their contacts.

President's piece

It is sobering to realise that I am now a quarter of the way into my term of office. In many ways this has been a relatively quiet period and there are no major developments or items to report. However, there have been three successful National Meetings: on LOIS outputs, the *Flood Estimation Handbook* and (most recent of all) Climate Change and Hydrology. These were all well supported, with excellent papers and lively discussions. As always the success of meetings relies heavily on the hard work and willingness of the organisers, to whom I pay tribute.

Booking forms for the Birmingham Symposium are enclosed with this issue. **Michael Hamlin** (BHS President from 1995 to 1997) will address the Conference Dinner and **Edmund Penning-Rowsell** (head of the Flood Hazard Research Centre at Middlesex University) has accepted my invitation to present the Penman Lecture. I am particularly pleased that they have both agreed to speak.

During his time at Birmingham University, Michael had a major influence on developments in water resources hydrology and in educating hydrologists, so it is appropriate that he should reflect on the changes during his career.

Edmund Penning-Rowsell has made significant contributions to our understanding and managing of the human dimension of floods and in promoting the integrated DEFRA / Environment Agency R&D programme. His lecture will bridge a link between hydrology and the social factors, which as I have discussed previously, hydrologists cannot ignore and must increasingly recognise.

Another reminder, this time of the wider issues to which hydrologists contribute, was brought to my attention when **John Rodda** kindly sent

me his paper *Water under pressure*, published in a Special Edition of the Hydrological Sciences Journal, *Can Science and Society Avert the World Water Crisis in the 21st Century* (December 2001). John's paper discusses the increasing number of problems that surround water, which he says are far greater in number than ever before. He examines the capability of society to deal with the pending water crisis, advocates an ecosystem approach and the response of the hydrological community.

One of the issues he raises mirrors comments at the Climate Change meeting and a recent personal experience: access to and availability of reliable, long-term records of hydrometric data. He says that lack of data is the biggest handicap to the adequacy of global and national assessments of water resources and assessments of water use.

One of the speakers on climate change commented on the vital need for long-term records and supported **Terry Marsh**'s initiative for a series of benchmark catchments. Another said that the study he was describing was over simplistic due to a lack of appropriate data. In my own case an organisation that should know better cannot find some records that have been archived.

Appropriately, data will form the topic of a National Meeting in July. One thing we will need to discuss is what additional steps we hydrologists should take to ensure its importance is properly recognised and data is given sufficient resources.

Peter D Walsh
Email: walshpeter@cs.com

Student prize

BHS is launching an exciting new student award to encourage the study of hydrology by undergraduate students. We hope that this award will foster interest in hydrology amongst undergraduates and will encourage them to consider becoming student members of the Society, as a means of developing their interest and exploring the potential for a career in hydrology.

A first prize of £400 and two runners-up prizes of £200 will be awarded to student dissertations that, in the opinion of the Panel, are outstanding in terms of their achievement, originality and presentation.

Dissertations must be commended by the students' supervisors and only one per year will be accepted from each Department. The closing date for submissions is **8th July 2002**.

Should you have any queries concerning this award or the Society, then please contact the Honorary Secretary, Tim Jolley *(tel 01738 627 989, email tim.jolley@sepa.org.uk).*

Water resources management in arid regions

Kuwait Institute for Scientific Research (KISR) conference 23-27 March 2002

The aim of this conference, which coincided with the annual world water day, was to bring together educators, researchers, managers and policy-makers from across the world involved in all aspects of water resources in arid and semi-arid regions.

Over 350 scientists and government officials from 52 countries attended, presenting over 150 scientific papers on water resources in dry areas. Through the exchange of state-of-the-art knowledge, such a large gathering allowed participants to better understand the approaches, models and actions that would help develop, manage and sustain water resources in the 21st century.

The opening ceremony was held in the Grand Ballroom of the impressive *Al Hashemi II*, the world's largest dhow, and began with the national anthem and a short reading from the Quran. The Kuwaiti Minister for Education, **Dr Al-Haroun**, inaugurated the conference under the auspices of the Crown Prince and Prime Minister, **Sheikh Saad**. Speeches followed by KISR General Manager, **Dr Al-Otaibi**, and Director of Water Resources **Dr Al-Rashed**.

Dr Al-Haroun called on human beings to protect and ensure the cleanliness of water for future generations. Kuwait was setting the trend for clean water initiatives in the Middle East by conforming to WHO standards, but there was a need to increase investment in the water sector to guard against future water shortage problems there.

During the first day, there were eight sessions and 30 scientific papers were presented. Keynote speeches were made by **Dr Dieter Prinz** (University of Karlsruhe, Germany) on the role of water harvesting in alleviating water scarcity in arid areas, and **Dr David Stephenson** (University of Witwatersrand, South Africa) on the assessment of runoff from arid catchments.

Dieter Prinz said that pumped groundwater, and water from rivers and reservoirs, is no longer enough to meet the growth in demand, but water harvesting is a viable option. Examples include rainwater harvesting, floodwater harvesting, fog & dew harvesting and the use of qanats (underground dams and special wells) called groundwater harvesting. If these small-scale irrigation methods could be revived and improved, they would provide excellent ways to ease future water scarcity in arid and semi-arid areas of the world.

In the second keynote speech, David Stephenson highlighted the difficulties in modelling flow in arid catchments because of the scarcity and unreliability of runoff records. Standard methods of estimating floods, such as the rational method and unit hydrographs, could not be used to generate hydrographs for extreme storms because of the preconceived hydrograph shape, and the non-linear rainfall-runoff relationship. Instead, he proposed a hydraulic-type modular modelling technique, which has been applied successfully on a number of catchments in the Kalahari Desert of Southern Africa.

On the second day 27 scientific papers were presented in 18 sessions.

Mona El-Kady (National Water Research Centre, Egypt) delivered the opening keynote speech on *'A vision for water security and sustainability in the Arab world.'* She said that Arab water resources were in danger, most Arab countries suffered severe water shortages, and the other countries in the region were approaching a similar fate.

In the light of this, an *'Arab Research and Learning Network for Water Science and Technology'* was proposed. Its aim would be to develop Arab-driven solutions and technologies to help water resources practitioners and decision makers in the Arab countries to sustain water security. It would also promote high standards in continuing learning and certification, research and technology adaptation and coordination with the water industry.

The second keynote address was by **Khaled Hamed** (Cairo University) on *'Nonstationarities in river flow time-series'*. He pointed out that hydrological time series often show signs of nonstationarity, which may be a result of natural or anthropogenic causes, such as global warming. In his study, monthly and annual river flow data from the Midwestern USA were

analysed for nonstationarity using (a) spectral analysis, (b) time-frequency analysis, (c) tests based on evolutionary spectra for nonstationarity in time series, and (d) time-scale analysis based on wavelet. The main conclusion was the general agreement in the results about the nonstationarity of the series.

My own presentation on *'Sampling uncertainty of climate change impacts on water resources: a case study using data from Iran and England'* was delivered in session 17 (Water Resources Development). I began by summarising some of the key findings from the IPCC's Third Assessment Report. For example, it is likely that human-induced climate change will persist for many centuries to come, with implications for water resources. Numerous studies have assessed the impact of climate change on water resource systems.

Although these used different schemes for baseline climate perturbation and different models for simulating the resulting catchment rainfall-runoff response, the impacts assessment is based on the single realisation of the perturbed and baseline climate. As a result, it has been difficult to estimate the sampling variability of the assessed impacts or to attach confidence limits to them.

In my study, Monte Carlo simulation experiments were used to assess the sampling uncertainties in impacts on water resources of projected climate changes. The investigation used data from basins in Iran and catchments in Yorkshire, both incorporating water supply reservoirs. The approach enabled the population of "impacts" to be obtained, which allowed risks of having different levels of impacts to be quantified.

During the third day, there were 16 papers in five sessions.

Dr M. Viswanathan (KISR) talked about *'Contamination of fresh groundwater lenses in Northern Kuwait'*. He affirmed that despite extreme arid conditions, Kuwait has fresh groundwater floating as lenses over saline water. These lenses are replenished by rainwater and are therefore totally renewable. Unfortunately, the recent Gulf War and the resulting oil well fires resulted in large-scale contamination of ground surfaces within the catchment areas of fresh groundwater lenses. The main findings from the study were that groundwater pollution in Kuwait is a long-term process, perhaps extending back some decades.

The author recommended rapid remedial measures to minimise the extent of groundwater pollution. The best remedial procedures would be (a) development of barriers between contaminated soil and rainwater, (b) increasing sorption capacity of the subsurface soil by using surfactants of oxides, and (c) using pump and treatment methods to clean the contaminated groundwater.

Prof. Vijay Singh (Louisiana State University, USA) introduced a rather different topic. His talk was on *'Rational Decision Making in the presence of risk and uncertainty'*, and he declared that most decisions involve certain amounts of risk, which greatly affects design and operation of water resources projects. The concept of risk combines a probabilistic measure of the occurrence of the event and its consequences. A risky decision exposes the decision maker to the possibility of some loss. A rational decision is aimed at a goal, is technically adequate, economical, and is arrived by following a rational evaluation process. Rational decision making involves decisions to accept a known or assumed risk and/or the implementation of actions to reduce the probability of occurrence.

Another interesting paper, *'Water management in Islam'*, was presented by **Dr A. Akber** of KISR, who pointed out that the Quran, the holy book of Islam, clearly states that water is the origin of life. This was quite a revelation, given that the first complete authorised version of the Quran was established more than 1300 years ago. Throughout the Quran, the word water and its derivatives are mentioned 63 times. In these verses of the Quran, water has been discussed at length from every possible aspect, all of which highlight its importance and benefits as a valuable gift to humankind. For instance, one of the Quranic verses warns against wastage. Furthermore, the documented narration of prophet Muhammad's actions and practices also reveal the considerable emphasis on water rationalization, conservation and protection from all sources of pollution. For example, on the issue of water conservation, it is recorded that prophet Muhammad stated that extravagance in ablution can even take place by the side of a flowing river.

The authors concluded by saying that, according to Islam, all human beings are entitled to use water without monopoly, usurpation, despoilment, wastage or abuse. The long experience of Arab jurists in the allocation of water rights in arid lands has given rise to an outstanding example of sustainable use of a scarce resource; an example which is of increasing relevance in a world where once abundant resources are becoming progressively more scarce.

Tuesday 26 March was the final day of presentations, with 25 papers in 6 sessions. Wednesday 27 March was reserved for visits to waste-water treatment plants.

Dr W. Strupczewski of the Polish Academy of Sciences began the first session by describing a *'Physically based model of discontinuous distribution for hydrological samples with zero values.'* He hypothesised that the impulse response of a linearised kinematic diffusion (LK) model is a probability distribution suitable for frequency analysis of hydrological sample with zero values. Such samples are observed in arid and semi-arid regions, and may include monthly precipitation in dry seasons, annual low flow and annual maximum peak discharge data. This model has two parameters, derived using the method of moments. The impulse response of the linear kinematic diffusion (KD) model is a promising model for frequency analysis of a hydrological sample with zero values. It was suggested that it is easy from a computational viewpoint, particularly if the method of moments is applied. Being a two-parameter model, KD is especially attractive in the case of short samples, which are very common in arid and semi-arid regions. Using data from some regions of the US, the author showed that the KD model represented flood frequency characteristics of arid zones quite well.

In the closing ceremony, the main recommendations from the conference were given, focusing on the need for integrated water resources management.

Conference recommendations

Water resources in arid regions of the world are scarce and constitute a major deterrent to their sustainable economic development. The availability of these resources is being further constrained by increasing demand and growing contamination due to burgeoning population, agricultural expansion, industrialization, environmental degradation, rising standard of living, mushrooming urbanization and deforestation. A long-term water policy and a plan for integrated water resources management (IWRM) have been lacking. Further exacerbating this is the looming climate change. To meet the growing demand for water, more and more water resources are being extracted and their use is growing. Placed in the context of limited water supply, the prospects for water security and sustainable economic development do not seem bright. Thus, national planning and integrated water resources management must receive top priority. Indeed, these issues must be viewed in the international context.

There followed a reading of the Kuwait Water Declaration.

This visit to Kuwait was extremely beneficial and I managed to establish a number of links with Middle Eastern organisations. I was especially pleased when invited to contribute to a book on water resources by a delegate from Canada. I am most grateful to BHS for providing partial funding for my visit and I would also like to acknowledge the financial support from the Royal Academy of Engineering.

Riz Nawaz
Dept. of Civil & Offshore Engineering
Heriot-Watt University, Edinburgh

[conference proceedings listed overleaf]

Kuwait conference proceedings

Volume 1: *Surface water hydrology*, Singh, V.P., Al-Rashed, M. and M.M. Sherif (eds), 2002, Swets and Zeitlinger, Lisse, ISBN 90 5809 363 8; **Volume 2**: *Groundwater hydrology*, ISBN 90 5809 364 6; **Volume 3**: *Environmental and groundwater pollution*, ISBN 90 5809 365 4; **Volume 4**: *Water resources development and management*, ISBN 90 5809 366 2.

Publications

New books from IAHS Press

The Extremes of the Extremes: Extraordinary Floods (ed. Snorrason, Finnsdóttir & Moss), Publ. no. 271 (2002), £60.00.

Agricultural Effects on Ground and Surface Waters: Research at the Edge of Science and Society (ed.Steenvoorden, Claessen & Willems), Publ. no. 273 (2002), £63.50.

FRIEND 2002 — regional hydrology: Bridging the Gap between Research and Practice (ed. van Lanen & Demuth), Publ. no. 274 (2002), £73.50.

For details see the IAHS web site *at www.cig.ensmp.fr/~iahs* or contact Jill Gash, IAHS Press, CEH Wallingford, OX10 8BB *(fax 01491 692448/692424, email jilly@iahs.demon.co.uk).*

HSJ contents

Recent issues of the *Hydrological Sciences Journal* contain the following scientific papers:

Vol. 47 No. 1, February 2002:

J. Wilk & D.A. Hughes: *Calibrating a rainfall–runoff model for a catchment with limited data*

J. Wilk & D.A. Hughes: *Simulating the impacts of land-use and climate change on water resource availability for a large south Indian catchment*

Sanjay K. Jain & M.K. Goel: *Assessing the vulnerability to soil erosion of the Ukai Dam catchments using remote sensing and GIS*

Chen Xiqing, Zhang Erfeng & Xu Jiangang: *Large and episodic decrease of water discharge from the Yangtze River to the sea during the dry season*

Dawen Yang, Srikantha Herath & Katumi Musiake: *A hillslope-based hydrological model using catchment area and width functions*

Alison Williams & David Archer: *The use of historical flood information in the English Midlands to improve risk assessment*

Juraj M. Cunderlik & Donald H. Burn: *The use of flood regime information in regional flood frequency analysis*

Pratap Singh & S.K. Jain: *Snow and glacier melt in the Satluj River at Bhakra Dam in the western Himalayan region*

Pawel M. Rowiński, Witold G. Strupczewski & Vijay P. Singh: *A note on the applicability of log-Gumbel and log-logistic probability distributions in hydrological analyses: I. Known pdf*

Stanislaw Weglarczyk, Witold G. Strupczewski & Vijay P. Singh: *A note on the applicability of log-Gumbel and log-logistic probability distributions in hydrological analyses: II. Assumed pdf*

Vol. 47 No. 2, April 2002:

Zekai Sen & Khalid Al-Suba'i: *Hydrological considerations for dam siting in arid regions: a Saudi Arabian study*

Xu Jiongxin: *Sediment flux into the sea as influenced by different source areas in the drainage basin: the example of the Yellow River, China*

Sanjay K. Jain, Pratap Singh & S.M. Seth: *Assessment of sedimentation in Bhakra Reservoir in the western Himalayan region using remotely sensed data*

Shiv Kumar Pandey, Abhay Kumar Singh & S.I. Hasnain: *Grain-size distribution, morphoscopy and elemental chemistry of suspended sediments of Pindari Glacier, Kumaon Himalaya, India*

Luc Descroix & Jean-Claude Olivry: *Spatial and temporal factors of erosion by water of black marls in the badlands of the French southern Alps*

Zuhal Akyürek & A. Ünal Sorman: *Monitoring snow-covered areas using NOAA-AVHRR data in the eastern part of Turkey*

Shahram Ashrafi, Ashim Das Gupta, Mukand Singh Babel, Norihiro Izumi & Rainer Loof: *Simulation of infiltration from porous clay pipe in subsurface irrigation*

Magnus Persson: *Evaluating the linear dielectric constant – electrical conductivity model using time-domain reflectometry*

V. Hrissanthou: *Comparative application of two erosion models to a basin*

Anne Coudrain, Michel Loubet, Thomas Condom, Amal Talbi, Pierre Ribstein, Bernard Pouyaud, Jorge Quintanilla, Claudine Dieulin & Bernard Dupré: *Données isotopiques ($^{87}Sr/^{86}Sr$) et changements hydrologiques depuis 15000 ans sur l'Altiplano andin*

Martijn J. Booij: *Modelling the effects of spatial and temporal resolution of rainfall and basin model on extreme river discharge*

Jacques Callede, Jean Loup Guyot, Josyane Ronchail, Michel Molinier & Eurides de Oliveira: *L'Amazone à Óbidos (Brésil): étude statistique des débits et bilan hydrologique.*

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UNESCO/IHP publications received

Internationally Shared (Transboundary) Aquifer Resources Management — A framework document (edited by Shammy Puri), IHP-VI, non-serial documents in hydrology, UNESCO, Paris.

Environmental isotopes in the hydrological cycle (edited by W.G. Mook), IHP-V Technical Documents in Hydrology No. 39: Vol. II *Atmospheric water* and Vol. III *Surface water* (six volumes in all), UNESCO/IAEA, 2001.

Urban drainage in arid and semi-arid climates (edited by M. Nouh), IHP-V Technical Documents in Hydrology No. 40 Vol. III (of three volumes, edited by Cedo Maksimovic), UNESCO, 2001.

Present state and future trends of Karst studies (edited by G. Günay *et al.*), Proc. 6th International Symposium & Field Seminar, Marmaris, Turkey, IHP-V Technical Documents in Hydrology No. 49 (two volumes), UNESCO, 2001.

Guidelines on non-structural measures in urban flood management (by Ivan Andjelkovic), IHP-V Technical Documents in Hydrology No. 50, UNESCO/IRTCUD, 2001.

Negotiation over water (edited by Uri Shamir), Proc. Haifa Workshop 1997, IHP-V Technical Documents in Hydrology No. 53, UNESCO, 2001.

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Members interested in consulting any of these publications may contact the National Hydro-Sciences Library at CEH Wallingford *(tel 01491 692266).*

BOOK

'Managing river environments' by Geraldene Wharton. Cambridge University Press, 2000, 92 pp, paperback, ISBN 0 52145854 4, price £12.95

This book is aimed at the A-level student and first-year undergraduate and is part of the "Update" series produced by Queen Mary and Westfield College, University of London.

It provides an introduction to fluvial processes, with a strong emphasis on easy-to-read maps, tables and diagrams, which make it appealing to those wanting to avoid detailed hydrological textbooks. The large selection of recent case studies in Europe and North America is diverse, and shows how actions and policies towards river management have changed.

Chapter 1 introduces river environments and describes current legislation. The second chapter develops the understanding of river systems' interactions with the local environment through sediment movement, channel form and a detailed section on flooding. Chapter 3 examines the engineering approaches to river management and bank protection. Chapter 4 considers the consequences of traditional river management. The fifth chapter builds on the traditional engineering approaches considered in previous

chapters and examines ways of mitigating environmental impacts and restoring river channels. Chapter 6 concludes by identifying the need for a sensitive and sustainable approach in river environments.

Managing river environments has a readable narrative with good definitions of key terminology and clear diagrams, making it a valuable book to anyone who is new to fluvial systems. Each chapter is well organised and coherently written, finishing with several points to consider, providing reflection and direction for further reading. I would recommend this book be included on the reading lists for any A-level and first-year degree courses that cover the management of river environments.

Neil Macdonald
University of Dundee

South East news

The South East Section committee regret that they had to cancel the meeting on "Sustainable water resources development — a south east perspective" on *Wednesday 6th March*. At this meeting it had been hoped to have people reporting on the application of CAMS to south-east water resources. Unfortunately, these programmes were still undergoing quality checks and discussions with stakeholders and the conveners felt it would have been inappropriate to run a meeting before some of the details of the work could be discussed in an open forum. Thanks to the BHS mailbase, notification did reach most people who were hoping to attend, but the committee apologises to anyone who was inconvenienced. The plan is to re-schedule this meeting later in the year.

Travel grants

Travel grants are available to help BHS members whose travel expenses are not met by an employer to attend scientific meetings. The amount will depend on the nature and location of the meeting and the case put forward.

Grants are mainly intended to help younger members, but are open to all. Successful applicants will be expected to write a short report for *Circulation*, and there are some in this issue.

The Exeter Fund, looked after by BHS, also pays grants, specifically to help British hydrologists to participate in IAHS activities.

To apply for a grant, please contact the Hon. Treasurer, **Steve Parsons**, Mott MacDonald Ltd, Demeter House, Station Road, Cambridge, CB1 2RS *(tel 01223 463926, email sbp@mm-camb.mottmac.com).*

SEPA forms National Flood Warning Development Team

The August issue of *Circulation* will feature a follow-up article describing the work that SEPA's National Flood Warning Development Team will be undertaking over the next few years.

Following the successful introduction of *Floodline* to Scotland on *1 November 2001*, SEPA have set up the National Flood Warning Development Team, to ensure that a high quality flood warning service is delivered across Scotland.

The team is led by **David Faichney** and reports to **Tim Jolley**, the National Hydrology Manager. David has worked as a hydrologist since 1985 and has been involved with flood warning since 1990, so he brings a broad range of hydrological expertise to this post.

Claire Taylor joined the team in December from the Environment Agency's North West Region. Claire's background is in flood protection and she has gained considerable modelling and mapping/GIS experience whilst working in this field.

Michael Cranston joins the team from the private sector, where he has worked on flood warning contracts for local authorities. He previously worked with SEPA as a hydrologist, involved operationally in flood warning. Michael is also undertaking a research project on "Weather Radar and Flood Forecasting in Upland Scotland" at the University of Dundee, and he is the Secretary of the Scottish Hydrological group.

Roy McIntosh, the team's Technical Administrator, joins us from the SEPA Communications Centre, where he helped set up systems for Floodline in Scotland. Before working for SEPA, Roy worked in the insurance industry and in retail management.

For further information on the work of the team, contact David Faichney, Senior Hydrologist, SEPA National Flood Warning Development Team, 7 Whitefriars Crescent, Perth, PH2 0PA *(tel 01738 627989, fax 01738 630997, email david.faichney@sepa.org.uk).*

News from BDS

The British Dam Society has awarded its first Bateman prize to **David Macdonald** and **Chris Scott** of Binnie Black and Veatch for their papers "Design floods for UK reservoirs: a personal view of current issues" and "Revised storm rainfall estimates obtained from the Flood Estimation Handbook". The prize is for work related to dams, where at least one author is a BDS member. Thomas Telford published this year's winning papers in the proceedings of the BDS Conference held at Bath. The citation mentioned the importance of these papers in drawing the attention of dam engineers to the differences between PMP estimates from the *Flood Studies Report* and the *Flood Estimation Handbook*.

Detecting environmental change: an author's response

In the February edition of *Circulation* (No 72), Joseph Holden gave his personal view of the conference held last July at University College London, Detecting Environmental Change. Can I please use your pages to correct a misconception about what I said in my talk at that conference?

I was not proposing, as Joseph's report suggests, that all our past historic meteorological records should be scrapped due to their inaccuracy — far from it. I was suggesting that the instruments used to collect the data, still widely used worldwide, should be scrapped as soon as possible and replaced by a new network of modern and precise instruments, geared to climate study, rather than to synoptic meteorology, as the old instruments were.

The Hadley Centre and the Climatic Research Unit at the University of East Anglia have both done excellent work 'homogenising' the land-air and sea-surface temperatures collected over the past 150 years. They have put a lot of effort into this. These data are invaluable and they are all we have. So while we should be wary about their accuracy and have reservations about what they might indicate, we should most certainly not scrap them.

But even modern instruments can be inaccurate and badly operated. As the old instruments are replaced, care needs to be taken over what goes in their place, and who manages them, otherwise we will be no better off in the future than we are now.

Ian Strangeways, 20 February 2002

FORTHCOMING EVENTS

Meetings

Scottish Natural Heritage Conference
NATURE AND PEOPLE:
Conservation and Management in the Mountains of Northern Europe
6–9 November 2002
Pitlochry, Scotland

This international conference in Pitlochry is being organised by Scottish Natural Heritage and the Centre for Mountain Studies, Perth College / UHI Millennium Institute, as a contribution to the International Year of Mountains 2002. Its objective is to link science and policy developments in the mountains of Northern Europe, and to highlight management needs in terms of stimulating and sharing 'good' practice. The target audience includes researchers, government advisers and agencies, non-governmental organisations, the tourism industry and other land users in the mountains. The conference seeks to make connections between these groups in order to share ideas and information and inform policy/ research agendas.

For further details contact Mrs Helen G. Forster, Nature and People Conference Secretariat, Scottish Natural Heritage, 2 Anderson Place, Edinburgh EH6 5NP *(tel 0131 446 2420, fax 0131 446 2406, email helen.forster@snh.gov.uk).*

International Conference on the
HYDROLOGY OF THE MEDITERRANEAN AND SEMI-ARID REGIONS
Montpellier, France
7–10 April 2003

The conference will be based on oral presentations (followed by discussion) and poster presentations, revolving around several themes:

- Climatic variability and hydrological consequences,
- Extreme climatic and hydrological phenomena (floods and droughts),
- Erosion and sediment transport,
- Surface and groundwater resources,
- Consequences of human activity (pollution, change of vegetation, overexploitation),
- Integrated water resources management,
- Coastal areas (lagoons, saltwater intrusion).

The conference web site at *http://www.mpl.ird.fr/montpellier2003* has full details and a registration form, or you can contact the secretariat: Muriel Tapiau, Secrétariat de la Conférence Internationale MONTPELLIER 2003, Hydrologie des régions méditerranéennes et semi arides, Laboratoire HydroSciences Montpellier, UMR5569, Maison des Sciences de l'Eau, BP 5045, F 34032 Montpellier cedex 1 *(tel +33 4 67 14 90 20, fax +33 4 67 14 90 10, email montpellier2003@msem.univ montp2.fr).*

Institute of Water and Environment and Cranfield University Policy and Legislation Unit — One-day seminar
IMPLICATIONS, IMPLEMENTATION AND IMPACT OF THE EU WATER FRAMEWORK DIRECTIVE
Silsoe, Bedfordshire
18 June 2002

The seminar will provide an insight into how the Directive will affect those involved with the water environment. One of the key speakers, **Peter Chave**, has recently published a book on the subject, which will be provided free to all delegates.

For further information, see the website *http://www.silsoe.cranfield.ac.uk/iwe/wfd/seminar.htm* or contact **Dr Tim Hess**, Institute of Water and Environment, Cranfield University, Silsoe, Bedford, MK45 4DT *(tel 01525 863292, email t.hess@cranfield.ac.uk).*

Course

University of Birmingham
EU advanced study course
RIVER BASIN MODELLING FOR FLOOD RISK MITIGATION
7–18 October 2002

This will address the mitigation of river flood risks, which has an important influence on wealth creation and the quality of life in all Member States. The topic will be explored by considering the nature and flow of information needed to mitigate the risk of flooding at a river basin level.

Further information can be obtained at *http://www. bham.ac.uk/CivEng/RBM* or from Dr Asaad Y. Shamseldin, Dept of Civil Engineering, The University of Birmingham, Edgbaston, Birmingham B15 2TT, UK *(tel 0121 414 5055, fax 0121 414 3675, email a.shamseldin@bham.ac.uk).*

Diary

1st-5th July 2002
Fifth International Conference on Hydroinformatics
Venue: Cardiff School of Engineering, Cardiff University, Cardiff, Wales, UK
Contact: Cherrie Summers *(tel/fax 029 2087 4421, email SummersC@cardiff.ac.uk, web http://www.cf.ac.uk/engin/news/confs/hydro/index.html)*

8th–10th July 2002
3rd Inter-Celtic Colloquium
"Celtic water in a European framework: pointing the way to quality"
Venue: Nat. Univ. of Ireland, Galway
Contact: Conleth Cunnane *(tel 00 91 750425, fax 00 91 524913, email conleth.cunnane@nuigalway.ie)*

18th July 2002
BHS National meeting
"Networks and monitoring"
Venue: ICE, London
Time: 2.00 p.m.
Contact: Steve Parsons, Mott MacDonald Ltd, Demeter House, Station Road, Cambridge, CB1 2RS *(tel 01223 463926, email sbp@mm-camb. mottmac.com).*

2nd–6th September 2002
Conference on "Quantitative precipitation forecasting"
Venue: Reading University
Contact: Kevin Tilford, WS Atkins Ltd, Birchwood, Warrington WA3 7WA *(tel 01925 622051, fax 01925 622054, email ktilford@wsatkins.co.uk)*

8th–11th September 2002
BHS 8th National Symposium
"Water extremes & water stress: science, policy & practice" — including ***Postgraduate Symposium & AGM***
Venue: University of Birmingham
Contact: Sue Lane *(tel 0121 414 7455, fax 0121 414 5528, email lanes@is-fs10.bham.ac.uk)*

16th October 2002
BHS National meeting + Roy. Met. Soc.
"Meteorology and Hydrology — towards closer collaboration"
Venue: ICE, London Time: 2.00 p.m.
Contact: Murray Dale *(tel 01344 854896, fax 01344 854156, email murray.dale@meto.gov.uk)*

20th November 2002
BHS National Meeting
"Low flows" — *details to be confirmed*
Venue: ICE, London
Contact: Dr Tim Jolley *(tel 01355 574213, email tim.jolley@sepa.org.uk).*

Copy deadline for *Circulation* No. 74
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