

Welcome to the winter issue of the FWR Newsletter



In September 2014 a Nationally Significant Infrastructure Project (NSIP) was granted a Development Consent Order – the Thames Tideway Tunnel is the largest ever NSIP in the UK. This ‘super sewer’ will be 25km long, running from Acton in the west to Abbey Mills in the east. In our lead article, Andy Mitchell, CEO of the Tideway Tunnel, presents the story so far.

The Environment Agency is consulting on both its draft River Basin Management Plans (RBMPs) and Flood Risk Management Plans. The RBMPs set out measures to improve water in rivers, lakes, estuaries, coasts and in groundwater. The draft plans relate to the second cycle of the Water Framework Directive. See page 5 for details.

In ‘Wastewater Matters’ Tim Evans considers the issue of endocrine active substances and whether or not they constitute a serious pollutant threat.

For information on events and news highlights please go to our website www.fwr.org. You can also contact us via email (office@fwr.org.uk) or telephone (01628 891589).

Maxine Forshaw - Editor

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THAMES TIDEWAY TUNNEL

Building for a 22nd century London



The Lee Tunnel, which will eventually connect to the Thames Tideway Tunnel



Andy Mitchell
CEO of Thames Tideway Tunnel

As we welcomed in the New Year, the Thames Tideway Tunnel team

was reflecting on – and recovering from – what was probably the most significant 12 months on the project so far, and the culmination of years of work.

In September 2014, we received the momentous news that the government had granted a Development Consent Order (DCO) giving the green light for construction of our 25km long ‘super sewer’, which aims to tackle sewage pollution in the River Thames. The tunnel, from west to east London, will be one of the biggest infrastructure projects in Europe – but it is one needed to address a serious problem facing the capital’s river.

WHY IS THE THAMES TIDEWAY TUNNEL NEEDED?

London’s sewerage system was designed by Sir Joseph Bazalgette in the 1860s, for a population of four million people. While the Victorian sewers are still in excellent working condition, they are struggling to cope with the demands of London’s

growing population. Now, even just a small amount of rain can cause them to overflow, pouring sewage into the tidal River Thames from Combined Sewage Overflow (CSO) discharge points along the river.

Currently this is happening on a weekly basis, amounting to around 39 million tonnes of raw sewage discharging into London's river in a typical year – enough to fill the Royal Albert Hall 450 times over. In 2013, due to the particularly wet weather, the figure was 55 million tonnes, which is the equivalent volume to eight billion toilets flushing straight into the river. Sadly, sewage discharge is the last major source of pollution in the capital's river. This is a problem that needs to be tackled urgently.

It is easy to forget that this waterway through the heart of such a bustling city is actually a vital habitat and migration route for a huge number of aquatic animals, and a valuable nursery for many commercially fished species in the North Sea. As many as 125 different species of fish have been found in the River Thames, including sea bass, eels and salmon, which we put at risk by allowing this pollution to continue.

Along with its ecology, we also have a duty to protect the river's recreational value. Every day we see it being used for a range of activities – rowing, sailing, paddleboarding and fishing to name just a few. Our, and future generations should be able to enjoy the river safe in the knowledge that its water is not dangerously polluted. Thousands of people go on boat cruises along the Thames to take in some of London's most popular landmarks, but we need to remember that the river itself is one of our city's most famous and beloved features. This magnificent asset deserves to be kept clean.



Andy Mitchell, CEO, in the Fleet Sewer.

THE PROPOSED SOLUTION

It has been more than ten years since discussions started about how best to tackle the issue of sewage pollution in the Thames. Since then, years of study have concluded that the most effective way to help prevent this pollution would be to build a 25km interception, storage and transfer tunnel running up to 65 metres below the river – the Thames Tideway Tunnel. The tunnel would need to be 7.2 metres in diameter and have a capacity of 1.5 million cubic metres, indicating somewhat the scale of the problem facing the river.

Starting in west London, the proposed route for the main tunnel generally follows the River Thames to Limehouse, where it then continues north-east to Abbey Mills Pumping Station near Stratford. There it will be connected to Thames Water's Lee Tunnel, due for completion next year, which

will transfer the sewage to Beckton Sewage Treatment Works. Main work is due to start on the Thames Tideway Tunnel in 2016, with the aim of completion by 2023.

While this project is absolutely central to preventing sewage pollution on such a big scale, continuing to develop green infrastructure and sustainable drainage systems (SuDS) will be vital to supplement the tunnel and help to prolong its lifespan.

PROGRESS TO DATE

Planning a project this size has been an enormous task. Thames Water started consultation on the project in 2010 and, following 114 days of public exhibitions and over 200 meetings, the biggest planning application ever submitted in the UK was handed to the government for consideration in February 2012.

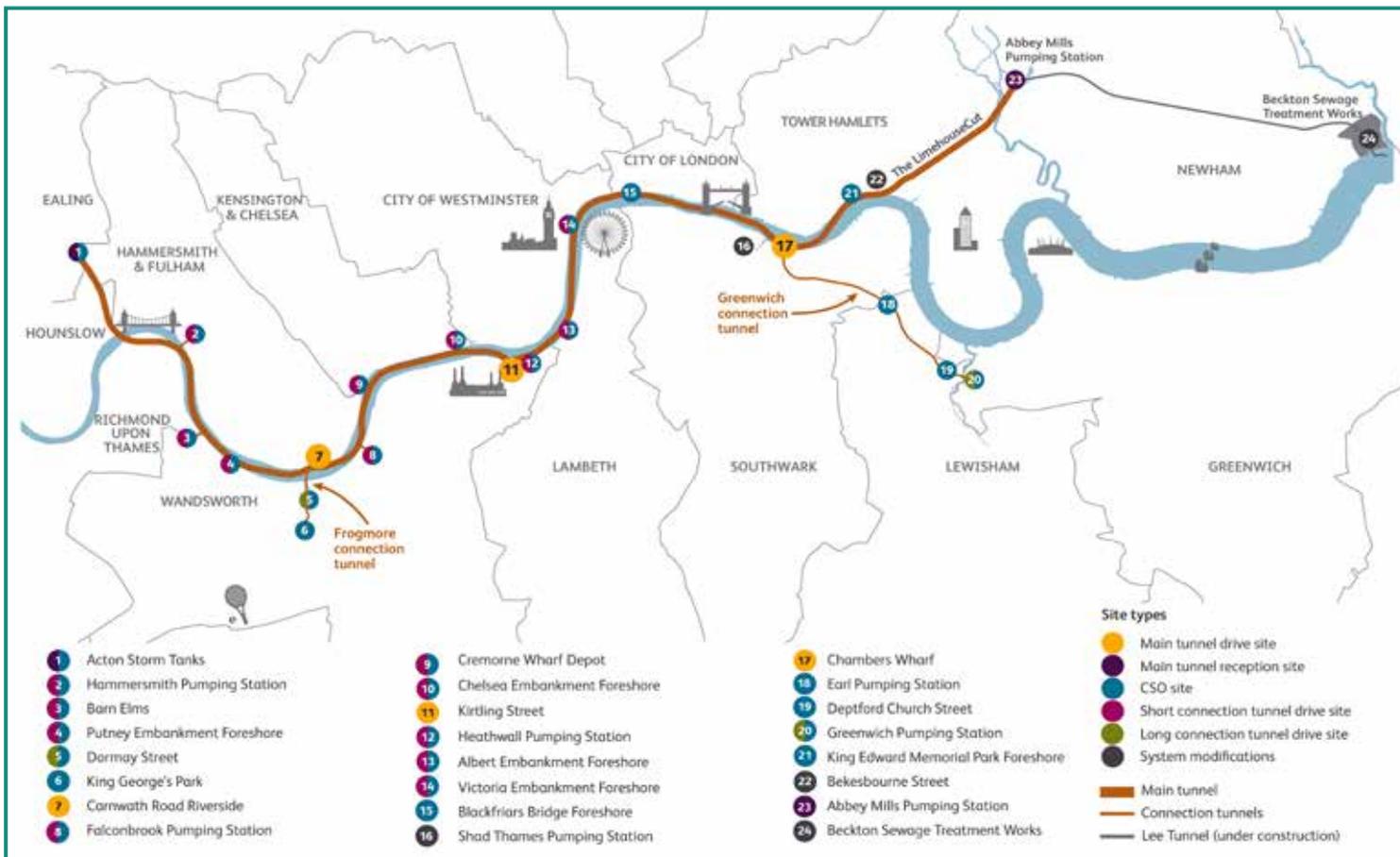
More than 400 employees, including civil engineers, ecologists, project managers and architects, work on the project. Although main construction isn't due to begin until 2016, the past few years have involved meticulous planning and designing in preparation. This has included thorough investigations of the ground to be tunnelled through, while designers have developed a route that will minimise the impact on existing infrastructure in London.

To give some more perspective on the scale of the project, it will require 24 construction sites across 14 London boroughs, and the route will pass under 1,301 buildings, 75 bridges, 20km of river walls, 50 in-river structures, 45 tunnels, 24km of gas main, 15km of water main and 18km of sewers. We have worked closely with organisations across London including Transport for London, the Port of London Authority (PLA), Crossrail and local authorities, and make sure we regularly meet with residents and other stakeholders.

We are following in the footsteps of Sir Joseph Bazalgette, the Victorian engineer whose sewer legacy has allowed London to maintain a safe environment to live in for 150 years. We need to ensure that we leave a similar legacy and make sure the sewerage network is long-lasting, protected against



CSO discharge point at Vauxhall.



Route map of the Thames Tideway Tunnel.

deterioration mechanisms that can occur in a sewerage environment.

Planning the tunnel has included constructing state-of-the-art physical models required to design various tunnel components and computational fluid dynamics (CFD) modelling. In the eastern sites, where the ground is predominantly chalk, the shafts will drop straight into the main tunnel instead of into a connection tunnel. This has led to the need for a unique solution – the creation of vortex drop shafts being within on-line shafts – which takes away much of the energy of large volumes of falling water, preventing damage at the bottom of the shaft.

NEXT STEPS

The project has been split geographically into three main construction works' contracts – Central, East and West. A tender process is under way to select the contractors for each section, with the successful bidders due to be announced this year. Each section of the tunnel will be under construction at the same time to ensure it can be completed within the required timescales.

A process is taking place to procure investors to finance the Infrastructure Provider (IP), an independent company which will be responsible for delivering and financing the tunnel. Successful bidders are also due to be announced later in the year.

Building such large-scale infrastructure will require a diverse range of skills. The project

will create around 4,000 direct jobs in the peak year of construction, and a further 5,000 are expected to be created indirectly. Thankfully, the legacy of other construction projects such as Crossrail and the Olympics means we will already have a pool of experienced engineers and construction workers equipped to work on the project. But we also want to inspire the future generation of engineers. The project team works closely with Crossrail's Tunnelling and Construction Academy, which aims to develop the skills needed for large tunnelling projects in a city as big as London.

Of the 24 construction sites needed to build the Thames Tideway Tunnel, 11 are located on the River Thames. It is expected that at least 4.2 million tonnes of excavated material could be transported by barges or ships. This will mean a 30% increase to the existing river traffic and will require expert marine skills. Thames Tideway Tunnel works with the PLA, the Thames Training Alliance, regulatory bodies and other river employers to help develop opportunities that will both meet the skills gap identified and reinvigorate the river economy.

More than 40 of our project staff are trained STEM (science, technology, engineering and mathematics) Ambassadors who help promote interest in STEM subjects by assisting with lessons, interview practice, career fairs, speed networking and after-school clubs. For every calendar day in the last year our project staff spent an average of 90 minutes

in a school or supporting educational and careers activities, a statistic of which we are proud.

Last summer I also announced that I wanted to achieve gender parity by the time we finished construction in 2023. Already, 29% of employees on the project are female; proof we are already making good progress. But we need to ensure more is done to address the gender imbalance in the engineering industry, and make certain this percentage doesn't fall as we enter the construction phase. We have signed up to the government's 'Your Life' campaign, encouraging youngsters – especially young women – to study STEM subjects at school, while our 'Encompass' inclusivity forum meets regularly to discuss the barriers facing women in engineering. We want to leave a legacy of a cleaner, healthier river, but it's also vital that we help develop the next generation of engineers who are equipped to build major infrastructure projects in the future.

We have another busy 12 months ahead as we award the construction contracts and prepare for the start of main works next year, but each day and everything we do takes us one step closer to reaching our goal of a cleaner, healthier River Thames. Motivation doesn't come much greater than that.

To keep up to date with what's happening on the Tunnel, visit:

<http://www.thamestidewaytunnel.co.uk/>

All images are courtesy of Thames Tideway Tunnel.

WASTEWATER MATTERS

Tim Evans
FWR Wastewater Section
Co-ordinator

THE POTENTIAL IMPACTS (HAZARDS) OF ENDOCRINE ACTIVE SUBSTANCES, pharmaceuticals and personal care products have become perennials of environmental concern. Whatever the real risks, people continue to undertake research and publish papers on the issue. In September 2014, the European Commission launched an online consultation to help define criteria for 'endocrine disruptors' as required by EU regulations on biocides and plant protection products (used in pesticides): <http://www.efsa.europa.eu/en/topics/topic/eas.htm>.

It closed on 16th January 2015. Worryingly, it does not seek to put endocrine active substances (EASs) found in biocides and plant protection products into context with other EASs such as the many naturally occurring phytoestrogens.



Red clover - a well-known source of phytoestrogens.

Phytoestrogens are plant-derived xenoestrogens not generated within the endocrine system, but ingested by eating phytoestrogenic plants. They mainly belong to a large group of substituted natural phenolic compounds. The best-researched are isoflavones, which are commonly found in soy and red clover. Many other food crops contain phytoestrogens. Lignans have also been identified as phytoestrogens, although they are not flavonoids. Mycoestrogens have similar structures and effects, but are not components of plants; they are mould metabolites of *Fusarium*, a fungus that is frequently found in pastures as well as in alfalfa and clover. Although mycoestrogens are rarely taken into account in discussions about phytoestrogens, these are the compounds that initially generated the interest on the topic. So, there are lots of phytoestrogens and they are being eaten by humans and farm animals and it would seem sensible to put biocides and plant protection products into that context.

Richard Williams of the Centre for Ecology and Hydrology, who is a member of FWR's Wastewater Research & Industry Support Forum, has just published a review paper with

John Sumpter of Brunel University, entitled *Putting pharmaceuticals into the wider context of challenges to fish populations in rivers*, [Philosophical Transactions B, February 2015, Volume 370, Issue 1661: <http://rstb.royalsocietypublishing.org/content/369/1656/20130581>].

They summarise the stressors faced by fish in urbanized catchments in the Western world and the magnitude of threat they posed with the suggested timeline shown in Figure 1. The width of a band at any time point reflects its relative impact on fish. The greater the width, the more harmful the impact on fish. The authors consider that the trends of the 19th and 20th centuries in terms of toxic chemicals, untreated and inadequately treated sewage, eutrophication and habitat loss have all been reversed, and because of this there is more life in our urbanized rivers than at any time since the dawn of the industrial revolution. The authors state that "The range of fish stressors has now increased as temperatures rise, and non-native fish introductions bring new diseases. The threat from pharmaceuticals [including EASs] to fish populations remains hypothetical, and no studies have yet linked change in fish populations to exposure." The last phrase is very important.

The EASs that Williams and Sumpter reviewed have come mostly through the urban wastewater system. They are substances that humans have consumed and excreted

as well as applied to themselves as aerosols, or inhaled (including personal care products), which must surely be the stage in the lifecycles of these products of greatest human exposure. A proportion of these substances partition to the sewage sludge and if not degraded in treatment will be recycled to agricultural land if that is the fate of the biosolids. Given that it is the weakly soluble fraction that will reside in the biosolids, the transfer to crops will be only a small proportion of the small proportion that is in biosolids. It is hard for me to imagine how this could be a risk to any human receptor.

In a multiyear, operational-scale field experiment, S. R. Smith and I used the soil microbial biomass as a non-specific bioassay to test whether there was any chemical or cocktail of chemicals in digested sludge from the 1980s and 1990s that would stress the biomass. There was no such stress. Soil microbial biomass respiration quotient was the most sensitive bioassay we could use¹. Opponents of biosolids recycling in Germany have tried to use polyacrylamide sludge conditioning agents used in dewatering to achieve their goal of getting recycling banned. The soil microbial biomass did not react to polyacrylamide and I propose that it is inconceivable that it could find its way to the edible parts of crops.

I think the environment is served badly by silo thinking. It is important to put things into the wider context as Williams and Sumpter have done. It is also important that laboratory results are 'ground-truthed' to check whether they mirror the wider world. Biosolids recycling can make an important contribution to stewardship of the planet's phosphate. Recovered water makes a vital contribution to the flow of rivers and streams in dry weather. In my view it would be the height of folly to spend money to treat hazards that are not significant risks when there is a desperate need for investment in the ageing and unseen infrastructure of pipes underground, and to provide safe drinking water and sanitation to the two billion people who do not have it currently.

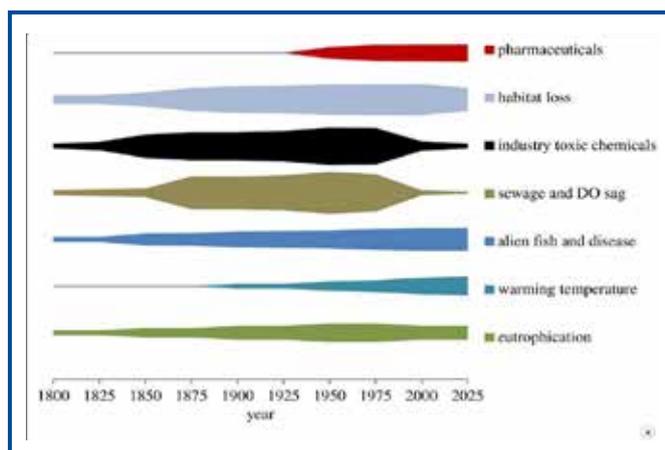


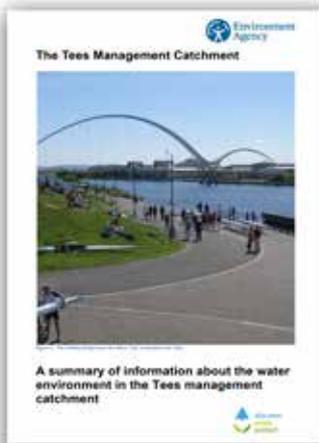
Fig 1 Timeline of relative stressors faced by fish in urbanized catchments in the Western world and the magnitude of threat they posed.

(1) Evans T.D. and Smith, S.R. (2012) *Bioassay of biosolids in an operational scale field trial*. Proc. 26th Water Environment Federation, Annual Residuals & Biosolids Conference, 25-28 March, Raleigh NC

Consultation on Draft River Basin Management Plans

RIVER BASIN MANAGEMENT PLANS (RBMPs) set out measures to improve water in rivers, lakes, estuaries, coasts and in groundwater. They have been established for the ten river basin districts in England and Wales, as required by the Water Framework Directive (WFD). In accordance with WFD, the plans are reviewed and updated every six years.

The present draft plans are for the second cycle of WFD – to be implemented from 2015–2021. In 2021 the second cycle RBMPs will be reviewed and updated, ready for implementation from 2021–2027. Further background information can be seen [here](#).



The aim, under WFD, is for designated water bodies to reach good ecological status (GES), in addition to good chemical status. Read more about good status [here](#). The present draft plans have been developed through consulting with organisations and individuals, via the Environment Agency's (EA's) *Working Together and Challenges and Choices* consultations, and cover the main issues for the water environment plus information on what's needed to tackle them.

The EA is now seeking views on these plans. They are asking you to comment on the issues, the current and future actions to protect and improve the water environment, and the outcomes you think are worth achieving. You do not have to answer all of the questions or need to have local knowledge to answer them, but the EA state that the more specific you can be in relation to particular river basin districts, the better their final update will be.



River Thames at Benson, Oxfordshire (courtesy Maxine Forshaw).

YOUR RESPONSE: THERE ARE A NUMBER OF WAYS YOU CAN LET THE EA KNOW YOUR VIEWS:

ONLINE - To see the RBMPs for England and to make your views known, go to: https://consult.environment-agency.gov.uk/portal/hofwd/draft_plans/consult?pointId=3034101. If you would like to save your comments as draft at any point, you will need to either [log in](#) or [register](#) as a consultee account before providing your comments.

BY EMAIL OR LETTER - here is a copy of the [response form](#) in a printable format. Please return your response by attaching to an email and sending to waterforlife@environment-agency.gov.uk or to the following address: Ben Bunting, Environment Agency, Manley House, Kestrel Way, Sowton Industrial Estate, Exeter, Devon, EX2 7LQ

If you have any queries, or wish to receive hard copies of any of the consultation documents and response forms, contact: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Telephone 03708 506 506. Email enquiries@environment-agency.gov.uk

ALTERNATIVELY, you can visit the [Blueprint for Water](#) website page on the consultation <http://saveourwaters.org.uk/> to add your voice.

Defra state: *Your input matters. Deciding how best to work, what to invest in and where, how fast action should be taken, and who should pay, is a complex process with significant consequences. The updated RBMPs will direct considerable investment and action from 2016 and provide benefits to society and the environment.*

Your comments must be received by 11.45pm on 10 April 2015.

Note that the Dee and Western Wales RBDs are managed by Natural Resources Wales. The Solway Tweed RBD includes catchments in both England and Scotland and is jointly managed by the EA and the Scottish Environment Protection Agency.

WALES: <http://naturalresourceswales.gov.uk/about-us/Consultations/our-own-consultations/consultation-on-the-proposed-update-to-wales-river-basin-management-plans/?lang=en>.

SCOTLAND: http://www.sepa.org.uk/water/river_basin_planning/solway_tweed.aspx.

Consultation on Flood Risk Management Plans

The EA consulted between 10 October 2014 and 31 January 2015. The FRMPs show the culmination of work between the EA, many lead local flood authorities and other risk management authorities, to identify flood risk and set out how to manage that risk. The EA sought views on proposals to reduce flood risk for communities and deal with the impacts of flooding when it does occur. The proposals set out how the Environment Agency, Natural Resources Wales, local councils, drainage authorities, highway managers and water companies will work together with communities to manage flood risk.

Flood risk management plans have been produced for each of the river basin districts which cover England; the EA has also developed draft flood risk management plans jointly with Natural Resources Wales for the Dee and Severn river basin districts. The draft flood risk management plan for the Solway Tweed river basin district only covers the English catchments. The Scottish Environment Protection Agency will consult on plans for the Scottish catchments. The consultation on the English catchments of the Solway Tweed river basin district will run until **2 June 2015**, to align with SEPA's consultation on the Scottish catchments. Go to SEPA's website for more information <http://www.sepa.org.uk/>.

Keep a look out on <https://www.gov.uk/government/consultations/draft-flood-risk-management-plans> for the latest information.

Private Water Supplies Learning about Best Practice in Action

25 September 2014

Royal Society for Public Health

Mike Waite, FWR Water Supply Co-ordinator

PROCEEDINGS STARTED WITH A PRESENTATION from **Professor Jeni Colbourne** (DWI Chief Inspector) on current progress with implementation of the Private Water Supplies regulations and possible future developments. Having described the content of the DWI annual report on Private Water Supplies (PWS) she noted that, allowing for some incomplete data, PWS quality had improved from 9.6% of samples non-compliant in 2010 to 7% in 2013.



Although the regulations require Local Authorities (LAs) to have carried out risk assessments (RAs) on all relevant supplies by 1 January 2015, only 32% of necessary RAs had been carried out by the end of 2013. In respect of large supplies and supplies to commercial or public premises, while 82 LAs had done all the RA required, 41 had not carried out any. For other PWS, 24 LAs had undertaken RAs on all, whilst 58 had done none. A total of 478 improvement notices have been issued in England and Wales. She noted that the apparent number of PWS had reduced between 2010 and 2013 due

to clarification of supply arrangements and discontinuation of use. She also noted that recent health service reorganisation had placed responsibility for public health strategy with LAs and advocated that PWS should be incorporated in strategies, especially for the 32 LAs which have more than 5% of their population reliant on PWS.

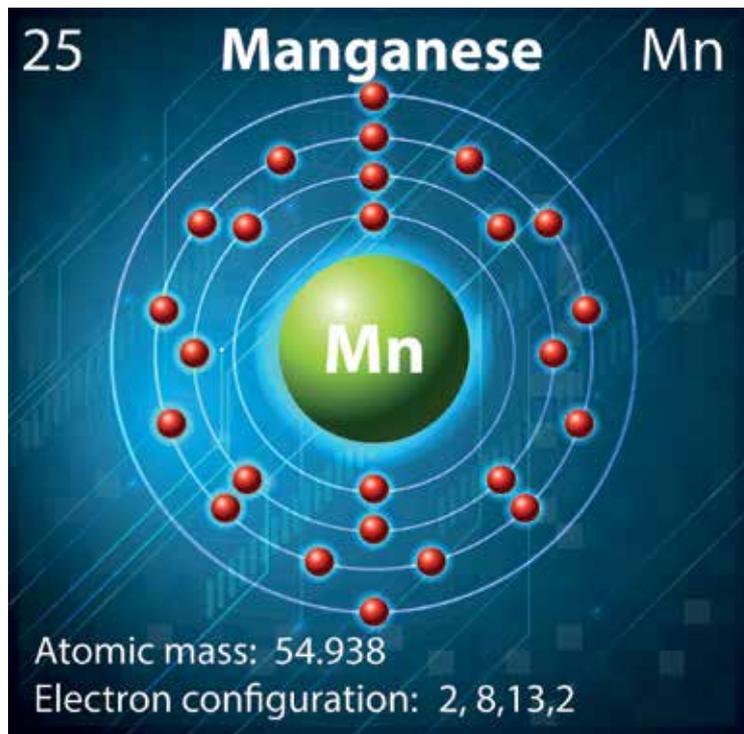
She emphasised that all sampling and analysis should be UKAS accredited and follow SCA (Standing Committee of Analysts) methods. Some LAs had not been using the correct method for Taste and Odour. Looking ahead she said that radioactivity would be included in future monitoring requirements and consultation on revised PWS Regulations would start in January 2015.

Tim Shakesby (*Shakesby and Sons*) explored issues which should be considered when fitting water treatment on PWS and stressed the importance of adequate pumping, perhaps over several weeks, before taking samples to design treatment for any new borehole.

Emma Richbell and Vincent Dreau (*Babergh and Mid Suffolk District Councils*) gave an interesting account of an unsuccessful appeal against a notice issued by their council under Regulation 18, which relates to sources presenting a potential danger to human health. The premises in question had a well and a borehole. The well had been taken out of use following non-compliances but was still available for use. Inspection showed the well was being used and was inadequately sealed and liable to ingress. The appellant claimed to have two supplies but DWI provided a definition of 'supply' which encompassed 'all the physical assets used to collect, treat and distribute water'. Magistrates dismissed the appeal and all necessary remedial works were undertaken.

David Clapham (*RH Environmental*) then spoke on the way forward for Water Safety Plans (WSPs). He argued the need for rainwater recycling to be considered as potentially PWS and questioned the responsibility for the risk assessment of larger PWS falling on LAs. For other legislation such as Food, and Health and Safety, the onus is on the company. Reliance on sampling of PWS is not enough – although 30% of PWS fail microbiologically on sampling, this could rise to 98% after rain. Larger PWS are often associated with building developments; hospitals in particular have, or are developing, boreholes but PWS regulations do not require RA – it may arguably be a requirement under Health and Safety. He suggested that businesses should carry out RAs followed by an audit from a LA.

John Fawell (*WHO Expert Advisor*) described the chemistry of manganese and the possible future reconsideration of its significance in water supplies. Although it occurs in 11 oxidation states, the most important from the health point of view is Mn 2+ although in distribution systems it forms Mn 4+ insoluble hydrides. Although Mn is an essential trace element, some studies have suggested it could be a neurotoxin by inhalation (and possibly by ingestion at very high levels) although there are, as yet, no suitable animal models and limited epidemiological studies yield mixed results.



There is some suggestion that higher Mn levels in children may be associated with lower school performance but more studies are needed. The first addendum to the 4th edition of the WHO Guidelines may reintroduce a formal health-based guideline value of 400µg/l which is higher than the present drinking water standard of 50µg/l.

Heather Woodhead (*Kelda Water Services*) described Kelda's contract to manage PWS for the MOD in Wales and the South West, showing several case studies involving RAs of catchments, treatment plant, service reservoirs and distribution systems. Kelda had achieved 99.94% compliance for MOD PWS compared with the national PWS figure of 93%.

The National Trust is responsible for 544 PWS, of which 451 serve single properties. **Mark Roberts** (*National Trust*) explained that each PWS is managed by the individual property with central support and advice. It has been calculated that 43% of all rainfall in England and Wales falls on, or flows through, National Trust properties. He gave several examples of unsatisfactory supplies which had subsequently been rectified.

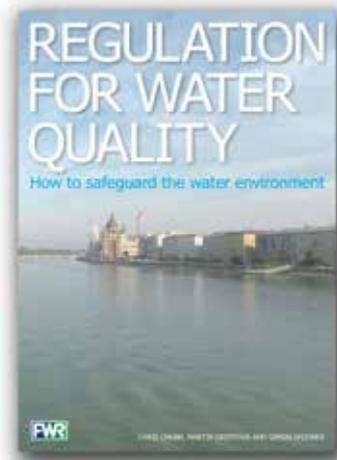
Regulation for Water Management

– Panel Discussion and UK Book Launch



Christ Church, Oxford (courtesy of Wikipedia)

THIS EVENT, HELD AT CHRIST CHURCH, OXFORD UNIVERSITY on 20 January 2015, provided an opportunity to question a panel of water management researchers, consultants and regulators on the implementation of science through regulation. This was hosted by the Oxford Water Network and sponsored by FWR.



The occasion also saw the UK launch of the book *Regulation for Water Quality – How to safeguard the water environment*, by Chris Chubb, Martin Griffiths and Simon Spooner.

The publication can be purchased from FWR (office@fwr.org.uk or call 01628 891589).

It can also be viewed on our website www.fwr.org

LOTT's Water Education and Technology Centre

Olympia, Washington, USA

LOTT's WET (Water Education and Technology) Science Center exhibit gallery and classroom opened in 2010 to provide the community with a fun, hands-on opportunity for learning all about water.



'Together, citizens and LOTT can conserve our water resources, support reclaimed water use, and take actions that will help protect Puget Sound. Learning more is the first step.' The Center offers education programmes, together with interactive exhibits, weekend family activities, and environmental presentations. Liz Morrison from FWR took the opportunity to visit the Center whilst on holiday in the USA last year.

See: <http://www.lottcleanwater.org/education.htm>

A trip down Diagon Alley



Hogwarts Castle 1:24 scale, which includes 2,500 fibre optic lights; constructed by 86 artists and crew members (courtesy Simon Blake)

IN THE AUTUMN, as members of the Institute of Water (IoW), FWR were invited to join IoW South East area for a visit to the Warner Bros. studio tour of 'The Making of Harry Potter'. The tour takes in various film sets, props and costumes, the triple-decker Knight Bus, green screen technology, Diagon Alley, plus the art and sketch department which included an amazing 1:24 scale model of Hogwarts Castle. It was a fascinating day out both for fans and for anyone interested in having a glimpse into the world of modern film-making.



An update on the activities of the FWR

Caryll Stephen

Chief Executive of the Foundation for Water Research



Firstly, a somewhat belated Happy New Year to all our friends, contributors and readers. The year for FWR has started just as busy as it ended, as you will see from this newsletter.

The UK launch of our *Regulation for Water Quality* book in Oxford, with the associated panel discussion, took place in January; a big thank you to all who took part in the discussions.

We are now looking to organise appropriate training sessions to complement this publication. On the ROCK (Reviews of Current Knowledge) and Guides front, two further documents have been published and a number of others are in the pipeline. Our Wastewater Forum continues to meet regularly and our Water Supply Section keeps us up to date with events. We are now planning our exhibition circuit for the year; our stand is always well attended and many new contacts are made.

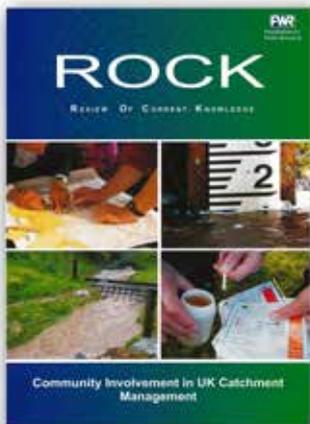
Our website remains very popular and the number of visitors is growing. So, as you can see, we are envisaging a very active year. Again, thanks to all who contribute to the work of the Foundation.

New FWR Publications

Copies of these reports are available from the Foundation for £15 each, less 20% for FWR members.

Community Involvement in UK Catchment Management

FR/R0021 January 2015



River catchments are naturally complex systems. The water environment is also heavily relied upon and modified by human activities. Catchment managers therefore encounter multiple issues relating to flooding, drought, poor water quality, sedimentation, erosion and habitat degradation, along with climate change projections. These recurring catchment issues have led to various policies and frameworks within the context of European legislation to support the management of catchments across the UK.

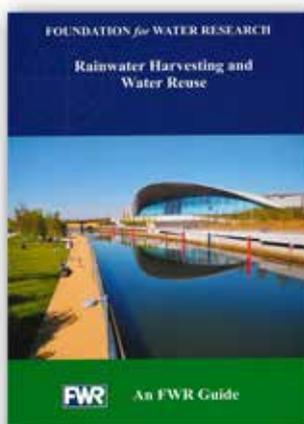
Long term observations are required to characterise catchment behaviour, implement effective mitigation measures and meet policy targets. Defra's Catchment Based Approach policy framework provides an example of how the UK is now encouraging a more integrated, evidence based and bottom-up approach, allowing for greater partnership for communities to be involved on a local level. Community Flood Plans also demonstrate how local people are becoming more actively involved in flood risk management.

This Review of Current Knowledge highlights issues related to monitoring and understanding the complexity of river catchments which are subject to multiple pressures. It details how countries, such as the UK, are beginning to manage catchments at a local level with involvement of local people. Case studies are presented and emphasise how the rapid growth in technology and communication facilities can be used in innovative ways to support the management of river systems.

Urban Rainwater Harvesting and Water Reuse

FR/G0006

Revised January 2015



With the ever-growing need to conserve the UK's water resources, rainwater harvesting (RWH), grey water recycling (GWR) and water reuse solutions are receiving growing interest from politicians, planners, developers and the general public. Recent focus in the UK, by a more environmentally concerned public and those responsible for long term urban planning and development, questions the sustainability of current water use in our modern, urban way of life, particularly our in-building use, 'personal water footprint' and recreational garden watering.

This guide was originally published in 2008 and has now been revised; it is intended for readers who are interested in the topic of water harvesting, recycling and reuse for non-potable urban applications. It provides an introduction to: the water cycle and drivers to supplement this with RWH and water reuse systems; regulations and guidelines on water reuse that apply throughout the UK and Europe; technologies currently available for non-potable, urban water harvesting and reuse; examples of water harvesting and reuse systems with a particular emphasis on UK practice for non-potable urban applications; and sources of detailed information for those planning to implement water harvesting and reuse systems in a UK urban environment.

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