Circulation

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The newsletter of the British Hydrological Society



BHS membership

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Cover photo: Low Moor gauging station, River Tees (Vicky Shackle)

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Membership enquiries: Moira Doherty, BHS Secretary, Institution of Civil Engineers, 1-7 Great George Street, London, SW1P 3AA.

Editor: Vicky Shackle: bhs-circulation@outlook.com

Web pages: http://www.hydrology.org.uk/

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Hello from your new editor—Vicky Shackle



Hi, I'm Vicky, the new editor of Circulation —and I must start by thanking Celia Kirby and John Griffin for 40 years of dedicated service in editing our magazine. Thankyou both—I have a lot to learn from you!

We missed Circulation in the summer while the editorship changed over, so I hope you enjoy Issue 158.

I'm really keen to receive contributions for our magazine from members who represent all sectors of BHS, especially early-career hydrologists. Also, I would love you to share any photographs related to hydrology, for inclusion in the magazine (otherwise most pictures will be of my favourite rivers!).

This year we celebrate BHS' 40th birthday—a lot has changed in the 20 years I've worked in hydrology, and even more in those 40 years. Happy 40th Birthday BHS, and here's to the next 40 years!

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Could you spare any time?

There are vacancies on several BHS sub-committees - if you could spare time to contribute, please contact Duncan at bhs-president@outlook.com, or see the contact details on page 7.

President's perspective — Duncan Faulkner

Thirty years ago, before email, a letter arrived welcoming me as a member of the British Hydrological Society. I was starting my journey of hydrological learning, led by Howard Wheater and others on the MSc course at Imperial College. It was a joy to see Howard again, online, for his fascinating talk at our AGM (see p12) - I was amazed to find that countries argue over water resources not only on large rivers like the Danube but on a stream so small that you can step over it. Howard's talk and the rest of the AGM, are on our YouTube channel (link on the BHS home page, hydrology.org.uk).

I continued to learn from many others—particularly inspirational were Duncan Reed and Lisa Stewart at the Institute of Hydrology (now UKCEH), John Mawdsley in my early years at JBA and Jeremy Benn for many years now. But we learn not only from our leaders but also from peers, junior colleagues, those whose work we read or listen to, those who review and challenge our work or those we encounter at events. In recent years I have learnt and gained inspiration from younger colleagues about equality, diversity and inclusion, reproducible workflows, R coding, BIM and Jupyter workbooks. This theme of learning between (and within) generations is at the centre of BHS's 40th anniversary celebration meeting on 6 November. We'll include some accounts of the event in the next issue of Circulation.

We also have much to learn from other disciplines, whether about new measurement techniques, statistical methods, applications of AI or models that span from hydrology

into economics, ecology, meteorology or geomorphology. Transdisciplinary working in a rapidly changing world is a theme Hayley Fowler has stressed during her time as President. I am very grateful to Hayley for her wise leadership of BHS over the past two years and aware that her presidency is a hard act to follow. One of Hayley's achievements on behalf of BHS is her successful application for a Royal Society Science Plus meeting on Hydrology in the 21st Century: Challenges in Science, to Policy and Practice. This landmark meeting, featuring speakers from around the world, will be funded entirely by the Royal Society and held in London on 10-11 June 2024. Look out for more information next year.

An important international link for BHS is with the International Association of Hydrological Sciences (IAHS). It has just launched a new scientific decade, dedicated to local solutions within the global water crisis, named HELPING (Hydrology Engaging Local People IN one Global world. A recent note from IAHS explains the background:

"The Earth is facing severe problems due to climate change, globalisation, and population growth. The Anthropocene has put the planet into an emergency state, where impacts on the water cycle are accelerating the crisis; freshwater supply often varies between being too much, too little or too dirty for sustainable development. Hydrological knowledge is needed more than ever to address these problems. However, the impact and management of water issues are spread over many actors and organisations.



There is a substantial lack of synthesis and easily digestible scientific messages among hydrologists, across disciplines and from scientists to practitioners, decision-makers and the general public. Hence, there is a need for concerted actions from the hydrological research community to link local hydrological research with global patterns of the water cycle, and further, to provide science-based water-centric decision support." Likewise, scientific knowledge on resilience and water security is fragmented.

We are modernising BHS's governance, and now have four sub-committees to manage activities; if you are interested in getting involved please contact their respective chairs:

Events and members: Victoria Coates (Gemma Coxon from January), bhshonsec@gmail.com.

Communications and publications: Chris Skinner, BHSCommsCtte@gmail.com.

Education and careers: Katy Peat, Katy.Peat@defra.gov.uk.

Early career members: Guiseppe Degan Di Dieco, giuseppe.degandidieco@bristol.ac.uk.

We are keen to encourage active regional groups to continue thriving (the Scottish Hydrological Group and BHS Pennines and Southeast regions) and to help re-invigorate some that have been inactive recently, such as the Southwest and Midlands regions. These groups offer opportunities for local meetings, social events or field visits, and open up valuable opportunities for more widespread and diverse participation in BHS activities.

Finally, thank you to **Emily Fowler** for her service to the main committee and to **Scott McGrane** who has agreed to be co-opted to continue in his role as our highly efficient Honorary Treasurer beyond the end of his elected term while we find a replacement. And a warm welcome to our two new committee members, **Chris White** of the University of Strathclyde and **Liv Burns** of Jacobs.

Forthcoming events which may be of interest:

BHS Symposium in 2024—date to be confirmed, Oxford

5th IAHS-ICWQ Workshop—1-3 December 2023, Zhuhai City, China (Flood-Drought Disaster Chain)

AGU2023— 11-15 December 2023, San Francisco, California

4th International Conference on Snow Hydrology —30 Jan-2 February 2024, Grenoble, France

25th River Restoration Conference—24-25 April 2024, Llandudno, North Wales

HEPEX Conference "Forecasting across spatial scales and time horizons"

Dr Linda Speight, University of Oxford

HEPEX is a friendly network of academics and practitioners interested in Hydrological Ensemble Prediction. Back in 2020 BHS kindly awarded me a travel grant, and I was able to use this to attend three days of great science at the HEPEX conference in Norrkoping, Sweden. When I was first involved in HEPEX 10 years ago, probabilistic forecasting methods were novel and under-utilised. Now as the science and operationalisation has matured, discussion is around what's needed to turn an ensemble forecast into effective action.

Florian Pappenberger (ECMWF) delved into how machine learning (ML) is outperforming physically based weather models—improvements that would otherwise have taken decades.



Urban-water landscape in Norrkoping (L.Speight)

How should we design infrastructure for operational models, ensure credibility and trust in our forecasting system, and teach hydrometeorologists essential skills in a rapidly changing field? There were ML application examples from pluvial forecasts (**Julian Hofmann**, Aachen University), inundation modelling (**Niels Fraehr**, University of Melbourne), droughts (**Annie Y.-Y. Chang**, WSL/ETH), humanitarian decision making (**Andrea Ficchi**, Politecnico di Milano) and a multitude of seasonal, and sub-seasonal forecasting applications.

On benchmarking, verification and evaluation, **Andy Wood** (NCAR) called for a testbed to compare different forecasting approaches - but there are challenges around the need to evaluate systems from a user perspective (**Thomas Pagano**, BOM) and move away from cost-benefit analysis to more relevant measures of value (**Louise Crochemore**, Université Grenoble Alpes).

HEPEXers' experience of co-design showed hat users want from a forecasting system may not be what scientists expect. **Micha Werner** (IHE-Delft) spoke about decision making as a process not a product, making it hard to neatly package up locals' and experts' knowledge, a theme echoed in several other presentations.

Giuliano Di Baldassarre (Uppsala University) spoke of the risk that if we get impact models wrong, they could have disastrous consequences, and called for greater effort to include social science and hidden voices, particularly when developing impact-based forecasts.

Many thanks to **Ilias Pechlivanidis** (SMHI) and the HEPEX team for organizing an excellent event. All of the abstracts, presentations and notes from the discussion sessions are available at www.hepex.org. I would encourage you to look as there are many links with the UK Flood Hydrology Roadmap and what hydrology, and hydrological skills, will look like in the future.

Conference participants outside SMHI, Sweden (L.Speight)



BHS 41st Annual General Meeting—held online on Tuesday 13th September, 2022—Gemma Coxon

Professor Howard Wheater opened the session with a thought-provoking talk on 'The role of science in inter-state water disputes: recent experience from the International Court of Justice (ICJ)'. Howard discussed the importance of trans-boundary water management, and resolving water disputes through the ICJ, with case studies from the River Danube (Hungary-Slovakia), River Uruguay (Uruguay-Argentina) and small groundwater streams (Chile-Bolivia). National and international treaties are key, but often outdated with respect to water quality, ecosystems and climate change.

Hayley Fowler opened the AGM, thanking all BHS members for contributing to our vibrant society, maintaining our water supply, sewerage and hydrometric systems, delivering flood forecasts and flood schemes, persevering with your learning, adapting your teaching, and sustaining world leading research.

During 2022, **Chris Skinner** undertook a governance review of BHS, following the Charity Commission guidelines. BHS members have voted 61:1 for the first recommendation from this review, of changing our charitable status to a Charitable Incorporated Organisation: therefore we will start to implement this change at the next committee meeting. The committee will also be restructured, to create greater separation between governance and management.

Over the next year there are exciting events including a 40th birthday celebration meeting on the 6th of November 2023, and a Royal Society Meeting on 'Hydrology in the 21st Century: Challenges in Science, to Policy and Practice' on the 10th and 11th June 2024. It would be great to see lots of hydrologists at both these events so please do register to attend.

Circulation continues to be an integral form of communication with members. A massive thank you to **Celia Kirby** for her dedication in delivering Circulation to the membership every three months for the last 40 years. Celia has now retired and we welcome a new editor, **Vicky Shackle**. Vicky is a hydrologist and project manager at JBA, specialising in flood warning.

Our relationship with Hydrology Research is ending; Hydrology Research is a small journal, accessible online, and most UK Universities have signed up to the publishing fee waiver agreement.

BHS awards: supported by the Environment Agency and the JBA Trust, BHS awarded eight MSc Studentships of £2,500 each for the 2023 academic year. We have increased the studentship value significantly this year, given the rising costs of living.

Hayley closed her presentation by welcoming our new president, **Duncan Faulkner,** Chief Hydrologist at JBA Consulting, specialising in flood hydrology. He thanked Hayley for all her efforts as president and re-emphasised his commitment to maintaining the very successful running of BHS.

Dr Gareth Old gave an update on the Flood and Drought Research Infrastructure (FDRI) project, a large capital infrastructure investment for hydrology, to facilitate new science to enhance the UK's resilience to floods and droughts. It will include a network of instrumented catchments (River Thames, River Severn, River Tweed), mobile infrastructure, innovation, capacity building and digital infrastructure. Confirmation of funding is expected in December 2023 with the implementation phase expected to begin in April 2024.

Many congratulations to **Asid Ur Rehman** and **Ruth Dunn**, prize winners at the BHS Peter Wolf Symposium with talks on 'Optimising Flood Risk Management Interventions in Catchments and Cities' and 'The Relationship Between Weather Morphology and Rainfall Physicality'.

Congratulations also to poster winners **Anthony Jones, Irina Rohrmueller** and **Eleanor Starkey**. Five excellent entries were submitted for the BHS Undergraduate Dissertation Prize and winners will be announced at the 40th Anniversary Meeting.

Changes of BHS Committee membership: we are delighted to welcome **Liv Burns** and **Chris White**. Liv is a flood hydrologist at Jacobs with over 20 years experience, and Chris heads the Centre for Water, Environment, Sustainability and Public Health at the University of Strathclyde - we look forward to you joining the first committee meeting. We will miss **Emily Fowler** who s leaving the committee having completed her term of office and made invaluable contributions to the BHS EDI sub-committee.

BHS income is healthy, with increased revenue from national meetings, website advertising and job adverts. As a result, we can offer more support for travel grants and MSc studentships. We encourage all members to continue submitting applications for attendance at conferences, relevant workshops, or training events.

Emily Fowler updated on equality, diversity and inclusion (EDI) activities and strategy, their importance for BHS, improved data collection, guidance for national meetings and Circulation articles. Looking ahead, we will be implementing and reviewing our EDI strategy, providing annual reporting in Circulation and supporting EDI events and schemes.

BHS Peter Wolf Early Career Hydrologists Symposium 2023

Amy Green and Felipe Fileni



Attendees at the 2023 BHS Peter Wolf Symposium

This year's Peter Wolf Early Career Hydrologists Symposium was hosted by Newcastle University (26th-27th June) with 47 attendees and 10 invited speakers from both academia and industry. Presentation topics ranged from hydrological modeling to climate impacts and novel uses of data for hydrology and resilience. The format this year included additional activities to break up the talks, as well as short talks in a more informal setting which provided early career researchers with a stepping stone between a poster presentation and longer seminar style talk.

Feedback on the flexible format and sessions styles was very positive—it kept people focused and gave the conference a lot of energy. Networking, and opportunities to meet new people from academia and industry were appreciated, as were the doughnuts.

Hayley Fowler and president elect **Duncan Faulkner** opened the conference with keynote talks. Additional keynotes from industry and academia provoked interesting discussions, including **Shannon Leakey** (Jacobs, *Moving from PhD to Industry)* and **Chris Skinner** (FloodSkinner, *Hydrology. SciComm. Games)*. Other invited speakers included **Gemma Coxon** (University of Bristol) and **Fiona McLay** (Senior Specialist Scientist at SEPA).

An interactive session on Open Data and Open Methods hosted by **Annie Ockleford** (Environment Agency) generated some thought provoking discussions, as did a panel discussion focusing on issues relating to equality, diversity and inclusion in hydrology and the wider engineering sector. The conference celebrated wonderful diversity – 49% of participants were women and 53% were of Black, Indian, Pakistani, Chinese or other non-white British/Irish backgrounds. It was great to host a conference during pride month, with 6% of participants identifying as LGBT+.

A fun hydrology-based treasure hunt around Newcastle wrapped up the conference. The aim was to collect as many pictures as possible at hydrological locations throughout the city, featuring a copy of *Circulation*. It was a very wet treasure hunt, so a big well done to everyone that participated as it wasn't for the faint-hearted!

Presentations this year were of a very high standard, so congratulations to this year's prize winners, and many thanks to all of the Organising Committee: **Alex Seawell, Amy Green, Asid Ur Rehman, Ben Smith, Ellie McGrady, Felipe Fileni, Keith Shotton,** and **Xiaobin Qiu**. Thanks also to the session chairs, **Andrew Tabas, Haider Ali** and **Luis Patiño Velasquez.** The next Peter Wolf Early Career Hydrologists Symposium will be held at the University of Bristol, so hopefully see you all there!

Prize winners voted (for by all attendees) -

Best poster joint winners:

Anthony Jones *Is the whole greater than the sum of its parts? Assessing the combined effect of multiple natural flood management features on downstream flooding*

Irina Rohrmueller *Next generation of global hydrological modelling - A physically based system for hydrological forecasting*

Eleanor Starkey *SuDS+: establishing a new vision for sustainable drainage in delivering sustainable and resilient urban communities*

Best quickfire oral presentation:

Ruth Dunn *The relationship between weather morphology and rainfall physicality*

Best full length oral presentation:

Asid Ur Rehman *Optimising Flood Risk Management Interventions in Catchments and Cities*

A first presentation at the Early Career Hydrologists meeting

Clare Burnell

I took the opportunity of presenting at the first BHS Early Careers talk in January - as someone who is not keen on public speaking, I thought it would be a good opportunity, and I was right.

The presentation was good practice for client meetings, to gain confidence in speaking in front of an audience and to consider how to communicate information in a clear and easy to understand way. I spoke about a few of the interesting hydrology projects I've worked on and the skills I picked up, which I thought others would find useful.

I encourage any early career hydrologists to take part by presenting or listening in. Your talk doesn't have to be too technical, just hydrology related. The setting is informal and a chance to practice your presentation skills in a friendly environment. It's also an opportunity to network with other early career hydrologists, share ideas and broaden your knowledge of different career paths in hydrology.

We aim to meet once a month and so far have had some fantastic speakers from industry and academia. If you are interested in joining please register using the form at https://forms.office.com/e/vkjCqhHHgM or keep a look out for meeting links on the BHS twitter page @britishhydrosoc.

UK Flood Hydrology Roadmap overview

The Flood Hydrology Roadmap was published by the Environment Agency in 2022, together with an action plan to achieve it. The roadmap sets out a 25-year vision for flood hydrology in the UK:

"Society has improved hydrological information and understanding to manage flood hazard in a changing world"

England, Wales, Scotland and Northern Ireland are all included in the roadmap, which lasts until 2046. All sources of inland flooding are covered (fluvial, surface water, groundwater and reservoirs), and inland flood hydrology activities from scientific research to operational practice. There are four themes to the Roadmap: ways of working, data, methods, and scientific understanding.

In England, the Environment Agency are delivering projects which will contribute to the Roadmap through their Flood Hydrology Improvements Programme.

More information can be found at:

https://www.hydrology.org.uk/Flood_Hydrology_Roadmap.php

https://engageenvironmentagency.uk.engagementhq.com/flood-hydrology-improvements-programme

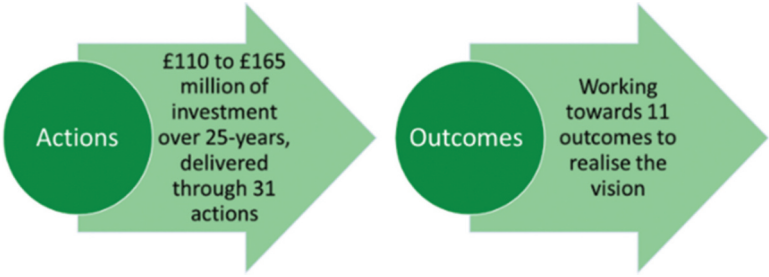


UK Flood Hydrology Roadmap progress update

Carl Townley, Roadmap Secretariat

With momentum building over a busy few months, the Roadmap partners would like to update the community on successes, challenges, and opportunities for involvement:

- The Governance Board and Scientific Technical Advisory Group [STAG) are fully operational and now focused on delivering the roadmap.
- The Board and STAG have developed a Roadmap Communications and Engagement Plan, with a consultant. Representatives collaborated to define objectives, map stakeholders, outline core messaging, and plan activity across the next five years. The Plan is key to ensuring we reach all hydrology users and realise the Roadmap vision.
- The Governance Board and STAG met in person at the initial workshop—a significant day, demonstrating how far the Roadmap had come, and outlining the role of the Roadmap team and wider community going forward.
- The STAG has progressed Roadmap action W3: co-ordination of related hydrological programmes and initiatives. A flood hydrology research and innovation catalogue will launch at the BHS 40th Anniversary event.



- The Board, supported by the STAG, is now scoping action W6: assess quality standards in applied flood hydrology.
- A challenge and priority for the Board is securing resources over the lifetime of the Roadmap. We are pleased that Natural Resources Wales now have a dedicated post to deliver their contribution —congratulations to Owain Sheppard, who has been recruited as Senior Specialist Advisor Flood Hydrology (UK FHR).
- The STAG has been reflecting on their first year, and have agreed to recruit annually, with the next phase to be advertised in the coming months.

For more information and opportunities to get involved please see the Flood Hydrology Roadmap page on the BHS website. There is a jointly hosted webinar update by Rob Lamb on the BHS and CIWEM YouTube channels.

Thank you to everyone for your interest and contributions so far.

Attendees of the communications and engagement workshop in London



Welcome to the BHS committee

The BHS committee is very pleased to welcome two new (ordinary) members—Liv Burns and Chris White. Below, they introduce themselves.

Liv Burns is an active hydrologist with 20+ years experience in flood hydrology at Jacobs, working on water resources, hydraulic modelling, low flow, water quality, spatial data assessments, and river morphological and peat depth surveys.



Having worked on a wide variety of projects, Liv understands the key role hydrology plays in many aspects of the water environment and beyond. Liv is keen to promote hydrology within the UK and will bring her perspective and enthusiasm to the committee, with a particular focus on emerging technology, community engagement and encouraging more people to study and take up hydrology related careers.

New members of the British Hydrological Society

Since the last issue of Circulation quite a few new members have joined BHS. A list will be published in the next issue.

Dr Chris White heads the Centre for Water, Environment, Sustainability and Public Health at the University of Strathclyde, leading the 'Engineering for Extremes' research group. He recently led two pilot Scottish Government-funded projects focused on improving resilience to extreme weather-driven hazards, and understanding the future risks to water resources. You may recognize him if you attended the Peter Wolf symposium last year, which he chaired.



Chris is President-Elect of the Commission on Coupled Land-Atmosphere Systems (ICCLAS) within IAHS. He is keen to support the activities of BHS by helping to connect the BHS community with the meteorological and climatological communities, and by linking drought and floods with other hazards.

Chris would also like to improve access to postgraduate studies and early career opportunities in hydrology, including increasing diversity and experiences.

UK Hydrological Bulletin, May-July period 2023

Terry Marsh, UKCEH Fellow

Total UK rainfall for the three months under review was very close to the long-term average but individual monthly totals departed markedly from the normal range; spatial variability was also very notable. Despite a relatively cool July, May-July was provisionally the third warmest in the UKMO series which begins in 1884. Correspondingly, evaporative demands were high – impacting on runoff patterns and agriculture, in particular. Most regions of the country experienced a substantially exaggerated range of river flows. The heat, together with depressed late spring/ early summer river flows and consequent limited effluent dilution, served to emphasise the threat global warming poses to aquatic environments. An extremely wet July triggered a series of exceptional summer spates with extensive and disruptive surface flooding. Usefully however reservoir stocks recovered appreciably and, with a few exceptions (mostly in south-west England), month-end stocks were within the normal late-summer range.



Meeting of the Waters, River Greta (V. Shackle)

Nationally, May was the 3rd driest since 1992 with parts of Wales, Scotland and northern England – including important reservoir gathering grounds – recording less than a quarter of the monthly average rainfall. It was also notably warm, ranking =6th in the UK Met Office temperature series. Whilst thunderstorms and associated flash flooding were a problem early in the month – on the 9th, 18 homes were evacuated at North Cadbury (Somerset) – soil moisture deficits generally increased rapidly and very steep river flow recessions became established.

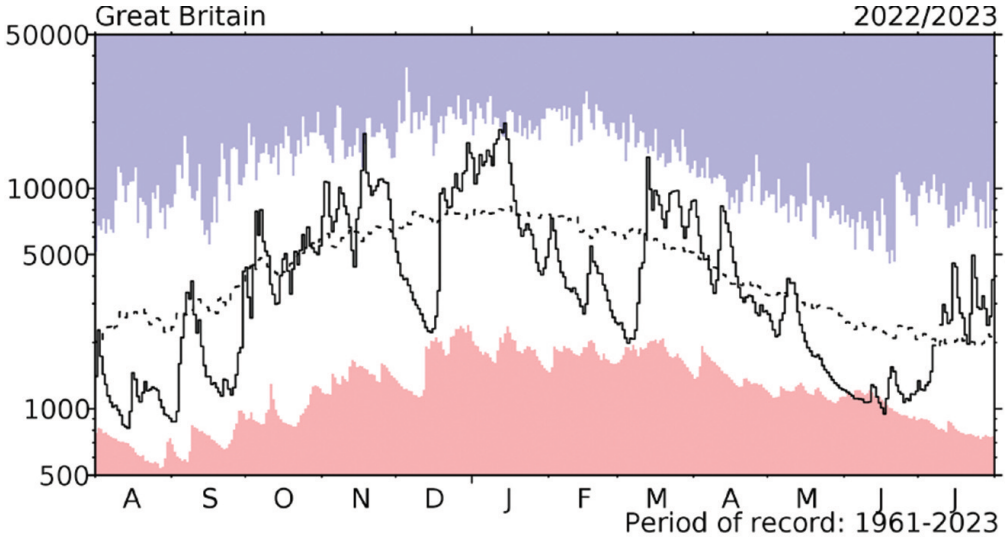


Figure 1: Daily outflows (m^3/s) from Great Britain (solid line). Blue and pink envelopes show daily extremes and dotted line shows long-term daily average

By mid-month flows in many western rivers including the Ewe (north-west Scotland), Clyde, Derwent (Cumberland) and the Welsh Wye were close to, or below, the lowest on record for the time of year. For Scotland as a whole, the combined May/June runoff was the lowest in a series since 1961; runoff was also very depressed across Wales and the Lake District. A contributory factor was the exceptionally high soil moisture deficits which extended across much of the country. In East Anglia particularly, the impact on agriculture – crop yields especially - was an increasing concern.

Declining reservoir stocks in Kent and Sussex triggered hosepipe and sprinkler bans late in June. In contrast, locally torrential downpours during the third week caused significant urban flooding and traffic disruption. Of wider concern was the impact of meagre flows, high water temperatures, low oxygen concentrations and, in some areas, sewage contamination, on aquatic wildlife in lakes, canals and rivers.

With the Jet Stream dominating weather patterns, July witnessed a dramatic synoptic change – whilst most of southern Europe was outstandingly hot and dry a succession of Atlantic frontal systems brought much cooler and exceptionally wet weather across the UK.

By month-end, outflows from Great Britain as a whole were very close to lowest on record for the time of year (Fig. 1) but regional contrasts in runoff patterns were also notable. In northern Scotland, the Luss Water and Nevis were among rivers recording their lowest end of May flows on record and levels in Loch Ness dropped to their lowest in at least 32 years.

Atypically, in Dorset the river Stour registered its highest May runoff in since 1973. A major contributory factor was an exceptionally high groundwater contribution – levels in the Chalk borehole at Woodyates being close to the highest for the time of year since 1942. More significantly in a water resources context, reservoir stocks remained appreciably below the seasonal average in Colliford and Roadford reservoirs – the largest in south-west England.

June was exceptionally hot - the warmest on record for the UK. It was appreciably warmer than 1976 and, for England, around three degrees higher than was typical of the late nineteenth century. With high pressure dominant, rainfall was well below average in all regions – most notably in Wales, the South-West and East Anglia where some areas recorded less than 30% of average. Some groundwater-fed rivers aside, river flow recessions were steep and sustained.

Much of the country recorded more than twice the average monthly rainfall; Northern Ireland provisionally registered its second wettest July since 1862. During the fourth week, river flows increased dramatically in most of northern and western UK.

On the 22/23rd, Castlederg in Northern Ireland recorded a 24-hr rainfall total of 72.6 mm, triggering both fluvial and disruptive urban flooding. For the river Mourne, the July runoff was the highest on record by a considerable margin (Fig. 2) and steep increases in river flows characterised much of northern and western Britain.

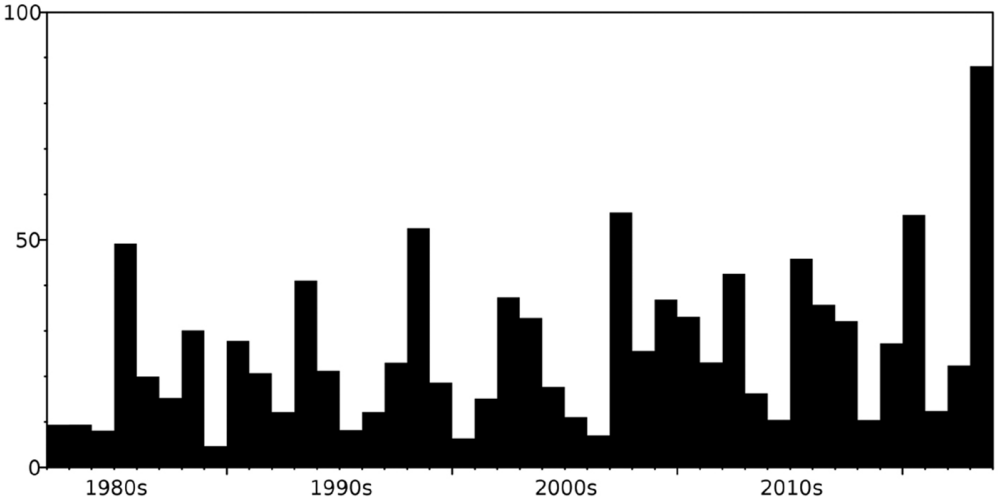


Figure 2: July mean river flows (m^3/s) for River Mourne

The contrast with June runoff patterns was extreme. In northern Scotland flows in the river Ewe, which had closely approached its full-record minimum in mid-June, approached its maximum for mid-July. Less dramatic but notable flow recoveries were registered in many index rivers.

Unusually, over the month, stocks increased in most index reservoirs – though remaining appreciably below the seasonal average in some major southern impoundments – and overall end-of-month stocks for England & Wales were modestly above average at the national scale (Fig. 3).

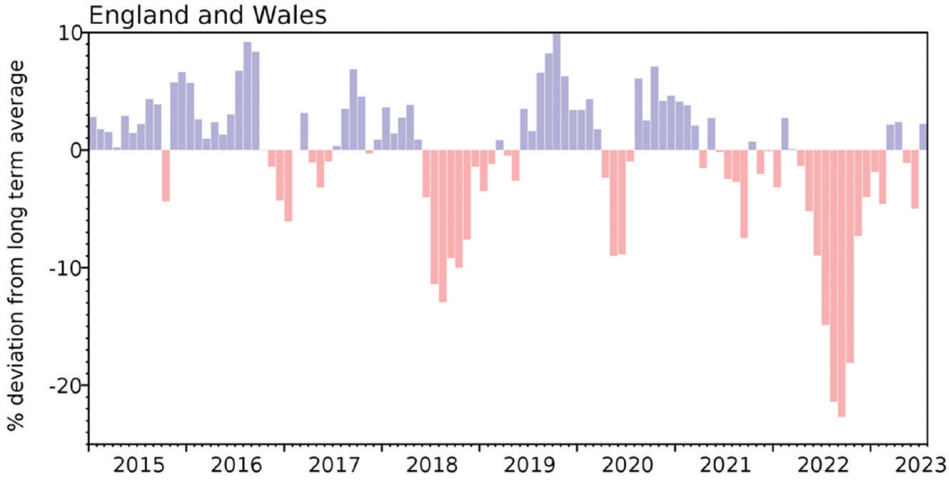


Figure 3: A guide to the variation in overall reservoir stocks for England & Wales

Differing aquifer characteristics made for very substantial differences in groundwater status but levels in most index wells and boreholes remained within the normal summer range, albeit relatively depressed in eastern Scotland and exceptionally high in the Chalk of Northern Ireland.

This report draws primarily on data and information from the UK Met Office and the CEH/BGS National Hydrological Monitoring Programme—the latter comprising data supplied by the Environment Agency, SEPA, NRW and Northern Ireland Environment Agency, as well as the UK water companies.

Low flow in the River Wear, Frosterley (T. Boase)



British Hydrological Society

1983-2023