

The Environment

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June 2018

CIWEM

A CLEANER, GREENER LONDON

The Mayor's 2050 manifesto



12 **Interview**
Deputy mayor
Shirley Rodrigues

16 **Biodiversity**
Do we under-
value urban trees?

20 **Diversity**
How to find and
develop new talent

22 **Air quality**
We ask the experts
how to tackle pollution

35 **CIWEM events**
Meet your
fellow members

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Contents



COMMENT

- 05 Letter from the editor

NEWS

- 06 Ofwat tells water firms to rebuild public trust
08 Defending wild rivers in the Balkans
10 UK launches fund to fight marine plastics

INTERVIEW

- 12 Deputy mayor environment and energy Shirley Rodrigues lays out London's 2050 targets

OPINION

- 22 How should the UK tackle its air pollution? The Environment asks the experts
30 Are we turning a blind eye to road run-off, asks Jo Bradley from SDS

FEATURES

- 16 **BIODIVERSITY**
Do we undervalue our urban trees, asks Karen Thomas?
19 What we've learned from the latest IPBES global biodiversity report
20 **DIVERSITY**
Tania Flasck presents Jacobs' pilot scheme to promote diversity and inclusiveness
25 **AIR QUALITY**
India accounts for quarter of deaths from air pollution, writes Sanjeev K Kanchan
26 **WATER INDUSTRY**
UK water firms are finalising their water-resources management plans
28 **WATER STORIES**
Deculverting the River Wandle
31 **NFM**
It takes a village to slow a flood

ARTS

- 32 A vision for Scotland

CIWEM NEWS

- 34 Will the 25-year environment plan protect UK biodiversity, asks Alastair Chisholm
34 CIWEM events
36 Meet the team
37 Smarter learning tools
38 UK Junior Water Prize – our 2018 winner
39 Letters: it's all about fracking

LAST WORD

- 42 Photos throw environmental troubles into focus, writes CIWEM chief executive, Terry Fuller



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"This excellent competition encourages all those with cameras (which is most of us these days, I suppose) to look at our environment with new eyes – to see the environmental impact of things around us, sometimes in the most surprising places. Our cameras can be turned from the narcissistic tool of the selfie into a weapon in the war on environmental destruction."

Stephen Fry, EPOTY Judge 2017

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THIS ISSUE, WE bring you interviews with some of the UK's leading thinkers and policymakers on environmental matters.

At City Hall, the mayor's office is finalising its 2050 environmental strategy, to put to members of the London Assembly later this summer. Deputy mayor environment and energy Shirley Rodrigues sat down with *The Environment* to spell out her vision for London – turning the Big Smoke into a cleaner, greener and more resilient city.

Air pollution causes serious health problems across the UK. Bad air kills around 40,000 people prematurely every year. In early May, the World Health Organisation announced that more than 40 of our towns and cities had already reached or topped their annual air-pollution targets. In our opinion spread, we ask seven of the UK's leading air-pollution experts how best to tackle the problem.

Our special report this month looks at biodiversity. Urban trees can be a problem for local authorities, damaging roads and pavements and creating headaches for planning officials. We look at how trees benefit our towns and cities, in ways that are obvious and not so obvious, and ask whether it's a solution to replace veteran trees, like for like.

Most employers struggle to identify, promote and retain the right people. Consultant Jacobs has devised a pilot scheme to help talented staff to fulfil their career goals. Our report on diversity in the workplace looks at how Jacobs' coaching club supports and promotes key staff.

Water companies across the UK are racing to finalise their PR19 objectives, to present to Ofwat in September. The challenges include tougher targets, the need to invest in new infrastructure and the north-south divide between areas prone to drought and to floods. They must also tackle the common threat of climate change, bringing worse weather and rising seas. We report on the preliminary plans of five of the six southeast water companies.

In other water stories, we look at how natural flood management schemes have mobilised two northwest communities, protecting homes and helping neighbours to recover from the trauma of flooding. And we report from south London on how daylighting a lost river turned a run-down Croydon park into a safer, happier place.

This issue, we introduce you to two new members of the CIWEM family and present our new, improved training programme. You also have to end-June to nominate a winner for the Nick Reeves environmental arts award and to end-July to enter environmental photographer of the year.

Let's give credit where it's due. What are you waiting for?

Karen Thomas
Editor, *The Environment*
@KT_environment



OFWAT TELLS WATER FIRMS TO REBUILD PUBLIC TRUST

UK WATER REGULATOR Ofwat has set out its “agenda for rebuilding public trust in the water sector”, to press water companies to act in their customers’ interests.

Ofwat aims to tackle practices giving UK water customers cause for concern. Ofwat chair Jonson Cox has written to Secretary of State for Environment, Food and Rural Affairs Michael Gove, setting out the regulator’s agenda to improve corporate behaviours.

Mr Cox’s plans include:

- Reforming company licences to make it even clearer that companies must put customers at the heart of everything they do
- Looking to companies to share with customers any financial benefits they make from taking on additional gearing
- Setting tighter standards to make sure companies are financially resilient in the long term
- Stepping up demands on transparency around dividends and profits, including a clear expectation that companies meet their obligations to customers before making dividend payments
- Addressing concerns about water companies’ executive pay, expecting their boards to explain executive bonuses by reference to exceptional delivery for customers.

Describing the need for change in the water sector, Mr Cox said: “Some



water companies appear to be focused too much on financial engineering at the expense of public service. Alongside this, we’ve seen significant service failures, most recently following last month’s cold snap and quick thaw, which led to tens of thousands of customers being left without water.

“All of these things have damaged trust in water. Ofwat has been pushing water companies to up their game for some time; but we need to go further, faster. That is why today we have set out an agenda of reform to bring the water sector back in balance, including getting back to a proper sense of public service provided under private ownership.

“We expect the water sector to own the challenge by taking the lead in engaging with customers and the wider public about how it can redefine its role and rebuild trust. Companies who wish to be leaders in the sector will step up, voluntarily accept the need for change and put customers’ interests at the heart of everything they do, as an essential step in rebuilding trust.”

Over the next six months, Ofwat will launch formal consultations “to get to the position where it can implement the initiatives outlined today”. It wants the water companies to bring

in these changes in parallel with planning to improve their efficiency and performance in 2020-2025, as part of the PR19 water-price review.

However, speaking at the TWENTY65 conference in Manchester in April, Angela Smith MP criticised Ofwat for setting “timid” targets for the UK water industry. She said the government should rewrite Ofwat’s powers to focus on outcomes, rather than processes.

Discussing the water companies’ PR19 targets, Ms Smith said: “Five-year plans have not been helpful. Where’s the ambition? To deliver innovation, the industry needs to be both flexible and ambitious. And UK water-industry regulation needs to be tough but flexible.”

Water UK, which represents the water industry, issued a short statement to respond to Ofwat’s announcement. Chief executive Michael Roberts said: “All companies take very seriously their responsibility to act in the public interest and to operate to the highest standards.

“We support the direction of travel to tackle issues of concern, in a way that recognises that the sector is diverse and that not all the issues are relevant for all the water companies. We look forward to discussions with all involved on next steps.” •



MAPPING THE CLIMATE-CHANGE THREAT TO SCOTLAND'S SALMON RIVERS

A NEW ONLINE mapping tool will help river managers to plan mitigation work to limit the impact of climate change on Scotland's rivers and fisheries.

Scotland's rivers account for around three quarters of the UK's and 30 per cent of European wild salmon production. Freshwater fisheries and associated expenditure contribute more than £79 million a year to the Scottish economy.

However, Atlantic salmon are sensitive to changes in river temperature and temperatures, which are expected to increase under climate change, raising concerns that Scottish rivers could become less suitable for salmon.

Scientists at Marine Scotland and the University of Birmingham have developed a river-temperature model to predict maximum daily river temperatures and sensitivity to climate change throughout Scotland, using interactive maps on the National Marine Plan interactive website.



Environment secretary Roseanna Cunningham said:

"We know a number of complex factors, including climate change, are affecting wild salmon numbers in the northeast Atlantic region.

"This research identifies areas where our famous salmon rivers are at risk due to climate change and will help fisheries managers target work

to protect stocks and increase the resilience of our fresh waters.

"It is vital we take decisive action to safeguard wild salmon stocks and we will continue to work with Fisheries Management Scotland and their members to do so." •

For more information, visit
<http://bit.ly/SCOTrivers>

GLOBAL FLOOD EXPOSURE COULD TRIPLE DESPITE CLIMATE TARGETS, STUDY WARNS

THE NUMBER OF people exposed to flooding could soar from 100 million to 300 million by the year 2300, as sea levels rise despite countries' efforts to mitigate climate change to meet their Paris Agreement targets.

University of Southampton researchers studied what the world will look like, based on a temperature increase of 1.5°C. The Paris agreement aims to hold global average temperature increases to below 2°C above pre-industrial levels.

However, Southampton says this does not account for the longevity of sea-level rise. The modelling-based studies found that early climate-change mitigation can reduce the rise in sea levels by 40cm-50cm by 2100 and by 1m-2m by 2300.

That's half the land area at risk by 2300 without measures to mitigate climate change. However, the findings indicate that between 1.5 per cent and 5.4 per cent of the world's people could face coastal flooding by then, particularly communities living on low-lying deltas.

The first study, by ocean and earth science lecturer Philip Goodwin, highlighted how climate-change mitigation can reduce rising sea levels within a 100-year time frame. Mitigation would slow the rate at which sea levels rise by 3.2m by 2300, Dr Goodwin concluded.

Two additional studies by senior research fellow Sally Brown focused on climate change.

"Around 100 million people are

exposed to flooding today, and this could approximately double by 2100 and increase threefold by 2300, even taking account of climate-change mitigation," Dr Brown concluded.

"Adaptation in coastal and particularly in delta areas is challenging, given the geographic scale and continued efforts to reduce risk by governments and other national and international organisations are required."

Increasing sea levels equivalent to 1.5°C – within the terms of the Paris Agreement – will mean more extremes and more widespread, deeper flooding without additional adaptation, researchers warn.

Southampton associate professor in coastal oceanography Ivan Haigh said: "The implications of sea-level rise have important consequences for society for hundreds of years to come. Extreme water levels affect thousands of people around the world today, and this will increase with sea-level rise." •

DAMMED IF THEY DON'T – DEFENDING WILD RIVERS IN THE BALKANS



CAMPAIGNERS IN THE Balkans are fighting plans to develop 2,796 hydropower projects between Slovenia and Albania, defending the last wild rivers in Europe to avert "an environmental catastrophe".

Regional governments class hydropower as renewable energy and offer subsidies to develop it. However, NGOs RiverWatch Austria, Bosnia's Centre for Environment (CZZS) and Friends of the Earth Croatia say the dams threaten the region's ecology, cutting water supply to local communities and delivering little economic benefit.

The scale of the projects is overwhelming. Slovenia, the northernmost country formed out of the former Yugoslavia, plans to dam and divert all its rivers. Some 90 per cent of the proposals are small-scale projects that campaigners say do little to improve energy security.

Although Yugoslavia dammed its largest rivers, smaller tributaries remain pristine. RiverWatch assessed 35,000km of Balkan rivers and found 80 per cent "in very good or good condition, 30 per cent...

almost unspoiled. In the rest of Europe, the picture is reversed; 80 per cent is in bad condition".

A new film, *Blue Heart*, highlights the Balkans' dam disputes. The film crew travelled to Albania, Macedonia and Bosnia Herzegovina, to interview local people.

Albania's River Vjosa is the largest wild river in Europe. It flows, with no man-made obstacles, from Greece to the Adriatic. There are plans to build 38 dams across it.

One project planned to flood a village called Kuta. The villagers filed the first lawsuit of its kind in Albania – and won. One villager told the documentary: "It's not about climate change. It's not about renewables. This is about money."

In Macedonia, Mavrovo National Park is a 731 sq km national treasure. Its forests, mountains and rivers support 17 threatened plant species and the critically endangered Balkan lynx. Fewer than 50 lynx survive, due to lost habitats and illegal poaching.

"It's a choice," a local hunter turned conservationist said on camera. "We can have the dam. Or we can have the cat."

In Bosnia, the women of Kruščica in

the Lašva Valley camped out for almost a year, putting themselves between the river that supplies the village's only drinking water and the diggers sent to dam it.

Bosnia derives 70 per cent of its energy from coal-fired power stations and 30 per cent from large hydropower projects – a legacy, CZZS president Natasa Crnkovic tells The Environment, of Tito-era energy policy.

The main problem with the proposed dams, she says, "is there's no long-term strategy for reducing emissions in the Balkans. There's no commitment to developing solar energy or to tackling wastage in the national grid. What we have instead, especially in Bosnia, is multiple small-scale projects and a complete lack of investment in real renewables."

Bosnia, home to 200 rivers, has more than 300 proposed power plants, many backed by foreign investors, lured by the promise of state subsidies. The dams will divert water from rivers, reduce groundwater and burden the country with debt, Ms Crnkovic says, benefiting only the investors and the construction firms.

Although Bosnia must replace its ageing coal-fired stations, Ms Crnkovic says the country's energy needs have fallen sharply. Power-intensive industries collapsed after the Balkan wars. She says Bosnia can remain self-sufficient in energy if it tackles energy efficiency and invests in solar power and wind energy.

The 2018 UN World Water Development Report concluded that dams in India have failed to deliver long-term food security and have displaced the country's communities and have increased problems with waterlogging and soil erosion. ●

Blue Heart is available on iTunes from August and screening around the UK from late May.

PICTURE THIS...

RIVER SURVEYS REVEAL mixed fortunes for the near-threatened common clubtail dragonfly, a distinctive black and yellow insect that breeds on very few sites in England and Wales.

Citizen science project the 2017 Clubtail Count spotted the dragonfly in Devon for the first time. It found common clubtails thriving on the Severn from Shropshire to Gloucestershire and on the Dee in Cheshire, and breeding on the cross-border River Fyrnwy.

However, the British Dragonfly Society is reporting “catastrophic declines”, with no evidence that the insects are breeding on the Avon in Worcestershire and Warwickshire, on the Kennet in Oxfordshire, or on the Towy and Teifi in Wales.

Last summer, more than 100 volunteers searched 206km of river bank, delivering 954 records of the species. This year, the Clubtail Count hopes to recruit kayakers and canoeists to survey “difficult stretches of rivers”. ◉

Visit <https://british-dragonflies.org.uk/content/clubtail-count> for information

Lesser spotted, the common clubtail breeds on rivers in England and Wales

BRITISH DRAGONFLY SOCIETY

SHIPPING AGREES TO CLEAN UP ITS ACT — BUT FALLS SHORT OF PARIS EMISSIONS TARGETS

GLOBAL SHIPPING has pledged to decarbonise and to reduce its greenhouse gas emissions by “at least half”, ending a fortnight of tense negotiations at the International Maritime Organization (IMO) headquarters in mid-April.

Member states have agreed to cut shipping emissions by at least 50 per cent of 2008 levels by 2050. However, shipping would need to cut its emissions by between 70 per cent-100 per cent to align the industry with the Paris climate-agreement goals.

If shipping was a country, it would

be the world’s sixth-largest emitter of greenhouse gases. Some 90 per cent of the world’s traded goods are carried by ship.

Industry lobby the Clean Shipping Coalition (CSC) welcomed the “potentially game-changing” IMO decision. But it pointed out that member states have yet to agree how they will deliver the promised emissions cuts, including short-term measures.

“Progressive states must now use the words ‘at least’ to keep the pressure on for full decarbonisation by 2050, to avoid the catastrophic climate change that a



temperature increase of more than 1.5°C would bring,” CSC said.

It urged the IMO to move quickly to introduce short-term measures to cut shipping emissions. ◉

UK LAUNCHES FUND TO FIGHT MARINE PLASTIC POLLUTION



THE UK GOVERNMENT has set up a £61.4 million fund to fight plastic pollution in the world's oceans, responding to a wave of public outrage over how waste affects ocean life, shown in the BBC series, *Blue Planet II*.

The fund allocates £25 million to research into the scientific, economic and social impact of marine plastic, £20 million to prevent plastic and environmental pollution from manufacturing from entering the ocean in developing countries and £16.4 million to improved waste management nationally and in UK cities.

Secretary of State for the Environment Michael Gove has also announced plans to ban single-use plastic such as straws, drink-stirrers and cotton buds made of plastic, launching a consultation later this year. The plans also propose to ban plastic straws used for medical reasons.

Recent studies suggest the UK throws away 8.5 billion plastic straws a year. The UK has already banned plastic microbeads and the government claims to have reduced the number of plastic bags distributed by 9 billion, having

introduced a 5p bag charge. A Plastic Planet founder Sian Sutherland has praised the plan for straws and drink stirrers, but urged the government to go further. "In January, the prime minister vowed to work with Britain's supermarkets on introducing plastic-free aisles in their stores," she said. "I urge Theresa May to... work with us and the UK's biggest retailers to make [this] a reality as soon as possible."

Responding to Mr Gove, Greenpeace UK policy director Doug Parr urged the government to act faster to launch a deposit-return scheme and to introduce a new environment act.

"With a truckload more plastic entering our oceans every minute, we can't afford for the government to get bogged down in unnecessarily protracted processes," he said.

"We need a deposit-return scheme for drinks containers without delay and there's no reason why the legislation needs to take two years. This lack of urgency isn't restricted to tackling plastic waste. Waiting until after March 2019 for a new environment act and for the

proper protections and targets for nature, clean air and clean water could provide loopholes for polluters, and waste time the environment doesn't have."

A second consultation will study the case for a deposit-return scheme for single-use drinks containers.

According to wildlife charity the WWF, the UK is among the biggest users in Europe of many single-use plastic products. It predicts that the UK will throw away a third more takeaway drinking cups by 2030. It is calling on the UK to ban all single-use plastics by 2025.

Responding to the government announcement, WWF chief executive Tanya Steele said: "The UK is moving quickly and has done a good job of learning from and adopting the best plastics legislation from around the world. But if the government wishes to show greater plastics leadership and save our oceans, and the whales and fish that live in them, we need to lead from the front.

"The best way we can do that is by implementing a ban on avoidable single-use plastic. That would set a real target that would galvanise action at home and send a powerful signal to the world."

Prime minister Theresa May described marine plastic pollution as "one of the most significant environmental challenges facing the world today".

News emerged in April that scientists have developed an enzyme that eats plastic that could tackle this pollution — having made the discovery by accident.

Researchers from the University of Portsmouth and the National Renewable Energy Laboratory (NREL) at the US Department of Energy were looking at the structure of a natural enzyme found in a waste-recycling centre in Japan when they made the discovery. Reports suggest that *ideonella sakaiensis* 201-F6 can eat polyethylene terephthalate (PET), the material used to make millions of plastic drinking bottles.

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THE MAYOR'S 2050 MANIFESTO FOR LONDON

City Hall is finalising its new environment strategy for London. Deputy mayor environment and energy **Shirley Rodrigues** spells out the challenges ahead. By **Karen Thomas**

When London Mayor Sadiq Khan appointed Shirley Rodrigues his deputy for the environment and energy two years ago, he tasked the former charity boss with transforming the Big Smoke into a world-leading player in clean energy, that is resilient to climate change, that will achieve zero-carbon status by 2050.

Ms Rodrigues, former acting executive director for climate change at the Children's Investment Fund Foundation, is about to present the final strategy proposal. The manifesto tackles six broad priorities. It aims to reposition as a green pioneer a city that is failing its air and water-quality targets and whose energy, water and infrastructure systems are under growing strain. *The Environment* asked Ms Rodrigues for an update.

WHAT PROGRESS HAVE YOU MADE TOWARDS THE FINAL DRAFT OF THE ENVIRONMENT STRATEGY FOR LONDON, ITS AIMS AND ITS COSTINGS?

The draft strategy, launched last August, set out the direction of travel that the mayor wanted to take. We want London to be a national-park city, at least half of its area

green, and to set it on the path towards becoming a zero-carbon city. Next, the mayor will sign off the final strategy, to be put before the London Assembly, which of course also has right of veto. That will start in the next couple of months.

WHAT HAS THE CONSULTATION PROCESS DELIVERED?

We've been surprised by the level of response – not just about air quality. The proposal to develop London as a national park city has also gained a lot of traction.

We've also been focusing on delivery. This year we launched the £34 million Energy for Londoners programme, aiming to turn London into a zero-carbon city by 2050, subject to central government doing what it should to decarbonise the National Grid.

We've launched a reverse solar auction programme, piloted in five boroughs. This will gauge interest from home owners in

putting solar panels on their roofs, to negotiate lower prices for those panels. This will help to increase London's installed solar power by 100MW by 2030. If that's successful, we will roll it out across London.



"We need better co-ordination between various bodies, to identify what underpins water stress in London"

Shirley Rodrigues: transforming London into a green pioneer



Under pressure: London's population will rise from 8.5 million to 11 million by 2050

LONDON 2050 – THE TARGETS

By 2020

- All new development will be zero-carbon
- London will have an ultra-low-emission zone (ULEZ)

By 2030

- London will send no waste to landfill
- It will recycle 65% of its waste
- It will have 100MW+ more solar capacity
- It will source 15% of its energy from renewables and community energy

By 2040

- London will have a zero-emission bus fleet

By 2050

- London will be a zero-carbon city
- Half the city will be green spaces
- It will have 10% more tree cover

WHAT ARE YOUR PLANS FOR GREEN INFRASTRUCTURE?

We want green infrastructure integrated into the planning system. We want that replicated across London, whether that's green walls or integrating parks into new developments. Developers need to understand that they must deliver an additional element.

We have the metrics that they will have to calculate, that they can meet in lots of different ways, preferably including parks and open spaces in new development. It's for the developers to judge how that's implemented – we will produce the advice.

WILL THAT GUIDANCE BE ENFORCED?

We don't have powers of enforcement. It falls to local authorities to consider planning applications and enforcement, but that enforcement has been outsourced. We've been advocating to government to enforce emissions and other standards on construction sites, for example.

HOW WILL YOU BOOST BIODIVERSITY SO THAT DEVELOPMENT DOESN'T REPLACE BUT DELIVERS NET GAIN?

We've worked with Natural England, the Heritage Lottery Fund and the National Trust to calculate London's natural capital. It's then about setting out the benefits of natural capital to flood

6 PILLARS FOR CHANGE

1 GREEN GROWTH

The London environment strategy aims to transform London's mean streets to green streets, halting and reversing the decline in biodiversity. It aims to replace lost natural resources as the city tackles its housing shortages and upgrades its creaking transport infrastructure, monitoring new developments to ensure that they include green spaces and boost natural capital.

London's eight million trees contribute an estimated £133 million to the city's economy, removing pollution, reducing surface-water flooding and storing some 2.4 million tonnes of carbon. The city's parks and green spaces have a gross asset value of some £91 billion. The strategy will invest in green infrastructure, increasing London tree cover by 10 per cent.

2 AIR QUALITY

London's pollution levels topped their annual targets barely a month into new year. Air pollution is responsible for some 9,000 premature deaths a year in the capital. In November, the London Atmospheric Emissions Inventory revealed that every part of London exceeds safe limits for toxic PM2.5 particles.

Some 7.9 million Londoners live in neighbourhoods where PM2.5 levels top safe limits by at least 50 per cent. Average annual levels in central London are almost double World Health Organisation limits.

The strategy names air quality as "the most pressing environmental threat to the future health of London". Ms Rodrigues will expand London's ultra-low-emission zone (ULEZ) by April next year, introducing tougher penalties for older, more polluting vehicles.

The strategy also focuses on noise pollution. The mayor's office opposes the proposed third runway at London Heathrow Airport.

3 WATER SUPPLY

London's water-supply systems and sewers are under growing strain. Its Victorian sewers are cracked and ageing. Fourteen London rivers fall short of European Union standards, ranked bad or poor and the capital loses a fifth of its clean water supply to leakages.

Meanwhile, the city is threatened by flooding and by drought. Water demand will outstrip supply by 10 per cent by 2025, the gap widening to 21 per cent by 2040. The Thames Barrier, managed by the Environment Agency, must be replaced within a generation to prevent flooding upstream.

The 2050 plan puts sustainable urban drainage and natural flood management front and centre of the battle to maximise London's water resources.

LONDON'S ENVIRONMENTAL CHALLENGES

- London is home to 16% of England's population
- Its population will rise from 8.5 million to 11 million by 2050
- 9,000 early deaths annually due to air pollution
- Water demand will outstrip water supply by 2025
- A forecast water-resource gap of 100 million litres a day by 2020 and 400ml/d by 2040
- 20% of the city lies on the Thames flood plain
- 21% of water supply lost to leakage
- 37,359 homes face a high to medium risk of tidal/fluviat flooding
- 80,650 properties at high risk of surface-water flooding
- Only half London's 7 mto of rubbish is recycled
- Landfill capacity will run out by 2026
- Carbon dioxide emissions are too high
- Half of all Londoners have poor access to public open space
- 10% of households live in fuel poverty
- 10% of electricity substations are close to full capacity
- 2.4 million Londoners are exposed to illegal levels of noise

HOW CLEAN ARE LONDON RIVERS?

Number of water bodies	47
Rivers ranked bad	5
Rivers ranked poor	9
Rivers ranked moderate	31
Rivers ranked good	2

WHY LONDON RIVERS FAIL TO MEET THE EU'S WATER FRAMEWORK DIRECTIVE

- Diffuse pollution from road run-off
- Foul-water misconnections
- Pollution from treatment works
- Modifications; canals, culverting etc
- Constraints on the combined sewer system

SOURCE: LONDON ENVIRONMENT DRAFT STRATEGY, 2017



prevention or sequestration of carbon – all the things to take into account – and to implement guidance.

It's about rolling that out, getting finance directors and local councils to understand that they must take these natural assets into account. It's tricky because local authority budgets are hard-pressed, due to massive cuts over the last few years. But it's about spelling out the benefits from green infrastructure.

GIVEN THE CUTS, HOW CAN COUNCILS DELIVER THOSE OBJECTIVES?

It's going to be tough, but they must do it. London's local authorities have powers and responsibilities. The mayor's job is to set the strategic focus, whether in environmental planning, or transport or housing, working with other stakeholder organisations.

Councils' technical capacity has been stripped back and they are looking for advice. In areas where we can help, we will seek funding. The Greater London

Authority has a good record securing money from the European Commission for technical assistance, for example, helping local authorities to roll out heat networks.

Ultimately, the statutory responsibility lies with the local authorities – although we have some £9 million of funding in place for green spaces, for which local authorities can bid to plant trees or develop green infrastructure, for example.

HOW CAN LONDON IMPROVE ITS WATER SECURITY?

We need better co-ordination between various bodies, to identify what underpins water stress in London. City Hall can identify the big issues and tell the water companies – primarily Thames Water – to do more to address leakages. The decisionmaking comes from the water companies.

It's for City Hall to set the strategic framework and for developers to build in ways to be more water-efficient. That comes back to Thames Water doing more

"We see the London environment strategy as a template for England... With challenges such as climate change, the matter is urgent now. We need to take action"



Groundwork for a greener future: London mayor Sadiq Khan

to roll out its water meters. Irrespective of the modelling and the ways we can narrow the supply/demand gap, the Environment Agency can't do it alone; we need a new water resource for London.

We will do our own analysis to ensure that any new water resource is appropriate to the needs of London's growing population. We expect local government to safeguard land for this new supply. But we all need to think more imaginatively to tackle this.

HOW CAN CITY HALL MAKE THE WATER COMPANIES MORE ACCOUNTABLE AND MORE WILLING TO INVEST?

When I started, we called Thames Water in to discuss its performance, particularly the leakage rates. It's incumbent on the new chief executive, the shareholders and the regulator to improve performance. The mayor has been clear that the performance being delivered in London is not great.

This winter, London had a couple of major water main bursts and a freeze-thaw. Customers don't have great confidence in water companies and we are trying to hold them to account regarding compensation and strengthening the regulator's powers. Water companies must adopt a long-term approach, rather than make a quick buck.

THE THAMES BARRIER WILL NEED TO BE REPLACED. WHAT'S THE TIME FRAME, AND HOW MUCH MIGHT THAT COST?

The level of investment depends on where and what it is. It took a good 40 years, from conception to getting the original Thames Barrier built. In terms of rising sea levels, we are confident that we are secure for now and that the Environment Agency is taking the right approach.

We have a couple of options for where [the barrier] might be and the EA has spoken to Thurrock Council about safeguarding that land. The mayor supports the EA objection. We must ensure that water companies recognise that this will take longer than the five-year AMPs – that they put money aside now for feasibility work.

HOW CAN THE UK JOIN UP ITS VARIOUS INITIATIVES TO IMPROVE ITS URBAN ENVIRONMENTS POST-BREXIT?

We need an independent environmental body to hold the government to account, to allow the public to bring cases as Client Earth has recently, regarding air quality. The public has no route to do so at present. That body must monitor progress, post-Brexit and set stronger, health-based targets.

We want current EU standards transposed to the UK, to build on what has been achieved so far. We need a body that can set standards and targets that are updated and reviewed. There are numerous options, from the committee on climate change, which has a legal basis, to the [former] Sustainable Development Commission, which was an advisory body. We need a body that has teeth.

Am I confident? Let's see... No.

Meanwhile, London is getting on with it. We see the London environment strategy as a template for England. The main obstacles are powers and funding – but there's a lot that the mayor can do, with his influence and his reach. With challenges such as climate change, the matter is urgent now. We need to take action.

Funding is one thing. But we need powers to move fast. ●

4 GREEN ENERGY

One in ten London electricity substations is approaching full capacity. City Hall will work with London's local authorities to expand the capital's energy infrastructure.

The environment strategy recognises that London can never be self-sufficient in energy. It aims to make the capital more self-reliant, focusing on renewables, particularly solar energy and on turning waste into biofuels.

Energy for Londoners will tackle the energy poverty that forces one in ten households to choose between heating their homes and buying food. It will identify ways to generate more low-carbon energy, improving energy efficiency by promoting smart meters, and helping Londoners to negotiate better deals from providers of energy and clean technologies.

5 WASTE AND RECYCLING

London will run out of landfill capacity within eight years. Tackling single-use plastic is a priority. More recycling, more conversion of waste into biofuel and initiatives to promote the circular economy aim to turn London into a zero-waste city by 2050. Tomorrow's motto is reduce, reuse and recycle more.

By the end of the decade, London's waste authorities will face minimum standards for recycling and food waste. This aims to cut food waste by a fifth by 2025.

6 CLIMATE CHANGE

Better monitoring and understanding the impact of climate change will help London to become more resilient to rising seas and extreme weather.

City Hall will work with the Environment Agency to plan how and when to replace the Thames Barrier, for completion in the 2030s or 2040s.

It will press London's water companies to shore up supply and reduce leakage rates to make supply more secure, efficient and sustainable.

Urban planning and planting will take account of changing temperatures.

GREENER PLANNING

The mayor's new environmental strategy for London pledges a "radical new approach", bringing "a fundamental change to the way London thinks about its parks and green spaces". It aims to unlock the value of green infrastructure to mitigate the decline in quantity and quality of London's green spaces by:

- Making London the first national park city, launching a Greener City Fund to plant more trees and improve green spaces
- Increasing and improving green infrastructure in areas where Londoners have the least amount of green space
- Applying a new urban-greening factor to evaluate planning applications for new developments
- Protecting London's green belt from further development
- Launching a London Green Spaces Commission to fund, manage and value green spaces and nature
- Setting up a Natural Capital Account to measure the economic value of London's green spaces
- Creating a planning system that protects biodiversity to offset new development.





URBAN TREES: BOON OR BURDEN?

Environmental campaigners love them. Council planners and contractors can be less keen. But are urban trees valuable assets, or obstacles to regeneration? And how do you measure their worth? **Karen Thomas** reports

In Sheffield, police arrest two dozen local people after clashes over plans to fell nearly half the city's 36,000 trees. Down south, the vicar of St Pancras Church chains herself to a tree outside Euston station, opposing plans to fell 200 London planes to make way for HS2.

These are just two recent cases in which urban trees have made national headlines, communities pitted against contractors, campaigners against local-authority planning departments and central government.

The UK lacks data to show how many

of its estimated four billion trees are rooted in towns. But urban trees support complex eco-systems. They cut air pollution from traffic, store carbon and regulate our climate, cleaning and containing water, intercepting rainfall, reducing soil erosion and creating shade.

US studies report that trees boost property values – even that shoppers spend more at retail outlets surrounded by greenery. Trees also contribute in ways that are hard to quantify, softening the urban landscape, creating nicer places

to live and work. The trouble is, we need more research into numbers and into the benefits that urban trees bring.

“Research suggests that even moderate increases in canopy cover within cities can aid adaptation to the adverse effects projected under a changing climate,” a recent Forest Research-led study concludes. “Yet a baseline value for many of the UK’s towns and cities is not known; nor is it known whether canopy cover is changing and, if it is, whether it is increasing or decreasing.”

But sometimes – especially in towns and cities – trees are just inconvenient.

The HS2 rail link will cut journey times between Birmingham and London to just 49 minutes. Phase one cuts a 230km track through Middle England’s cities, towns and countryside. A lot of trees stand in the way. The Woodland Trust says the first phase alone threatens 36 ancient woods and will disturb 27 more. HS2 says 32 ancient woodlands will be directly affected.

HS2 Ltd will plant seven million trees, of more than 40 species, reintroducing threatened species such as Midlands hawthorn and black poplar to create more than 9 sq km of new woodland between London and Birmingham. It will create a green corridor for wildlife, to cover 33 sq km for phase one.

The new woodlands will be more resilient to climate change. Having consulted the Forestry Commission and Woodland Trust, HS2 Ltd has been sourcing seeds locally and from locations up to 5° latitude further south, that suit warmer temperatures. “We will also translocate soils, which contain valuable seed banks and spores, to recreate these woodlands’ ecosystems at new sites,” a spokesman told *The Environment*.

DISPUTES

To compensate for ancient woodland lost to the project, the government has launched a £5 million fund. However, the high-speed rail project will also cost urban trees. HS2 Ltd has no numbers for these and supplied no compensation figure for trees lost to towns and cities.

The UK government plans to plant 11 million trees during this session of parliament and to expand England’s woodland cover to 12 per cent by 2020. Despite this, critics say urban trees are under threat.

“Anecdotal evidence and local research suggest a drop in tree canopy and that the number of trees in UK towns and cities is going down,” says Barrell Tree Consultancy (BTC) founder Jeremy Barrell. “Local authorities find trees expensive to maintain and we are losing trees to mismanagement at a local level.”

Last September, Wandsworth council felled 51 mature chestnut trees on Tooting Common in South London after finding leaf-miner infestations, despite local opposition. Experts had argued that careful pruning could save the 140-year-old chestnuts.

"Council leaders say spending cuts restrict the options – forcing them to claw back the £500,000 cost of saving the trees from budgets such as social care"

In Sheffield, the city council has awarded a £2.2 billion PFI contract to Amey for highway maintenance that will see the contractor fell and replace 17,500 of the city’s 36,000 trees by 2037. By March, 6,000 trees had been felled.

Campaigners say Amey is removing healthy trees unnecessarily. Local MPs and even environment secretary Michael Gove have urged Sheffield to stop felling. The council says the trees in question are dangerous, dead, dying, diseased, damaging to footpaths or properties or an obstacle to prams and wheelchair users.

Sheffield council guidelines present 25 alternatives to felling problem trees. But council leaders say spending cuts restrict the options – forcing them to claw back the £500,000 cost of saving the trees from other budgets, such as social care. By early April, however, the council had paused the felling to review new evidence from *Trees for Cities* and the Woodland Trust.

COUNTING THE COST

Although the government’s recent 25-year plan for the environment calls on planners to include natural capital in decision-making, it says nothing about urban trees. “There is nothing in there about the built environment – and that’s staggering when

more than 80 per cent of us live in an urban environment,” Mr Barrell says.

“We also hoped to see urban trees included in the National Policy Planning (NPP) draft review. What we have is a beefing-up of legislation regarding ancient trees that effectively ignores millions of urban trees that maybe aren’t special but that are doing the grunt-work to make our towns and cities better places to live.”

How do we value a tree? Many tree experts use Capital Asset Value for Amenity Trees (Cavat) to value a tree as a general public asset rather than as property of a local authority or landowner.

The National Association of Tree Officers says Cavat uses extrapolated and adjusted replacement cost to measure functionality. “[Cavat] is socially progressive, in that it uses official UK population figures to calculate the Community Tree Index (CTI) factor, used to adjust the functional value, according to local population density,” it says.

Applied to individual trees, the measurement integrates computerised inventories and management systems to work out the value of individual or group of trees, to determine asset-value management for trees (AVMT).

AVMT works out how the value of tree stock changes over time, and how that relates to investment, to demonstrate “productive and cost-effective use of financial resources and provide an argument to safeguard the budget for continued planting and management”.

Cavat calculations suggest that the Tooting Common chestnuts were worth £2.6 million within the local environment and that the trees to be felled in Sheffield are worth £66 million “at least”, Mr Barrell says.

Tree officers also use i-Tree assessments, a US system that analyses on an annual basis the structural value of a population of trees, to work out what to do with damaged trees or those said to be damaging property.

Wandsworth has replaced the 51 lost chestnuts, planting 64 small-leaf lime trees on Tooting Common. The whole exercise cost more than £83,000. Wandsworth said: “These 64 new trees are a native species and, over time, will support greater biodiversity than declining, non-native horse chestnuts, which are increasingly falling prey to infection diseases.”



Sheffield campaigners say Amey is removing healthy trees unnecessarily



Wandsworth council has felled 51 mature chestnut trees on Tooting Common

QUALITY, NOT QUANTITY

But is urban tree cover a game of numbers? “In my view, numbers is a silly place to start,” says Forest Research head of urban forest research Kieron Doick. “What matters is the size of the tree and its health and condition... Our research indicates that large-stature, mature trees deliver most benefit – and that it’s the size and volume of the tree canopy that is critical.”

In forestry, the time to fell trees to maximise timber production is often 30-80 years. “But urban trees can often live for much longer than this and continue to deliver ecosystem benefits for decades, and sometimes centuries,” BTC’s Mr Barrell says.

“Newly planted trees must establish those ecosystems from scratch. Early-stage trees provide perhaps 10-15 per cent of the benefits that a tree delivers across its full lifecycle. The community therefore loses 80-90 per cent of the value of a tree... that is only at the beginning of its payback phase to the urban environment.”

Some local authorities are expanding their canopy cover, however. Treeconomics director Kenton Rogers praises London’s Ealing Council for its 10-year tree-planting programme.

"What matters is the size of the tree and its health and condition... Large-stature, mature trees deliver most benefit – it's the size and volume of the tree canopy that is critical"

The council measured its canopy cover and completed a full i-tree eco study to determine what species to plant where and at what intervals.

“Often, what it takes is having someone pro-active – a champion for trees,” Mr Rogers says. “Ealing worked with the local NGO, Trees for Cities. In these times of austerity, it’s about collaboration; finding ways to achieve more with less.”

England’s Urban Forests, a recent report by Urban Forestry and the Woodland Advisory Committee Network, recommends towns and cities work towards 20 per cent tree-canopy cover and that coastal settlements work towards 15 per cent.

Having a mix of species of different ages protects urban trees against disease, says architect Sue James, a member of the Trees and Design Action Group (TDAG).

“Trees start to deliver their major benefits at 30+ years, which is why it is so tragic to have situations like Sheffield, where trees now delivering benefits are cut down and replaced with new plantings, which will neither replace canopy lost, nor deliver the same level of ecosystem benefits for another 30-40 years,” she says.

TDAG has met DEFRA to urge the government to draw up a national policy for trees. “A change of mindset is needed; it would be good if all local authorities had robust tree strategies embedded in planning law, enforcing national standards,” Ms James concludes. ●

TDAG will publish *Trees, Planning and Development: a guide for delivery in November*. Help citizen scientists to map the UK’s trees at Treezilla.org

CITIES' URBAN TREE CANOPY-COVER TARGETS

CITY	TARGET FOR TOTAL CANOPY COVER, %	DEADLINE
Bristol	30	not specified
Greater London	25	2025
Wrexham	20	2025
Plymouth	20	2034

URBAN TREE-CANOPY COVER IN ENGLAND, IN NUMBERS

HIGHEST: Farnham, Surrey
 LOWEST: Fleetwood, Lancs
 URBAN CENTRES WITH MORE THAN 30% COVER: 8
 URBAN CENTRES WITH LESS THAN 10% COVER: 40
 MEAN URBAN TREE-CANOPY COVER, ENGLAND: 16.4%
 MINIMUM RECOMMENDED, COASTAL TOWNS: 15%
 MINIMUM RECOMMENDED, OTHER TOWNS: 20%

SOURCE: CANOPY COVER OF ENGLAND'S TOWNS AND CITIES, 2017

WHAT HAVE THE TREES DONE FOR US?

BENEFITS TO GOODS AND SERVICES	HEALTH BENEFITS FOR
Improved air quality	Respiratory ailments
Trapping pollutants	Respiratory ailments
Improved water quality	Cuts risk of Legionnaire's disease, e-coli, Weil's disease
Environmental impact	Mental health, blood pressure, sport and exercise
Natural shade	Protection from UV rays, reduced dehydration

SOURCE: FOREST RESEARCH, 2018

WHAT WE'VE LEARNED FROM IPBES' GLOBAL BIODIVERSITY REPORT



● AMERICAS

US\$24 trillion	Value of land-based biodiversity
65%	Percentage in decline
21%	Percentage declining strongly
31%	Populations of species decline since European settlement
40%	Projected populations of species decline, European settlement-2050
IPBES says:	In the Americas, rich biodiversity makes an immense contribution to the quality of life, helping to reduce poverty, while strengthening economies and livelihoods.

● AFRICA

20%-30%	Drop in lakes' productivity by 2020
54%	Urbanisation by 2030, up from 39% in 2003
2.5 billion	The continent's population to double by 2050
50%+	Of birds and mammals lost to climate change by 2100
500,000 sq km	Is over-exploited or suffers from salinisation, erosion and pollution
IPBES says:	Africa's natural resources and diverse heritage are important strategic assets. Africa is the world's last habitat for numerous large mammal species, but plants, fish, amphibians, reptiles, birds and mammals are threatened by man-made and natural causes.

● EUROPE AND CENTRAL ASIA

50%	Decline in biodiversity, 1960-2016
15%	Drop in per capita water availability since 1990
42%	Decline in land-based animal and plant species since the last decade
73%	EU freshwater habitats with unfavourable conservation status
51%	Decline in wetlands in western, central and parts of eastern Europe since 1970
IPBES says:	Only 7% of European Union marine species and 9% of marine habitat types enjoy favourable conservation status. More than a quarter of species assessments and 66% of habitat-types assessments have unfavourable conservation status.

● ASIA-PACIFIC

0	Exploitable fish stocks by 2048 if current fishing practice continues
2%-3%	Annual growth in urbanisation
90%	Of region's corals will suffer severe degradation by 2050
60%	Of grasslands degraded by over grazing, farming and invasive species
12.9%	Drop in forest cover in southeast Asia 1990-2015
IPBES says:	Over the past 25 years, marine protected areas increased almost 14% and terrestrial protected area by 0.3%. Forest cover increased 2.5%, up 22.9% in northeast Asia and 5.8% and in south Asia. However, these gains don't do enough to halt net losses of biodiversity.

THE INTERGOVERNMENTAL Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) carried out a three-year, four-region study. It assessed biodiversity and ecosystems in the Americas, Asia-Pacific, Africa and Europe/central Asia. IPBES chair Sir Robert Watson said: "Biodiversity and nature's contributions to people sound, to many people, academic and far-removed from our daily lives. Nothing could be further from the truth — they are the bedrock of our food, clean water and energy. They are at the heart, not only of our survival but of our cultures, identities and enjoyment of life. The best available evidence... points us now to a single conclusion: we must act to halt and reverse the unsustainable use of nature — or risk not only the future we want but the lives we currently lead."

THE COACHING CLUB



How can you make your organisation more diverse and inclusive? Jacobs has launched a pilot coaching and mentoring scheme. Vice-president solutions and technology **Tania Flasck** explains how it works

WHAT IS THE COACHING CLUB; WHAT NEEDS DOES IT ADDRESS?

The coaching club is a pilot initiative I have trialled with my teams to develop our so-called high potentials. It's a participant-driven, customised approach to personal development. Using guidance and sponsorship, we aim to equip people to amplify their capabilities to grow their ideas, overcome challenges and solve problems.

Jacobs has numerous mentoring initiatives across the organisation. It supports mentoring with training and guidance on the role of a mentor and empowers local regions and leaders to tailor these to their own needs. Coaching aims to bring out the best in the participants using honest, constructive performance feedback.

Participating cohorts complete self-assessments, giving them greater awareness of strengths and areas to build on. This supports personalised plans for self-development with one-on-one and group coaching sessions, encouraging

participants to experiment with tasks to develop skills. We encourage them to share their progress with the wider cohort over six to eight months.

WHAT DOES JACOBS DO WELL – AND LESS WELL – WHEN IT COMES TO DIVERSITY AND INCLUSION?

Jacobs has a strong history of valuing diversity and inclusion. We're committed to accelerating our efforts to attract and retain a globally diverse talent base. The acquisition of CH2M, an industry leader in this respect, has enabled us to redouble our diversity and inclusion efforts, and to update our global strategy this year.

We are creating an environment where employees and supply-chain partners thrive because Jacobs invests in them and in an inclusive culture. Our network groups represent all walks and experiences of life – with company investment and sponsored by our top executives.

These groups include the Jacobs Women's Network, the Jacobs Futures network for new and recent graduates, Jacobs Next for mid-career professionals, Jacobs Colours and LiFE for LGBT+ professionals. Assist, care, educate (ACE) networking supports physical, cognitive, caregiving and adaptive abilities. VETNET supports military veterans and families. Our STEM Ambassador network

works with UK schools to attract young people from diverse backgrounds to pursue careers in science, technology, engineering and mathematics.

These networks make Jacobs more inclusive. That said, we continue to act to accelerate our diversity and inclusion agenda. In the UK, our equality, diversity and inclusion committee is working on career-lifecycle initiatives, starting with STEM outreach, to develop a pipeline to attract a more diverse workforce.

In mid-career, more of our employees need flexible working, due to lifestyle choices, parental leave or looking after sick or ageing parents. Our policies are evolving to be more flexible and to lead the way in this. And with career progression, we need honest conversations to understand unconscious bias. All of this involves active mentoring, coaching and sponsorship.

WHAT CRITERIA DO YOU APPLY TO IDENTIFY COLLEAGUES WHO WOULD BENEFIT FROM THE COACHING CLUB?

We started with our high performers. We have a leadership-identification process that we constantly review and update. This enables us to track employees' performance and potential to progress and support them through their career stages.

HOW DO YOU DETERMINE INDIVIDUAL TRAINING/DEVELOPMENT NEEDS?

A senior leader helps participants to look at:

- Self-awareness: assessment stage to understand personal strengths, improve self-awareness and identify the focus for further development
- Self-development: personalised coaching plans for each participant over six months to develop specific skills, with assignments that add value to the business
- Shared learning: regular facilitated group check-ins to share experiences and ideas for improvement
- Each participant has a personalised learning agenda to include specific skill development ideas, but group also learn from each other in learning cohorts.

"Jacobs networking groups include the Women's Network, Jacobs Futures, Jacobs Next, Jacobs Colours and LiFE for LGBT+ professionals"



Coaching club: "seek out different thinkers to get more from the conversation"

HOW DO YOU FIND THE RIGHT SENIOR MANAGER TO TACKLE THOSE NEEDS?

Based on our conversations and on the learning agendas, it becomes clear what skills the individual needs in a mentor. One participant wanted to better understand the commercial aspects of project management. She benefited from coaching with a very experienced project manager familiar with varied commercial issues, and from contractual coaching from our legal team.

When participants build their own learning agendas, we test the content with the team and discuss the outcomes they want, to identify the type of mentor that will help them to achieve their learning objectives.

HOW DOES THE COACHING CLUB FIT WITH JACOBS' WIDER TRAINING AND DEVELOPMENT STRUCTURES?

As a global organisation, we empower local regions and leaders to tailor mentoring to their own specific needs. Our wider training and development programmes combine formal, informal coaching and mentoring and on-the-job experience.

We use virtual and eLearning programmes to deliver some formal learning. Our company-wide leadership development programmes and resources also support our people leaders. We help our people to consider what they want

from their career development.

Empowering people to consider what they want to achieve in the next few years, then working backwards to what that means right now, helps to focus on specific training requirements; how they want to develop and what help they need. This enables more targeted training and development to align with their personal goals.

"I encourage people to seek out people they respect and can be challenged by, as that's how you learn and grow" *Tania Flasck*



WHAT OUTCOMES DO YOU HOPE TO ACHIEVE FROM THE COACHING CLUB PILOT?

We aim to demonstrate measurable impact on performance using metrics. These range from the measure of participant satisfaction with the

programme to changes in knowledge, skills and attitudes.

Using a learning agreement enables participants to document the required skills and knowledge and how this is gained through participation in the club, sharing the information with their line managers.

Analysis of these agreements, with follow-up both during and after participation, allows us to measure and document learning in a consistent way. We also track whether participants apply the knowledge, skills and information they gain and how they are being supported. If they don't feel supported, we ask why. We also gather data to identifying the participants' skill gaps, as well as strengths.

We continue to obtain data at key intervals during and after the coaching programme, to determine how effectively participants apply and implement learnings. We also aim to measure business impact such as employee turnover/ retention and productivity.

WHAT HAVE YOU GAINED FROM COACHING CLUB?

I truly love the coaching club. I probably enjoy participating as much as the members and learn so much myself from the conversations we have. ●

SNAPSHOT CV: TANIA FLASCK

Tania Flasck graduated with a degree in environmental science, then studied agriculture. She spent her early career commissioning and operating water and waste water plants in the US and UK.

Ms Flasck worked globally in project delivery, strategy and business development, becoming vice-president for a large portfolio of municipal infrastructure projects in the US. Three years ago, she joined Jacobs as programme manager.

As UK vice-president water and energy, Ms Flasck has more than 600 people report to her. Her latest challenge is taking on a new role in solutions and technology.

Mentoring has been crucial to her own career development. "I would not have been able to do what I do now, or have the career I have, without the support of both mentors and sponsors," she says. "I encourage people to seek out people they respect and can be challenged by, as that's how you learn and grow. Seek out different thinkers – you will get a lot more from the conversation."

WHAT SHOULD THE UK DO TO IMPROVE ITS AIR QUALITY...?



In March, the UK government announced new funding to fight pollution, setting up a £260 million clean-air fund. The money will support local efforts to fight pollution, with charging points for electric vehicles, incentives for low-emission taxis, cycle routes and feasibility studies.

The package follows plans that the

Department of Environment, Food and Rural Affairs announced last year to curb roadside emissions of nitrogen dioxide (NO_x). The plan requires councils with the highest concentrations of air pollution to take immediate action.

Meanwhile, ClientEarth has taken the UK government to court over illegal air pollution. In February, the High

Court ruled that government plans to combat the problem are “seriously flawed” and unlawful.

The UK could also face huge fines from Brussels for breaching European Union regulations. The Environment asked seven leading experts a simple question: what should the UK do to improve its air quality?



Left to right: James Thornton, Nick Molden, Eman Martin-Vignerte, Robert Evans, Brendon Harper, Andy Eastlake, Tompion Platt

CLIENTEARTH FOUNDER, JAMES THORNTON

The UK track record on air quality is dire. Legal limits on pollution came into force in 2010 and have been breached across the country ever since. We have won three court cases confirming the government needs to kick-start co-ordinated action to protect the nation's health, but we're still not seeing the commitment needed.

In March, a super-inquiry by MPs from across the political parties criticised the government's reticence to do anything about poor national air quality. The report came up with a suite of recommendations, many of which directly echo what ClientEarth has been calling for.

The car industry, which is partly responsible for this mess, has still not been pushed to pay its share of getting us out of it. We should follow countries like Germany, seeking to hold them to account.

Air pollution is not a London-only problem – illegal levels of nitrogen dioxide are charted across the UK. We need a national network of clean-air zones to filter out the most polluting vehicles from the most polluted parts of towns and cities.

We also need a nationally co-ordinated scrappage scheme to help car owners move to cleaner transportation, but the government failed to commit to this in its recent consultation response, passing the buck again to local councils.

We look forward to announcements from the government about bringing forward the 2040 ban on the sale of new diesel and petrol vehicles, and hope to see new legislation that upholds people's right to breathe clean air.

EMISSIONS ANALYTICS FOUNDER AND CHIEF EXECUTIVE NICK MOLDEN

At a macro level, we need information: lots of our problems come down to a lack of it. With passenger vehicles, we

have had poor regulations that are badly monitored and full of loopholes. Cars and vans emit a lot more – particularly NOx – than the official figures indicate.

On average, NOx emissions from cars are five times the official level. In the worst cases, it's 20 times higher – and it's legal. The official measurement system has historically not been monitored or enforced properly. Legally, these vehicles are optimised to the standard.

The UK has 11 million high-emitting diesel cars on the road, and they're not all old bangers. Lots are less than three years old. And that excludes several million high-emitting diesel vans. We are not meeting our air-quality targets, because fleet owners and individuals have invested in these vehicles – often in good faith.

Parts of the UK breach their annual emissions targets days into the new year. The only smart way to solve this is to discriminate between cars and vans that are good and those that are bad. Because the official figures don't give that information, Emissions Analytics launched the Equa Air Quality (Aq) Index to measure vehicles' real-world NOx emissions.

You can't solve this problem if you base your policy on European standards when the reality is five times worse than the official data reveals. We tested 1,000 European vehicles to enable towns' and cities' policymakers to base decisions on real-world information.

This lack of real-world data also applies to construction-industry vehicles. We are working with King's College London, visiting building sites to test the vehicles' emissions. Again, we're reporting much higher emissions than the official, rated level.

The irony is that the data is so much better for heavy trucks, which proves that this can be done – that regulation works. Where things have worked well for trucks, they've worked very badly for cars and vans.

New on-road vehicle certification,

called Real Driving Emissions, is a powerful tool – but it's come far too late to solve the UK's air-quality problem. We must tackle our dirty diesel problem.

ROBERT BOSCH HOLDING DIRECTOR EMAN MARTIN-VIGNERTE

Air quality is already improving in most of the country. Over the past few decades, emissions of every pollutant have reduced considerably. NOx emissions, the focus of much of the debate, have reduced by around two-thirds since 1990 and are still dropping.

This doesn't mean that we can become complacent; much more can be done. Road transport is not the only major emitter; vehicles account for around a third of NOx emissions and less than a sixth of particulates. However, it has become the focus of the air-quality debate.

Long term, electric vehicles will improve air quality in city centres. The industry has made a lot of progress on internal combustion engines. A modern diesel car emits 84 per cent less NOx than in 2000, hardly any particulates thanks to the use of advanced filters and 16 per cent less CO₂ than 2010.

Industry is spending £2.5 billion a year on better solutions, not just for tailpipe emissions. Bosch has launched a brake disc that generates up to 90 per cent fewer particulates. Reducing engine emissions is only part of the solution; technology to let vehicles use the roads more efficiently is also key.

When connected vehicles start talking to each other and the surrounding infrastructure, route guidance can automatically change to minimise congestion and drivers will never need to search for an empty parking space again.

Computers drive more efficiently than humans; even semi-automated functions like adaptive cruise control contribute to reducing emissions. There is no technological silver bullet to

improve air quality, but a considered, broad combination of solutions can make a real difference.

CENEX ADVANCED TECHNOLOGY INNOVATION CENTRE CHIEF EXECUTIVE OFFICER ROBERT EVANS

Improving air quality means cutting transport emissions and steps that encourage zero-emission vehicle (ZEV) uptake are an obvious way forward. Cenex has been investigating the city journey to zero-emission transport, learning from transport and energy projects in cities with that commitment, including Amsterdam and Copenhagen.

This means understanding the business case for all types of moving vehicle and how they can be transitioned to plug-in electric or hydrogen fuel-cell vehicles. It also means a change in energy use and integrating zero-emission vehicles with energy infrastructure, especially renewable and distributed power generation.

When it comes to policy, we need a new UK Clean Air Act. The Private Members Bill submission by Geraint Davies MP provides a model template. It combines measures to improve air quality, including encouraging ZEVs, taking measures to lower emissions from the mainstream market and recommending an improved inspection regime to identify gross polluters.

For the policy debate on air quality, Environmental Protection UK (EPUK) is a hugely important organisation, as it brings together a multi-stakeholder community to focus on this issue, with a continuity that outlasts successive governments.

CROSS RIVER PARTNERSHIP AIR-QUALITY PROJECT MANAGER BRENDON HARPER

With air pollution contributing to nearly 40,000 premature deaths a year, improving UK air quality is a public health challenge that affects us all. Although some indicators show a slow improvement in air quality, we will only reach legal limits and WHO-recommended targets if we all tackle the challenge from every angle.

Clean air requires strong leadership and regulation from all levels of government. The Mayor of London's

world-leading ultra-low-emission zone will reduce emissions significantly, and the government's recently announced £260 million funding will help local authorities to up-scale their action.

However, we require further leadership and action, such as diesel vehicle and building boiler scrappage schemes.

Businesses play an important role. Employers can encourage and enable staff to cycle to and from work and reduce staff travel fostering an e-conferencing culture. And as consumers and polluters, they can operate cleaner fleets and greener buildings like UPS and The Crown Estate in London. They can use their purchasing power to influence suppliers, favouring those that operate clean fleets.

We need action at an individual level, supporting citizens to walk, cycle and use public transport wherever possible, and to switch the family car to an electric model. Those of us who shop online should think about how purchases are delivered and click and collect to consolidate deliveries and reduce van miles.

LOW CARBON VEHICLE PARTNERSHIP MANAGING DIRECTOR ANDY EASTLAKE

This is a big question that deserves a detailed answer, but I would say mass-market engagement in the challenge and personal solutions are at the root of the solution.

My area of interest and expertise is road transport, one of the primary focal points. Although road transport perhaps offers some of the best solutions too, changing the cultural paradigm appears to be a generational shift. We can't afford to take that long.

The vision of our transport system is of integrated, connected, zero-emission vehicles operating at maximum efficiency, seamlessly transporting us and our goods around town and country, complementing a wide range of healthy travel solutions.

However, our resolute desire to retain our personal car and to protect that perceived bastion of independence at all costs, rather than embrace it as a piece of the wider system for the overall benefit, is perhaps the biggest roadblock to change.

Creating the mindset and convenience of a fully integrated mobility solution where costs are much better levelled and

presented, using the most appropriate vehicle in the optimum way, is the obvious choice for all.

In the very near term, rebalancing the costs between private and public transport and efficient and convenient goods delivery, would enable the environmental impacts that few really engage with to be reflected better in the financial impacts that everyone does.

Encouraging rapid cleaner-vehicle uptake and clean-air zones, implemented effectively to discourage inefficient private car use where better alternatives exist and can be effective, is perhaps the most visible step we can take to ensure everyone begins to understand and engage with the impact of their personal activity.

LIVING STREETS HEAD OF POLICY AND COMMUNICATIONS TOMPION PLATT

Motorised traffic is the biggest source of air pollution and so the focus must be reducing car use.

High pollution levels harm everyone, but the risk to children's health is even higher; their exposure is greater and they retain pollutants in the body for longer. Almost one in four cars on the road at peak time is people on the school run.

The myth that children are protected from air pollution inside the car is not true. And when they walk, they benefit from being more active – vital, when just a fifth of children achieve the recommended 60 active minutes a day required to be fit and to maintain a healthy weight.

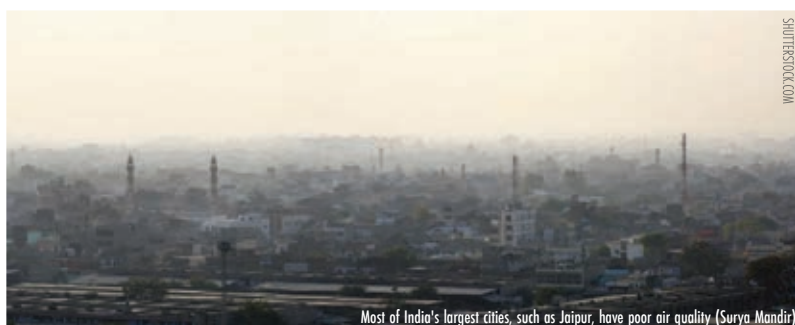
School street closures, closing the street to motorised traffic at drop-off and pick-up times, encourage more families to walk to school. Research this year from ClientEarth found that most parents back air-pollution exclusion zones around schools.

However, schools and local authorities must go through an onerous process to put these closures in place – in our experience, it takes at least 18 months. This needs to be made easier.

WOW, the year-round walk to school challenge from Living Streets, offers collectable badges to children who walk to school at least once a week. On average, schools that take part increase their walking rates by 23 per cent with a corresponding drop in cars around the school gates. ●

INDIA – POPULATION PRESSURE AND AIR POLLUTION

Home to fourteen of the world's 15 most air-polluted cities, India accounts for at least quarter of global deaths from air pollution. **Sanjeev K Kanchan** spells out the scale of the problem



Most of India's largest cities, such as Jaipur, have poor air quality (Surya Mandir)

India faces serious air-pollution problems, due to rapid urbanisation and industrial growth. Increasing vehicle numbers and population growth are creating serious environmental problems.

A 2018 World Health Organisation (WHO) report named 14 Indian cities among the 15 most polluted worldwide. Nearly 90 per cent of Indian cities have levels of PM₁₀ emissions 1.5 times the national norm of 60 microgram/cu m. Only 2 per cent comply with the norm.

Air pollution is one of the most critical threats to human health and its impact is visible in India. Of seven million deaths worldwide because of air pollution, nearly two million happen in India. A report published in the *Journal of Indian Pediatrics* last year notes that Indian children reach adulthood with lungs that are nearly 10 per cent smaller than normal. This has worrying implications for India's 1.3 billion people.

The causes of air pollution in India are complex and diverse. Poverty makes a significant contribution to pollution. India must grow and produce more to meet the requirements of its vast population, from agriculture, industrial products, energy, infrastructure and transport. All generate pollution.

POWER

Take the need for electricity: nearly 300 million Indians have no access to it. Huge electricity demand, the availability of coal and other energy sources' technical limitations make coal-based electricity the most viable option for the coming years.

Coal-based electricity production has expanded rapidly, to some 200GW. But this sector emits more than half of Indian industries' particulate matter and sulphur dioxides, 30 per cent of nitrogen oxides (NO_x) and more than 80 per cent of mercury. Meanwhile, other polluting industries such as cement and steel production are growing fast and need power.

"India's capital Delhi is one of the most polluted cities in the world, a classic case of a city in which the weather contributes to pollution"

Industry is not the only culprit. Other sources of air pollution include vehicle emissions, road dust, burning waste, diesel generators and emissions from homes. Because waste management is poor, many people burn their waste.

Inadequate power access mean that diesel generators and fossil fuel cooking stoves generate more pollution.

Indian cities face a cocktail of problems. However, vehicle emissions are among the biggest sources of air pollution. Population growth requires more transport and constraints on public transport infrastructure are putting more and more vehicles on India's roads. Many vehicles feature diesel engines and outdated technologies and are poorly maintained. Congestion, badly maintained and dusty roads and poor traffic management make air pollution worse.

Nearly 40 per cent of urban-based Indians live in 46 cities of more than a million inhabitants. Most of those cities have poor air quality – but we can only guess how bad it is. Most cities do not have data. Just 5 per cent – 303 cities out of a total 6,166 – monitor their own air quality. And just 57 monitor air quality in real time.

SMOKING GUN

Delhi, the capital, is one of the most polluted cities in the world. It is a classic case of a city in which the weather contributes to pollution. A landlocked city, Delhi suffers additional air pollution when farmers in neighbouring Rajasthan, Haranya and Uttar Pradesh burn crop residues.

In winter, low wind speed and falling temperatures invert pollutants, creating dangerous smog. Last November, a west Asian dust storm that lasted for several days in Iraq, Kuwait and Saudi Arabia led to Delhi being covered in smog. Delhi's particulate matter levels rose to PM_{2.5} to 640microgram per cu metre from its normal level of 60 microgram per cubic metre, as an average over 24 hours. ●

Sanjeev K Kanchan is programme manager for environmental governance and industry at the Centre for Science and Environment in New Delhi. In the next issue of *The Environment*, he looks at how India is tackling poor air quality

SOUTHEAST WATER FIRMS SET OUT THEIR STRATEGIES



Five members of the Water Resources in the South East Group came together to present their water-resources management plans. **Karen Thomas** reports

Five of the six southeast water companies invited their stakeholders to a joint resources-planning event in April, to set out their achievements in the current five-year plan and to present their priorities for the next cycles, to 2080.

UK companies must deliver their final water-resources management plans (WRMPs) to Ofwat by September. Water Resources in the South East Group (WRSE) members Southern Water, South East Water, SES, Affinity and Portsmouth Water

held the briefing without Thames Water, the group's sixth member.

WRSE members' goal to 2080 is to develop a regional water grid that will move a billion litres a day to where customers need it. The members plan nine new transfers; two from outside the WRSE region, two between companies in the region and five within

BY 2045, 4.1 MILLION MORE PEOPLE WILL LIVE IN THE SOUTHEAST – THAT'S AN INCREASE OF 21 PER CENT

companies' own areas. "We are looking at how to improve these connections in a more cost-effective way," South East Water head of water resources and environment Lee Dance told the gathering. "We are also planning to look outside our own area."

WRSE members have identified 24 so-called big-ticket schemes that can deliver 15 million litres a day, or more. They have whittled down their plans to 19 schemes.

Southern Water director of wholesale water services Helen Simonian said the firm has cut consumption levels by 16 per cent during the current plan, thanks to its drive to install water meters. Southern has reconfigured its supply networks to secure 11.3 million litres of water to improve its resilience to drought and to protect the Medway catchment from flooding.

Southern will need to boost its water supply by 50 per cent, or 230 million litres a day, by 2070 to adjust to climate change and population growth. To reach its 2070 targets, Southern is focusing on abstraction licences, reducing leakage rates by 15 per cent and cutting average individual water consumption to 100 litres a day.

It plans to invest £1.6 billion in new infrastructure.

South East Water expects to have installed meters for 90 per cent of its customers by 2020. Dr Dance says the current plan will reduce per capita water consumption

by 21 litres, even though 47,000 new homes are being built. The water company has cut the volumes lost to leakage by 2.3 million litres a day.

By 2080, South East Water is facing a 53 per cent increase in population to more than 3.3 million people, and new pressures from climate change. It plans to increase the amount of water it supplies by up to 294.2 million litres a day, cutting leaks, introducing water-saving measures and building new infrastructure.

This could require £1 billion of new investment in infrastructure including reservoirs, recycled water, new sources, regional transfers and even desalination plants.

SES Water wholesale services director Tom Kelly says the percentage of customers using meters from 46 per cent to 60 per cent during its current plan.

It is maintaining leakage levels below 15 per cent and has helped customers to reduce their consumption by three million litres a day. The company has invested £14 million in infrastructure, including upgrades at the Woodmansterneworks treatment plant.

Facing population growth of 43 per cent by 2080, SES is working to improve its network's resilience and connectivity. By 2030, it plans to reduce leakage by at least 15 per cent, saving 3.6 million litres a day. It will roll out meters to 90 per cent of its customers by 2030, and smart metering to at least 10 per cent by 2025.

It is looking to increase abstraction in winter from groundwater in the River Mole catchment and to offer bulk

more than 60 million litres, and it plans to build a new reservoir to serve the southeast. It plans a ten-year project to improve bulk supply.

Leakage has been "a challenge" for Portsmouth Water this year, Mr Morley admitted. "We have struggled this year and are going to miss our targets. However, we hope to get back on track for the AMP as a whole," he said.

Affinity Water asset specialist Nick Honeyball says the current plan is on course to cut leaks by 14 per cent. It cut leakage rates by nearly 8 million litres a day last year, exceeding its targets to operate below its economic level of leakage, freeing enough water to supply an additional 18,000 houses.

The company has installed more than 139,700 new AMR meters. During this planning period, it will invest £500 million, upgrading pipework and taking steps to protect environmentally sensitive sites during droughts.

Initially, Affinity will focus on tackling leakage to save 18 million litres a day. It will also roll out more water meters.

Further ahead, it is studying its options to utilise brown water. "As a landlocked region, we don't have many options other than groundwater, so it's about optimising our services and changing our licences to better use what we have," Mr Honeyball said.

Affinity is looking at its options to trade with Anglian Water, South East Water and Southern Water, to use its existing licences more flexibly. Some licences revert to Affinity after 2030, which will help the company to better use its existing infrastructure. It also hopes to reduce its leakage rates by 50 per cent.

WRSE members supply 19 million customers and two million businesses. Regional demand is normally five billion litres a day, rising to nearly six billion litres during heatwaves. The members increasingly share water, making 60 transfers a day between them.

The draft WRMPs deliver 92 per cent of the total volume of water that the WRSE members' schemes can provide. Supply-side options aim to deliver 824 million litres a day of new water. Demand-side schemes aim to save an additional 18 million litres a day. ●

WRSE IS WORKING WITH NATURAL ENGLAND AND THE ENVIRONMENT AGENCY TO LEAVE 100 MILLION LITRES IN ITS NATURAL HOME

CLIMATE CHANGE COULD LEAVE THE SOUTHEAST SHORT OF WATER FROM 1.5-2.6 BILLION LITRES A DAY, UNLESS WATER FIRMS BECOME MORE RESILIENT

BY 2080, 10 MILLION MORE PEOPLE COULD LIVE IN THE SOUTHEAST, EQUIVALENT TO 10 NEW CITIES THE SIZE OF BIRMINGHAM

SOUTHEAST WATER, SUPPLY AND DEMAND

WATER COMPANIES	6
MAJOR RIVERS	8
COASTLINE	700 miles
CUSTOMERS	19 million
BUSINESSES	2 million
NORMAL WATER DEMAND	5 billion litres/day
HEATWAVE WATER DEMAND	>6 billion litres/day

supply to South East Water from 2035, from its Bough Beech treatment works.

Portsmouth Water regulation manager Steve Morley says the company has supplied 230,000 water-saving devices since 2015. Its current plan has delivered new supply to Southern Water, enhanced the rivers Hamble and Elm and focused on tackling leaks and improving resilience.

Its 25-year goal is to cut leakage rates by 15 per cent, install more water meters, from a low base of just 30 per cent, adding 5,000 meters a year. By 2045, it wants to increase its supply by a third, to

WRSE SETS OUT THREE SCENARIOS TO INVEST IN RESILIENCE. THESE PROJECT INVESTMENT COSTS OF £17.6 BILLION, £26 BILLION, OR £28 BILLION



A river restored, making Wandle Park a lovelier place to visit

A RIVER RUNS THROUGH IT

For 45 years, a hidden river flowed, forgotten, through a culvert beneath South London's Wandle Park. Now it has been reopened. **Marc Pieris** of Royal HaskoningDHV and Croydon Council's **Tom Sweeney** and **Andrew Dickinson** report

For more than 45 years, the River Wandle was buried beneath Wandle Park in Croydon, south London, having been culverted in the Sixties in response to urbanisation and growing water quality problems. Over time, local people forgot the river was there. But five years ago, Croydon Council led an ambitious regeneration project, reopening the river and transforming the park.

In 1890, Wandle Park was formed from water meadows to provide green space for Croydon's rapidly growing population. In 1967, the river was diverted into a concrete box culvert 3m below ground level and the original river channel filled in. Two manhole covers and a line of willow trees

were the only visible clues that a river flowed beneath the park.

Local people used the park for dog walking and recreation, but incidents of vandalism and anti-social behaviour were increasing. In 2010 Croydon Council identified an opportunity to regenerate the park, centred around daylighting – or deculverting – the River Wandle.

The council secured funding from several sources, including the Heritage Lottery Fund (HLF), The Big Lottery Fund, the Environment Agency, the Greater London Authority and, through a Section 106 developer contribution linked to a new housing development that overlooks the park, with Barratt Homes.

Royal HaskoningDHV geomorphologists,

ecologists and engineers worked with Croydon Council and landscape architects LDA Design to design the new river channel and inlet/outlet structures. We faced several technical challenges, associated with flood risk, buried services and contamination, as much of the park was infilled with contaminated made ground.

The project aimed to restore the historic landscape, reconnecting the local community with its lost water heritage. The masterplan included a restored ornamental pond, community garden, wildflower planting, bandstand, natural play area, skate park and new café. More than 7,000 people turned up to the reopening in July 2013.

The project team minimised off-site disposal by creative use of excavated material in the landscape design, retaining 95 per cent of arisings on site. A remediation strategy was developed, to isolate the contaminated material with a capping layer of clean material. The design allowed for some lateral movement of the low-flow channel within a fixed wider flood channel.

MEASURING SUCCESS

It is often challenging to quantify the wider benefits that such schemes can deliver, to public health, amenity, access to nature, education, and climate-change resilience. The ecosystem services

approach, quantifying natural systems' benefits to society and using this in decision making, is gaining momentum. However, more can be done to identify the benefits of established schemes to help unlock future development and to share best practice.

Although the benefits of the scheme are tangible for anyone visiting the park today, they are not centrally measured, valued or reported. The Wandle Park project's five-year anniversary is an opportunity to reflect on the positives, and to look to future challenges.

Community engagement was central to Croydon Council's HLF application, which has financed dedicated volunteer and learning officer Andrew Dickinson. He works with councillors, volunteers, the Friends of Wandle Park group and the local community to strengthen the sense of local ownership and pride in the park.

In addition to biodiversity and restoring the historic landscape, other project benefits include:

- More than 400 new volunteering opportunities, covering everything from horticulture to event management
- Learning activities drew 360 schoolchildren to the park last year alone. More than 1,000 school children have visited in the past five years. A 2015 study shows that children who learn about the natural environment during site visits are increasingly motivated to do something different to help the environment in their everyday life
- Contractors working in the park must now include training in their tender proposals; three staff have successfully completed modern apprenticeships.
- The park has staged more than 100 community events over the past four years, around fitness, learning, food, and music
- The park is part of a network of catchment-based initiatives such as the Wandle Valley Regional Park Get Active project, and restoration work led by the South East Rivers Trust.
- Wandle Park has secured Green Flag status.

Visitor numbers have undoubtedly increased from the 47,000 visits annually estimated in 2010. Andrew's observations suggest that the demographic and overall numbers have improved, thanks to step-



"The Wandle Park project's five-year anniversary is an opportunity to reflect on the positives, and to look to future challenges"

free access, reduced anti-social behaviour, new facilities and year-round events.

Further opportunities exist to quantify park usage and benefits in future at a low cost, such as through higher education dissertations/theses or crowd-sourcing.

Citizen science, the collection and analysis of data by the public, often overseen by scientific institutes, is gaining momentum. In the UK it has been used successfully by organisations such as the Biological Records Centre recording scheme and Riverfly Monitoring Project to further scientific investigation.

Social media, smartphone apps and online resources present alternative mechanisms for data capture and analysis and can improve monitoring data and demonstrate the benefits of projects such as Wandle Park. Croydon Council is exploring these approaches, which could unlock additional data on the park and, potentially, additional funding.

Other benefits are truly hard to quantify, however. Andrew Dickinson singles out excitement from adults seeing bats for the first time on a bat walk and from school groups as unusual invertebrates are scooped out of the pond.

FUTURE CHALLENGES

Funding for Wandle Park's Volunteer and Learning Officer is due to end this year. Faced with increasing pressures on resources, Croydon Council and the

Friends of Wandle Park will need to find new and innovative ways to maintain support for the park.

Partnerships with local stakeholder groups, such as Wandle Valley Regional Park Trust will become increasingly important. The trust is exploring innovative ways to fund projects in the catchment, such as community shares and implementing HLF Resilient Heritage Funding.

The park faces catchment-based pressures, too.

Urban diffuse pollution is a key challenge for the future. Upstream booms, and planting within the river channel have improved local water quality to a limited extent. However, the Wandle catchment continues to suffer from poor water quality associated with contaminated urban runoff, accidental pollution and foul drainage misconnections within the sewerage system.

The Wandle Park project demonstrates the wider benefits of urban river restoration, beyond the immediate ones associated with physical processes and biodiversity. Appointing a dedicated learning officer has provided continuity and a focal point for community engagement. This is useful model for unlocking other urban green spaces in London and throughout the UK.

Benefits of urban river restoration are widely recognised but rarely quantified. Social media, crowd-sourcing and academic studies offer low-cost mechanisms for improving post-implementation data. As yet more pressure is placed on resources for green spaces, we need to identify new, innovative ways of funding.

Above all, the Wandle Park Project's partnerships and strategic alliances demonstrate how different organisations can work together to access a range of funding sources, improving local amenities for people and the environment, now and for the future. •

Marc Pieris is associate director at Royal HaskoningDHV. Tom Sweeney is a programme manager for walking and cycling at Croydon Council. You can contact them for more information about this project at marc.pieris@rhdhv.com and tom.sweeney@croydon.gov.uk

RUN-OFF POLLUTION: THE ELEPHANT IN THE ROOM



Two thirds of all the microplastics released into our oceans are likely to have come from our roads and we are doing little to solve the problem, writes **Jo Bradley**

Road run-off is a serious and toxic contributor to pollution in the water environment. You don't need to take my word for it; the Environment Agency (EA) itself said so in its *State of the Environment* update on water quality.

Yet, the very same report fails to call out one single action to control the toxic metals, hydrocarbons and microplastics washed into aquatic environments during peak rainfall. Why? Could it be that the problem is just too difficult to deal with?

The trouble is, very little is known about the full extent and impacts of highway run-off pollution in England and Wales because there is hardly any routine monitoring and very little enforcement.

Pervasive pollution from microplastics due to tyre abrasion might just turn out to be the biggest elephant in the room. Unprecedented new research by a team from the University of Manchester has discovered the highest microplastic pollution levels recorded in river-bed sediments anywhere in the world on an otherwise unremarkable river in a highly populated urban location in Manchester.

Published in the journal *Nature Geoscience* in March, the research revealed how high concentrations of microplastic pollution were flushed out into the sea after the 2015 Boxing Day floods. The findings reveal how much there is to understand about where and how microplastics build up, where they come from and how they are deposited in the river system and washed into the sea.

Last year a seminal report by the International Union of the Conservation of Nature estimated that two-thirds of global primary microplastic releases to the oceans are likely to be via road run-off. It suggests that in western economies with established waste-management programmes, the proportion of microplastics pollution from synthetic tyre abrasion is likely to be significantly higher than from other microplastics sources.

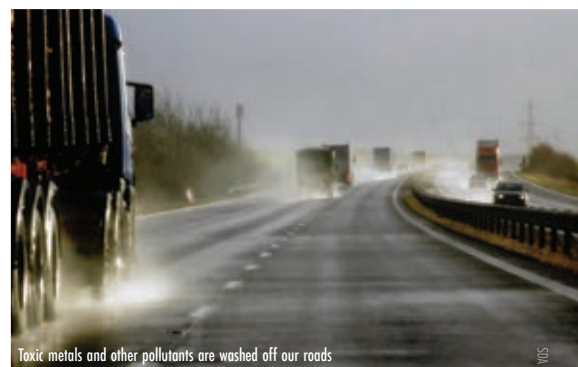
POINT-SOURCE OUTFALLS

There are about one million discharges of road run-off across the UK. These pathways are often in rural locations where there is little other pollution and the flows in the streams are low. They are point-source discharges that could be easily measured and routinely controlled.

Using Highways England drainage design guidelines, we estimate that 7,000 tonnes of contaminated sediment and microplastics is washed off England's motorways each year. Pollutants from brake and tyre erosion, exhaust fumes and oil spills bind to sediment and microplastic fragments and some metals also dissolve in the surface water.

The pollutants of most concern are copper, zinc and polyaromatic hydrocarbons such as fluoranthene and benzo[a]pyrene, which are recognised to be toxic and bio-accumulative.

Methods of controlling run-off pollution using storm-water treatment are well proven and well understood. Treatment systems such as hydrodynamic vortex separators and storm-water filters



Toxic metals and other pollutants are washed off our roads

are designed to remove pollutants. Vegetative features such as ponds and swales can be deployed where space allows, in combination with manufactured devices.

It's true that some welcome progress is being made in mitigating the impacts of pollution from highways, but a great deal more action is needed, to collect and understand data, to enforce existing regulations and to install appropriate treatment. Then, ongoing monitoring should ensure proper maintenance and track the effectiveness of the mitigation.

Since the advent of the Environmental Quality Standards Directive and the European Union's declaration of benzo[a]pyrene as a substance of very high concern, one might have expected the EA to extend its monitoring programme and to measure the impact of road run-off on rivers, streams and groundwater. Yet, across England and Wales the water-quality monitoring programme does not look for priority hazardous substances downstream of major road run-off discharges.

Looking for pollution in the most likely places is a sensible use of limited resources. But avoiding looking for pollution in the places where you think you might find it, perhaps because you'd rather not know?

That would be unforgivable, wouldn't it? •

Jo Bradley is market-development manager at SDS; www.sdslimited.com. She worked at the Environment Agency for more than 20 years

"We estimate that 7,000 tonnes of contaminated sediment and microplastics is washed off England's motorways each year"



IT TAKES A VILLAGE TO SLOW A FLOOD

Community groups have moved centre stage in natural flood-management projects around the UK. **Michael Norbury** and **Bede Mullen** report

Take a scenario: your property has flooded, and not for the first time. You know where and how that run-off is being shed from the surrounding landscape, creating the damage in your area.

The effects can be more damaging if overland flows coalesce to create a bigger impact. You see increasing urbanisation, intensification of farming and more intense rainstorms predicted, compounding the production of runoff.

If you have lived in the catchment for years, possibly all your life as many of us do, you may know who owns the land where runoff is being lost from the landscape, sometimes shedding off at unchecked and unabated rates, accelerating down slope and downstream, during heavy rain.

Natural flood management (NFM) is about upstream planning for those facing flooding. Rather than dealing with flooding near where it intrudes into property, it is about going up stream, and developing a catchment consciousness.

Catchment interventions can slow, store, disconnect and filter overland

flow pathways that coalesce in flooding downstream, affecting a community at risk. Features in the upstream landscape – building leaky dams, reconnecting former relict channels of the river and creating wetlands to act as sponges – make space to hold water.

If you have survived a flood, fear history will repeat itself and can help your neighbours and local landowners to build features to reduce flood risk, albeit by small increments, this must be a natural approach worth advocating.

Community groups and organisations in the UK are coming together, volunteering their time, strength and knowledge to combat flood-risk challenges, notably at Hebden Bridge in Yorkshire and Blackbrook in Merseyside.

JOINING HANDS

Both have flooded repeatedly, most recently and devastatingly on Boxing Day 2015.

At Blackbrook it would be necessary to retain 250,000 cu m of water upstream in the 21 sq km catchment; equivalent in volume to 100 Olympic swimming

pools, to alleviate the one-in-100-year event. Among others, St Helens MBC, the Environment Agency, Natural England, the Total Environment Partnership, Groundwork's Green Energisers and Corpus Christi School have come together to address this need.

Volunteers planted hundreds of trees and built 11 leaky and woody dams, more than 1km long. Now, 5,000 cu m of floodwater has been retained, equivalent to two Olympic swimming pools. Bio-filters reduce pollutants and sediments are settled-out.

At Hardcastle Craggs, a National Trust site, some 20 volunteers have worked almost fortnightly to build leaky dams and block gullies. They have now installed some 150 leaky dams. On both projects, volunteers contributed several months' worth of time in kind to protect their communities from flooding.

This kind of groundwork will not resolve flooding on the scale of Boxing Day 2015 in Blackbrook and Hebden Bridge. However, it creates grass-roots environmentalism, enabling citizens, organisations and landowners to work together to steward the land and hold up floodwater running off their plots.

The financial costs of flooding are one thing; the fear of floods returning to your property is another. NFM can have a positive psychological effect, enabling those who have been flooded to act to reduce future risk, albeit by very small increments.

To be effective, NFM requires people, partnerships and perseverance. We cannot understate the challenge. In Blackbrook, a solely NFM-based approach would require around 500 leaky dams.

Woody-leaky barriers are not the only means to reduce flood risk; neither is voluntary work alone. They form part of a range of measures to retain flood waters, in conjunction with expert advice.

However, community activism can spearhead community consensus on how to reduce risk, where communities and their landowners steward natural water-retention measures, across the catchment, together. ●

Michael Norbury is NFM project manager at the Mersey Forest, <http://www.merseyforest.org.uk/> **Bede Mullen** is secretary for Slow the Flow Calderdale, <http://slowtheflow.net/>

'A VISION FOR SCOTLAND'

The Center for the Study of Force Majeure (CFM) has used predictive data to produce six artworks, mapping Scotland's natural assets and the likely impact of climate change.

The Deep Wealth of this Nation, Scotland

addresses Scotland's natural assets – “the Commons” – and its flood risks. The images challenge us to create a low-carbon future, in which Scotland becomes the first country to give more to the environment than it consumes.

Scotland could lead the world in low-carbon technologies, thanks to its small population, clean air and abundant water and forests. However, the artwork reveals that Scotland's carbon footprint is three times its size – it wastes water and fails to capture run-off, making it vulnerable to flooding.

The artwork spells out an apocalyptic scenario, in which rising seas split the Scottish mainland into three major islands. It urges Scotland to harness its assets – soil, forests, clean air, water and people – to reach “an ecologically informed commons of mind”.

The project united CFM, a renowned California artistic practice, with artists and scientists from the Barn in Aberdeenshire and the James Hutton Institute in Aberdeen. Artists Helen and Newton Harrison formed CFM in 2012, at the University of California in Santa Cruz. Professor Anne Douglas and Mark Hope, co-Chairs of the Barn, invited CFM to Scotland to explore responses to climate change.

The project arose from the winter 2015-2016 Dee catchment flooding. Newton Harrison examined both the Dee and Don watersheds, whose outfalls lie on either side of Aberdeen. Farming and urban growth have reshaped the rivers' floodplains, contributing to local flooding.

CFM brings together scientists, artists, engineers and planners to design ecosystem adaptation works, focusing on regions close to tipping point thanks to climate change. To do so, it designs entropy-reducing ecological mitigation systems at scale.

“Scotland is uniquely placed among

industrialised nations to lead on the carbon issue,” Professor Harrison says. “[It has a] low population, access to land, clean air, water and forests for intense carbon sequestration, substantial scientific research and supportive communities of interest prepared to take action.”

HERE, ANNE DOUGLAS AND MARK HOPE EXPLAIN THE PROJECT:

WHAT DID YOU LEARN, WORKING WITH CFM?

This work has already fulfilled this promise in ways we could not have imagined. It is testing our assumptions of what to expect from art or science, our ability to hear diverse points of view and to engage people from different communities, seeking what needs to be done to anticipate change. We learned that questioning is a means to address our fundamental beliefs, to face the inconsistencies and contradictions of a human-centred world and to face, collectively and positively, the realities of climate change.

HOW CLOSELY DID THE EXPERIENCE MATCH YOUR EXPECTATIONS?

We initially posed a very specific, localised question: how can we, as communities along the Dee, imagine the 2015-2016 floods as symptomatic of profound changes in the environment? To our surprise, we have been gifted a vision for Scotland – even though we knew that the Harrisons tackle issues of ecology from three perspectives; local, planetary and community.

The concept draws on Scotland's cultural history, foregrounding the ethical foundation of Adam Smith's thinking, which has become lost, often destructively, in industrialisation, free-market capitalism and consumerism, impelling us to rethink the meaning of economy.

WHAT IMPACT WOULD YOU LIKE THIS PROJECT TO HAVE?

We want to sustain a critical, well-informed conversation, to lead to practical action and to policy changes that develop consciousness of climate change and adaption at a deep level. We would like these insights to support strong communities that can figure out their own responses to change, creating hope, not powerlessness. •



STAND AND DELIVER

The government's 25-year environment plan sets out welcome headline ambitions. But effectiveness of delivery will make or break the plan's much-vaunted promise to leave the environment in a better state for future generations. How prepared are we to achieve this, asks CIWEM head of policy **Alastair Chisholm**



YOU CAN'T FAULT the ambition. It's been stated since the 2015 general election and it's been followed up by pledges by Secretary of State Michael Gove that environmental standards will be put on a legal footing by an independent environmental watchdog to hold governments to account.

Mr Gove said: "We will consult on... a new, world-leading body to give the environment a voice and hold the powerful to account. It will be independent of government... And it will be placed on a statutory footing, ensuring it has clear authority."

"Our environment can be managed in a very fragmented way, with a plethora of organisations and plans, ostensibly pulling in the same overall direction, but doing it slightly differently, at different scales, with different funding streams, to different timescales, within different administrative boundaries"

So far, so promising. There is an increasing emphasis on integrated approaches to management to deliver multiple benefits, both in the plan and in how policy is shaping up on several fronts.

Departmental and functional silos are perhaps less evident than in the past.

But headline policy is one thing, the capacity to deliver another. Since 2010, austerity has cut the capacity of government agencies and it continues. Reliance on grant-in-aid has had to reduce. More for less is the mantra.

Environmental departments and agencies have suffered some of the deepest cuts. Through a combination of efficiency, the dedication of those remaining within the DEFRA family and by galvanising the sector's charitable organisations and civil society, certain areas continue to progress. But in others, the statistics tell a sober tale.

SCOPE

The 25-year environment plan is an extensive document with a broad scope. Arguably the component that has exercised many environmental organisations' thinking of is the health of the natural environment and its need to recover. It is here that some of the most complex challenges lie.

Several bodies have charted the long-term decline of UK wildlife. Some species are showing welcome recovery due to dedicated conservation measures. Others continue to dwindle. The RSPB's 2016 State of Nature study ranks the UK 189th out of 218 countries on the Biodiversity Intactness Index. Agriculture and climate change are significant factors in wildlife decline.

The encouraging factors in an otherwise often gloomy picture are that focused effort can achieve some amazing and inspiring successes.

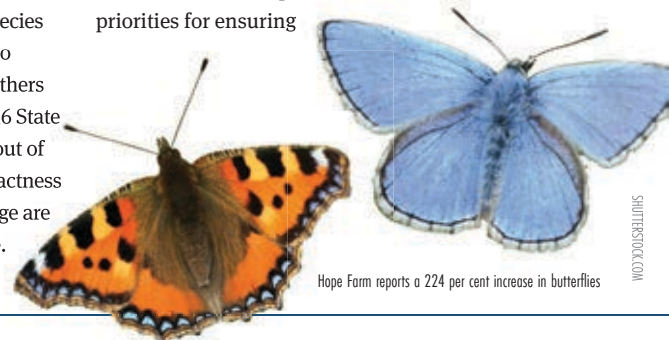
RSPB compared Hope Farm in Cambridgeshire with national trends. It found that where butterfly and farmland birds are in decline nationally, at Hope Farm butterflies have increased by 224 per cent and farmland birds by 174 per cent. This shows that the government's target is not outlandish. But it also shows that this won't happen at a national level without a lot more effort.

Progress against European Union Water Framework Directive (WFD) targets paints a similar picture. According to the Environment Agency, only 14 per cent of rivers in England are at good or better ecological status. Lakes fare marginally better at 16 per cent. But locally there are many examples of improvement in the health of our rivers, typically as charitable organisations, supported by government agencies, help to drive recovery.

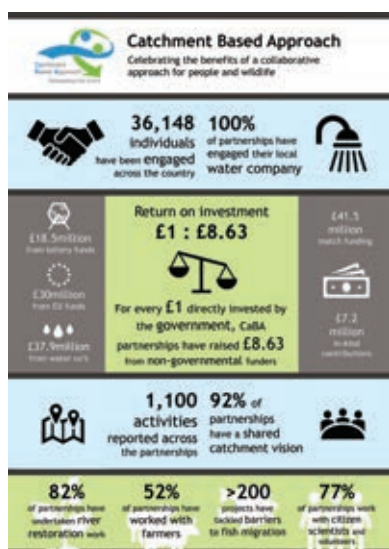
Success is eminently possible, then. But mainstreaming activities that ensure that the national picture looks more like these local examples of best practice requires more effort. And the UK must deliver this in the face of Brexit uncertainties and challenges such as development pressure, emerging pollutants, plastic pollution and climate change.

FRAGMENTATION

The 25-year environment plan emphasises "better local planning" and "more effective partnerships" as its priorities for ensuring



Hope Farm reports a 224 per cent increase in butterflies



Catchment-based approaches deliver significant third-party investment: Source: CaBA Review, 2017

“strong local leadership and delivery”. Our environment can be managed in a very fragmented way, with a plethora of organisations and plans, ostensibly pulling in the same overall direction, but doing it slightly differently, at different scales, with different funding streams, to different timescales, within different administrative boundaries.

The plan rightly identifies that this isn’t the most efficient way to deliver improvements at a broader scale.

DEFRA calls for continuing or improved reflection of local needs and priorities. However, it aims to put the underpinning administration on a more integrated, efficient footing. It recently placed the Environment Agency, Natural England and the Forestry Commission on a common geographical framework of 14 areas.

Each has common area integrated plans, due, in time, to become local natural capital plans. The plan proposes that four pioneer projects running now – marine, urban, landscape and catchment – will develop ways to engage this integrated framework of government agencies more effectively with other bodies; Local Enterprise Partnerships, Local Nature Partnerships, catchment partnerships, businesses, utility companies, local authorities and national park authorities and more.

The aim is to deliver outcomes that draw on the combined resources of those involved to deliver wider benefits than with

a fragmented approach. This approach would need oversight and co-ordination and the concept of a system operator has been proposed, though DEFRA’s thinking about how to define and operate such an entity is at an embryonic stage.

This approach might balance strategic-level oversight and prioritisation with local focus and delivery. It would need to strike the right balance between having the authority to take difficult decisions, a top-down approach, and enabling strong local delivery, from the bottom up.

DIRECTION

This seems to be welcome movement in the right direction. It should ensure improved efficiency through using common systems and data. It needs to then provide appropriate support for the bodies that will no doubt continue to be required to do much, if not more, of the delivery on the ground.

A prime example of how a certain amount of investment by government into the right kind of structures and programmes can deliver significant amounts of third-party investment is the catchment-based approach (CaBA).

CaBA works collaboratively at the river catchment level to deliver environmental, social and economic benefits. It has achieved great levels of engagement, with partnerships across 102 catchments linking with more than 36,000 people to deliver improvements on the ground. For every £1 of government support, it returns £8.63 from other investors.

Originally conceived to deliver WFD outcomes, catchment partnerships are now seen as agents to achieve improvements in natural flood management and in abstraction management. In time, they may play some role in delivering some of government’s ambitions for public benefits out of agricultural reform.

But with a growing range of outcomes to deliver against, such grass-roots delivery mechanisms will undoubtedly need greater support.

CaBA currently only has its funding confirmed on an annual basis. Longer-term funding certainty would allow partnerships to plan for the longer term, to integrate their projects better

with other organisations such as water companies, which operate on far longer financial cycles.

The 25-year environment plan set a welcome level of ambition and direction of travel. Now the focus needs to be on delivering against it. ◉

EVENTS

CIWEM – GET TOGETHER, GET INVOLVED

www.ciwem.org/events

7 JUN

Drinking Water 2018: Developments in Water quality, treatment and distribution
LOCATION: Central London

13 JUN

Ripping up the Rule Book: Regeneration, Infrastructure and Delivering Flood & Coastal Erosion Risk Management
LOCATION: Leeds

27 JUN

Urban Drainage Group summer conference and exhibition
LOCATION: Newry

5 JUL

CIWEM Annual General Meeting 2018
LOCATION: Leeds

18-19 JUL

Diffuse pollution: evidence, effective practice and lessons for policy, practice and investment
LOCATION: Central London

6-8 NOV

Urban Drainage Group autumn conference and exhibition
LOCATION: Blackpool

CIWEM organises events across the UK and internationally

For full information visit www.ciwem.org/events

Contact the events team on +44 (0)20 7831 3110 or email events@ciwem.org

To sponsor an event call +44 (0)20 7269 5810 or email sponsorship@ciwem.org

CIWEM – MEET THE TEAM

Sarah Anderton joined the CIWEM policy team in March as policy advisor with specialist knowledge of rural affairs



TELL US WHAT YOU'RE DOING AT CIWEM

My role at CIWEM is to contribute a rural perspective to our policy

work. It's such an exciting time at the moment for the environment and for farming. We have the Department for Food and Rural Affairs (DEFRA) Agriculture Bill, the government's 25-year environment plan and post-Brexit regulation to engage with. There's certainly lots to keep me busy.

TELL US A BIT ABOUT YOUR BACKGROUND

I completed a bachelor's degree in rural land management, then joined the Central Association of Agricultural Valuers (CAAV) in 2014. There, I worked on a wide range of policy matters affecting rural landowners and land managers, from agricultural subsidies to water quality and quantity issues. Seeing the effect that policy has on the ground has inspired me to contribute to its development, to help to make sure it's as practical as possible.

WHO INSPIRES YOU?

Sir David Attenborough, who inspires so many people. I absolutely loved Blue

Planet II and have been trying to reduce my waste to help to protect our environment.

WHY DO YOU ENJOY WORKING FOR CIWEM?

Environmental issues are so important to us all, but they have sometimes been overlooked in the past in favour of issues that can be more easily monetised. Working for CIWEM gives me the opportunity to work with members to ensure that policy makers know about – and prioritise – environmental issues.

IN MY SPARE TIME, YOU'LL FIND ME...?

In Richmond Park. Come rain or shine, I know I'll feel better for having spent a while looking out for deer and getting my boots muddy. ●

Connect with Sarah online at: <https://uk.linkedin.com/in/sarah-anderton>

Rachael Bliss joined CIWEM in April, as head of learning and development services



TELL US WHAT YOU'RE DOING AT CIWEM

My objective is to ensure that CIWEM delivers best-in-class education

and training that supports professional development needs at every career stage in the water and environmental management sector. I will work with our clients, in the UK and internationally, and with subject experts to develop new, high-quality courses online and face-to-face that meet this objective.

TELL US A BIT ABOUT YOUR BACKGROUND

My original dream was to become a barrister: I was called to the Bar in 2010. Because the market had crashed two years earlier, pupillages were few and

far between. I had spent my summers at university working at ProTech Computer Systems, writing user manuals for customer relationship software for the not-for-profit sector. This introduced me to working with professional awarding bodies.

After university, I qualified as an ADR-accredited civil and commercial mediator and volunteered with West Midlands Police Authority as an independent custody visitor and appropriate adult. This taught me how to communicate effectively – as well as the value of having the support network of family and friends that we so often take for granted.

I then joined the learning and development team at CLT International, which provides training to the Society of Trust and Estate Practitioner, as assistant programme developer where I designed professional education and training. There, I worked my way up to client

development manager.

In 2015, I completed my Masters in advanced legal practice. That gave me an insight into the difficulties that my clients also face.

WHO INSPIRES YOU?

Throughout her life Oprah Winfrey has had a lot to deal with. She has never let it get in the way of her ambition and drive. Oprah inspires me to be the best version of myself, to believe in myself and in my abilities, and to follow my dreams.

WHY DO YOU ENJOY WORKING FOR CIWEM?

Working for a chartered institution enables me to help support the development of people's professional careers which is really rewarding.

IN MY SPARE TIME, YOU'LL FIND ME...?

Playing netball, having golf lessons, at pilates or spending time with family and friends. ●

Connect with Rachael online at: <https://www.linkedin.com/in/rbliss/>

EDUCATION AND TRAINING

CIWEM LAUNCHES SMARTER LEARNING TOOLS

CIWEM has been supporting professional development for people working in the water and environmental management sector since 1895, writes **Rachael Bliss**



CIWEM TRAINING: completing our courses demonstrates your commitment to your profession

IN THE LAST TWO YEARS, CIWEM has trained more than 300 industry professionals in the UK alone. Our course tutors are leading experts in their fields, who combine academic and practitioner experience to deliver the best possible learning experience.

Over the last few months CIWEM tutors have worked hard on updating our course materials to reflect the latest legislation, regulation, practices and procedures.

Our eLearning courses are fully online

and we deliver them to you through a learning platform that provides you with the flexibility to study from anywhere at any time.

The platform features a discussion forum, allowing you to interact with the course tutor and to network with your fellow professionals on the course. We are also about to launch some new, interactive learning resources and self-assessment tools to improve the way we deliver education and training.

FUTURE CIWEM COURSES

4 JUNE

ELEARNING MODULES:

- SLUDGE TREATMENT AND MANAGEMENT

SUMMER 2018, DATES TO BE FINALISED:

MENTOR TRAINING MASTERCLASS

3 SEPTEMBER

ELEARNING MODULES:

- AN INTRODUCTION TO THE UK WATER INDUSTRY
- ANAEROBIC DIGESTION
- CALCULATIONS OF LOADINGS AND CONCENTRATIONS
- CONSTRUCTED WETLANDS
- DISINFECTION OF WATER AND WASTEWATER
- MUNICIPAL WASTEWATER TREATMENT
- POTABLE WATER TREATMENT
- SLUDGE TREATMENT AND MANAGEMENT

We are often asked to explain the benefits of completing a CIWEM course. For you, as an individual, it's about enabling you to demonstrate up-to-date technical knowledge. That knowledge validates your professional competence and enables you to deliver even better service to your clients.

Completing our courses also demonstrates your commitment to your profession. It can help with career progression, to advance through the various CIWEM membership grades and to meet your annual continuing professional development (CPD) requirements.

For you, as an employer, our courses help you to increase your teams' technical knowledge, enhancing your business' reputation and boosting levels of customer satisfaction and your employee retention rates.

Course prices range from £200-£750 and we can offer discounted rates to CIWEM business partners.

We are busy developing a variety of new technical eLearning modules and professional skills courses, so watch this space for further details. •

To find out more, please contact me on +44 (0)20 7269 5829 You can also email Rachael.Bliss@ciwem.org or visit www.ciwem.org/training.

UK JUNIOR WATER PRIZE: KRTIN LANDS HIS SECOND WIN



SUTTON GRAMMAR SCHOOL student Krtin Kanna Nithiyanandam has won CIWEM's 2018 UK Junior Water Prize for the second year running.

Krtin's 2018 project uses smart-phone technology purify contaminated water in a cost-effective way. He impressed the judges with his presentation and interview skills and with the technical

content of his project, *Employing computer vision and cellulosic bio-composites for rapid, automated and cost-effective water analysis and purification.*

Leona Irwin and Olivia Winter were highly commended. Leona looked at *Investigating the hygiene of dispensing rehydration therapies in developing countries in relation to infant mortality.* Olivia's Rain, hydro project looked at generating electricity from rainfall on large roofs.

Seventeen-year-old Krtin will fly to Sweden in August during World Water Week to represent the UK at the Stockholm Junior Water Prize, competing against young water inventors from more than 30 countries.

CIWEM organises the annual competition in partnership with the

Stockholm International Water Institute (SIWI), with Environment Agency support. Finalists visited Cranfield University in April, meeting the Gates Foundation-funded Nano Membrane Toilet research team and Dr Chole Sutcliffe, research fellow in water and food system resilience.

"We have had another fantastic year judging the UK Junior Water Prize," says CIWEM chief executive Terry Fuller.

"I was taken aback by the quality and complexity of projects this year and inspired by the young people driving innovation for solving major global environmental challenges." ◉

For more information, visit
www.ciwem.org/uk-junior-water-prize
or email victoria.west@ciwem.org



We are proud to announce our new business partnership with

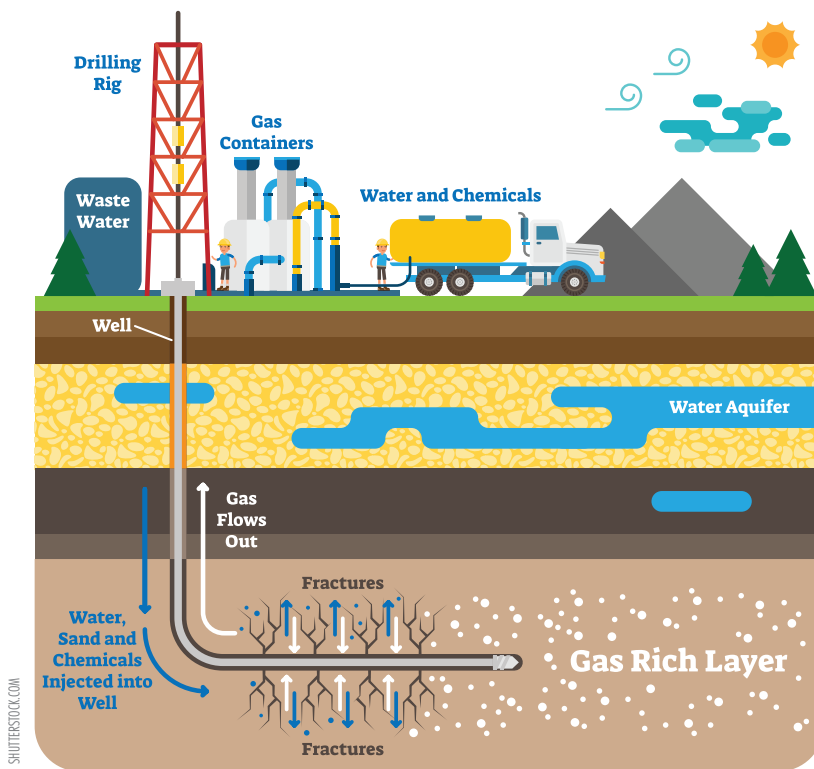


To discuss how a partnership with CIWEM can benefit your business email businesspartners@ciwem.org

LETTERS

FRACKING AND ENERGY POLICY

In April, Fellow Member **Kristian Ravnkilde** wrote to ask why The Environment hasn't generated "a vigorous debate" about fracking. Here, two writers pick up Kristian's gauntlet...



THE ELEPHANT IN THE ROOM, regarding utilisation of gas, is that a very high proportion of properties in this country are heated by gas and cook by gas. Heating is often one of the main items of expenditure in such households. Even with current significant subsidies for renewables, electricity is three times the cost of gas per kW/h. The thought that folk will spend three times as much by changing to heating with electricity is pie in the sky.

Official records show that even at

peak output, current wind power can only match the few remaining coal-fired stations; some days it hardly provides anything. In the recent cold spells only ramping up these coal stations to maximum allowed enough gas to be diverted to heat homes.

These coal-fired stations are being decommissioned and several nuclear power stations as well. Even a massive increase in wind-produced electricity will struggle to reliably make up for these losses, never mind replace gas.

If Mr Ravnkilde thinks we are not going to be needing gas very soon, he lacks the evidence to support his view.

UK dependence on imports of gas makes us very vulnerable to supply interruption. The current situation with Russia should make us very aware of this. If they turned off the supply, even for a few days, this could cause a crisis.

We have opportunity, with fracking, to give ourselves some independence and we should do so. I am confident that, with a little experience of the procedure, any safety issues can be addressed. Had we taken Mr Ravnkilde's attitude when we started coal mining, the industrial revolution would never have taken place and we would have been heading back to the stone age.

The regulations that were applied to that industry led to far fewer accidents than might have been expected in a much more dangerous operation than fracking.

Norman Grocock, MRSC MCIWEM ◉

"Coal-fired stations are being decommissioned and several nuclear power stations as well. Even a massive increase in wind-produced electricity will struggle to reliably make up for these losses, never mind replace gas. If Mr Ravnkilde thinks we are not going to be needing gas very soon, he lacks the evidence to support his view"

THE SUBSTANTIAL LETTER from Kristian Ravnkilde concludes that fracking is unnecessary and that we should spend resources on energy saving and renewables. This conclusion, because it is widely accepted, begs closer examination.

To start off, who are 'we'? Are we the 100 million or so Nigerians living on less than \$2 a day? The suggestion that the poor should save our planet by



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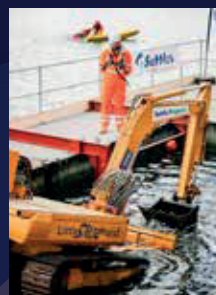
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Courses commencing 2 July 2018:

- Introduction to the UK Water Industry (£175)
- Anaerobic Digestion (£440)
- Calculations of Loadings and Concentrations (£250)
- Constructed Wetlands for Pollution Control (£528)
- Disinfection - Water and Wastewater (£250)
- Municipal Wastewater Treatment (£650)
- Potable Water Treatment (£650)

NEW COURSES COMING
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E: learning@ciwem.org T: +44 (0)20 7831 5829.

*Prices are excluding VAT

CIWEM



changing their light bulbs is little short of obscene. These billion or more in poverty worldwide create unsustainable population increase, the underlying driver of existential threats to the planet; global warming, species extinctions and depletion of natural resources. By 2050

"Nuclear fission is more than a million times more energy-dense than any other available resource. These reactors are placed below ground level, providing a level of security not achieved with most industrial-scale alternatives"

the indications are that Nigeria, with a population then reaching 400 million, may become the third most populous nation after India and China.

The available information indicates that national average energy use and prosperity

are closely linked. Countries are in poverty if below an annual electricity consumption of 2,000 kWh/h per capita.

Nigeria's average annual electricity consumption is only 150 kWh per capita, among the lowest in the world – just 7.5 per cent of the 2,000 kWh/y threshold below which unsustainable population growth can be expected.

Renewables are good news for autonomous local supply in the underdeveloped tropics. However, to provide 2,000 kWh/y/person, they lack the necessary energy density of industrial alternatives. By 2030, liquid-fuelled molten salt fission reactors will be safer, cleaner and cheaper, harnessing energy at a lower price than any alternative carbon-free, industrial-scale energy resource.

Nuclear fission is more than a million times more energy-dense than any other available resource. These reactors are placed below ground, providing a level of security not achieved with most industrial-scale alternatives.

It is reported that there are significant

programmes all over the place for coal-burning plant, with new investment in Japan, Malaysia and more. Squeaky-clean Germany now gets 40 per cent of its energy from coal.

Fracking provides a welcome opportunity in the short term – until better nuclear technology is industry-standard – to replace all coal burning with gas. With effective carbon taxing, market forces alone will close down fracking as new nuclear becomes available.

No need to tighten regulations to extinguish fracking: just seek coherent and rational energy policy from all the players.

**Jasper Tomlinson, MA (Oxon) CEnv
MCIWEM AMIMechE** ◉

The Environment enjoys readers' feedback and encourages you to debate the latest issues. Email karen.thomas@ciwem.org with the word LETTER in the subject line to respond to previous articles, share information or question CIWEM's experts. Contributions are edited to space and style constraints.



ANINDYA PHANI/2017 CIWEM ENVIRONMENTAL PHOTOGRAPHER OF THE YEAR

SUSTAINABLE DEVELOPMENT? TIME TO ADJUST THE DISPLAY



A single, powerful image can bring the complex challenges we face into stark focus, writes CIWEM chief executive
Terry Fuller

CIWEM's environmental photographer of the year competition is now in its 11th year. The main purpose is to highlight environmental impacts, both positive and negative, and to be a catalyst for action.

The image that you see here is *Journey to School* by Anindya Phani. It was a runner-up in the 2017 competition. Rising sea levels and higher intensity of monsoon in southern Bengal has led to hundreds of villagers losing their homes, land and community infrastructure, including their road to the school.

I like this image because it portrays an essential, everyday activity while highlighting how fragile it can be. It shows how the most vulnerable can be impacted by climate while showing a determination

to carry on. For 70 years The United Nations Development Policy and Analysis Division has published a *World Economic and Social Survey*. These annual reports provide insight into world economic conditions, trends and prospects.

The *World Economic and Social Survey* 2017 pointed to evidence that climate-related events are causing greatest harm to the poor and vulnerable. Families living in poverty often occupy land susceptible to impacts from extreme climate such as low-lying areas and so there is an obvious link to a changing climate and increasing risk.

What I find more interesting, though, is that climate is shining a light on governments' policies and investment decisions and how they are looking after their people. The report suggests that climate change per se is not the biggest

reason for increasing risks to the lives of the poor and vulnerable. It is lack of investment that would address entrenched inequalities.

Climate change is shining light onto situations in a way that helps us to see what else is wrong with the ways that people are treated.

Equality and inclusivity are very strong themes of the United Nations' Sustainable Development Goals (SDGs). While there are specific goals relating to climate change and safeguarding our natural environment, it is recognised that these are crucially important to achieving the vision established by each of the SDGs.

My analogy is to think of climate change and environment as the brightness and colour controls on a display screen. Adjustments to both can bring a new understanding and perspective on what we are seeing as well as giving us the ability to make the world we see better or worse.

There are many ways that would inhibit young people in this world from having access to education. If it takes an image of rising water levels to bring these into focus then, perversely, that is no bad thing. ●

UKWIR Research & Communications Administrator

GENERAL INFORMATION

COMPANY: UK Water Industry Research Ltd (UKWIR)
POSITION: Research & Communications Administrator
REPORTING TO: UKWIR Chief Executive
LOCATION: Based in central London but some home working is possible
HOURS: Full time
REMUNERATION: Negotiable depending on experience

COMPANY INFORMATION

UK Water Industry Research (UKWIR) was established in 1993 by the UK water industry to facilitate and manage collaborative research on 'one voice' issues.

UKWIR's members comprise 20 water and sewerage operators in England and Wales, Scotland, Northern Ireland and the Republic of Ireland. We are a small team based in a central London office and our objective is to procure and ensure delivery of research projects to our members. Projects are often carried out in collaboration with government departments and regulators including Defra, the Drinking Water Inspectorate and the Environment Agency. Some work is also undertaken in collaboration with research organisations internationally.

WHAT WILL THE ROLE INVOLVE?

The role is a full-time position comprising coordination of and assisting with the development of UKWIR's programme of research projects, company communications and the management, recording, approval and distribution of research reports. There will be ample opportunities to develop expertise and competences as part of the role.

WHAT SKILLS ARE REQUIRED?

ESSENTIAL

- Developing, delivering and sustaining a communications strategy
- Ability to work as part of a small team
- Working closely with our website provider in developing the site
- Events management
- Good communication, organisational and administrative skills
- Effective IT skills

DESIRABLE

- Experience of working in the water and wastewater industry
- Broad understanding of project management
- Strong attention to detail and proof reading skills
- High degree of initiative and ability to work independently
- PR experience

Apply in writing, by Friday 8th June 2018, with your CV, to:
 Hans Jensen, UKWIR Limited, 36 Broadway, London SW1H 0BH
hjensen@ukwir.org.uk

UKWIR Strategic Programme Manager

GENERAL INFORMATION

COMPANY: UK Water Industry Research Ltd (UKWIR)
POSITION: Strategic Programme Manager
REPORTING TO: UKWIR CEO
LOCATION: Based in central London but home working is possible
HOURS: Full time
REMUNERATION: Negotiable depending on experience

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WHAT WILL THE ROLE INVOLVE?

The purpose of the role is to develop, manage and deliver UKWIR's strategic research programme. The programme will be developed by supporting and working with UKWIR's Programme Leads to develop, promote and answer a number of Big Questions that the industry faces. The role also comprises building relationships with potential collaborators and co-funders, managing communications and overseeing the project management of the specific projects in the programme.

The role will be a full time position, with ample opportunities to develop expertise and competences as the role develops.

WHAT SKILLS ARE REQUIRED?

ESSENTIAL

- Ability to work closely with research colleagues in the water industry throughout the British Isles
- Develop good relationships with relevant UKWIR Programme Leads
- Good communication and organisational skills
- Good strategic perspective
- High degree of initiative and ability to work independently
- Experience in project management and delivery

DESIRABLE

- Experience of working in the water and wastewater industry
- Experience in managing and delivering programmes of work
- Broad knowledge of IT
- Contract management experience
- Ability to work as part of a small team
- PR experience

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- Validated UV System Upgrades
- Full Disinfection for Marginal Chlorination
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