

President's Perspective

Concerns over river water quality

On 16 September, the Environment Agency published the latest data on the chemical and ecological status of rivers in England (Environment Agency, 2020). With only 14% of English rivers achieving 'Good' status for chemical or ecological quality, several NGOs raised major concerns (Wildlife and Countryside Link, 2020). Last year's publication of the 'State of Nature 2019' report (National Biodiversity Network 2019) demonstrated the continued decline in our terrestrial and aquatic ecology since the reference date of 1970. The release of the Living Planet Report 2020 on 9 September (World Wide Fund for Nature, 2020) showed that this 'ecological crisis' is global.

The headline figure of 14% does however mask decades of progress in removing many point sources of pollution to our rivers, the generally higher water quality in headwaters, and the toughening of standards following the work of UKTAG (Water Briefing, 2020a). Huge investment has already been made by water companies in reducing storm-water overflows and phosphorus discharges from sewage treatment works (STWs) with a further £5 billion of investment in water quality planned for the next few years (Water UK, 2019). Further in 2019, in an attempt to reduce agricultural impacts, Government did implement more stringent controls on the more polluting aspects of farming under the 'Farming Rules for Water' (UK Parliament, 2019).

The Government has committed to ensure that 75 % of rivers in England attain good chemical and ecological status by 2027 (The Guardian, 17 Sept 2020). Unprecedented levels

of targeted interventions in the water industry, farming sector and elsewhere are going to be needed to transform 14% to 75% in the next 7 years. A 'green revolution' of investment in technological and nature-based solutions is needed to dramatically reduce the amounts of livestock waste, agrochemicals, sewer overflows and urban pollutants from entering the natural environment - if we are to 'bend the curve' of ecological decline (Tricker et al. 2020). There is a key role for the hydrological community in achieving this: first by researching and then informing society of those measures of water quality mitigation proven to be effective at the large-scale, and then by helping to implement schemes across the most intensively managed and populated parts of the country, where the problems are most acute. This will be ever more challenging as we strive to produce more of our food locally and see our population grow, alongside a water industry that is necessarily capital intensive and a farming sector already coping with large uncertainties. Effective technologies continue to be installed at STWs by hydrologists and other practitioners for removing phosphorus (BluewaterBio, 19 Jun 2020), transforming waste to useful biogas (Energy Live News, 14 Aug 2020) and preventing sewer overflows (New Civil Engineer, 18 Aug 2020). However it is considerably more difficult to demonstrate the effectiveness of measures

to reduce diffuse pollution sources at the landscape-scale (Holden et al., 2017) before they are actually deployed at a wide-scale.

The scale of the problem demands a much greater focus by research hydrologists and allied scientists on the science of pollutant transport. Increasingly UK hydrologists are aware that storm periods dominate the migration of chemical, physical and biological pollutants to our rivers: continuous, high frequency monitoring through such events is therefore, needed to quantify what is happening (Rode et al., 2016; Chappell et al., 2017). As a direct corollary, quantifying which local interventions are effective in storm periods also demands high frequency monitoring (Cooper et al., 2020).



Turbid River Kent in Storm Ciara (9 Feb 2020)
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Interventions will need to be intensively applied in particular localities and extensive across the wider landscape to have any discernible effect on the quality of our rivers. This will be costly - so the emerging science must be robust and clear to support the required public expenditure. The Environment Agency are doing their part by publishing their

water quality data for all 12,000 monitoring sites, together with planned mitigation measures (see: Environment Agency, 2020). They have also just announced the contractor to deliver £4.5m of high frequency water quality monitoring across the country - well done to Xylem Analytics UK Ltd for winning the tender (Water Briefing, 2020b). In conclusion, restoration of our aquatic ecology needs the expertise of the British hydrological community to identify the most effective ways to mitigate water pollution and then to implement schemes within the built- and natural-environment nationally. A year of great achievements by the UK hydrological community The BHS Annual General Meeting on 30 September coincided with the end of the UK Water

Year 2019-20. I wish to thank all BHS members for their work contributing to the UK economy, maintaining our water supply, sewerage and flood mitigation infrastructure, enhancing water policies and practice, conducting valuable research, and training the next generation of water scientists and engineers - all at a time of great personal and national challenges.

So many of our community deserve acknowledgement of their achievements. At the AGM we able to acknowledge just a few of you. We awarded John Curtin (Executive Director of Flood & Coastal Risk Management, Environment Agency) the BHS President's Prize 2020 for his visionary and inspirational contribution to the ground breaking 'National Flood & Coastal Erosion Risk Management Strategy for England' (published 14 July 2020). We also recognised early career

hydrologists. We judged that the most outstanding undergraduate dissertation submitted to our annual competition was 'Assessing the transfer of heavy metal contaminants from Yewthwaite lead mine into the Newlands catchment area' by James Lockwood while he studied at Durham University. We had received 15 strong projects for the competition, and felt that the project of Ryan Pigott also showed some outstanding elements. We awarded Ryan the Runner-up prize for his study on 'The effect of broad-crested weir geometry on downstream channel hydraulics: a coupled physical-mathematical modelling approach' while at Leeds University.

Twenty-nine individuals submitted academic cases for financial support for hydrology masters' study at a UK university. The sub-committee, comprising of BHS, Environment Agency and JBA Trust representatives, made awards to 12 individuals: Caitlin Asquith (University of Chester); Amber Bentley (Newcastle University); Ewan Cronin (Lancaster University); Samuel Dickens (University of Birmingham); Adam Hartley (University of Leeds); Lauren Hunt (University of Birmingham); Rachael Hurst (Lancaster University); Eleisha Lord (Newcastle University); Emily Seabrook (Imperial College London); Joshua Thompson (Loughborough University); Megan Trussler (Loughborough University); and Phillip Wadley (Lancaster University). We wish them success in their studies.

Over the last year, officers and representatives of the Society delivered many new initiatives and hard work for our membership - I am indebted to all for their support. In particular, I would like to pay tribute to those completing their

term of office for the Society. Thank you to elected committee member Matt James (Stantec UK Ltd) for his valuable contributions including leadership with the undergraduate dissertation competition, and Nick Kettridge (University of Birmingham) for ably representing the Midlands section. Particular appreciation goes to Mike Cranston (Scottish Environment Protection Agency, and formerly RAB Consultants) for working tirelessly as BHS Honorary Secretary, delivering a programme of very rewarding meetings - latterly as the BHS Webinar Series where attendance has exceeded 200. Peter Ede (Mott MacDonald Group) completes 10 years of leadership within the Society as he finished his term as BHS Past President. I am personally very grateful to Peter for his considerable insight and support during my time on committee. In recognition of Peter's profound contributions to the Society and our Membership, the BHS Main Committee agreed unanimously to award him BHS Honorary Membership at its meeting on 7 October 2020. Thank you Peter!



We were able to announce at the AGM three new elected members to the BHS Main Committee. We warmly welcome Emily Fowler, a senior flood risk specialist working for Mott MacDonald Group. The Midlands section is again well represented by Emma Neachell of the Environment Agency – welcome Emma. Lucy Barker, a hydrological analyst at the UK Centre for Ecology and Hydrology (UKCEH), was elected as BHS Honorary Secretary building on her already substantial contributions as an elected ordinary member of committee. I am similarly delighted that Hayley Fowler, Professor of climate change impacts at Newcastle University, has been elected to the post of BHS President Elect. Hayley is no stranger to the committee, serving as Hon Secretary from 2006 to 2008.

Lastly, I would like to thank you for your engagement with our BHS Webinar Series, your contributions to BHS Circulation, our mailing list and social media, and of course for your promotion of hydrology and hydrologists nationally and internationally.

Nick Chappell
President
October 2020

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