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FOR ENVIRONMENT AND SUSTAINABILITY PROFESSIONALS

Dec/Jan 2019/20
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PLUS

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Pond life Monitoring nutrient levels in water systems

Helping habitats The environmental net gain requirement debate

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Upfront

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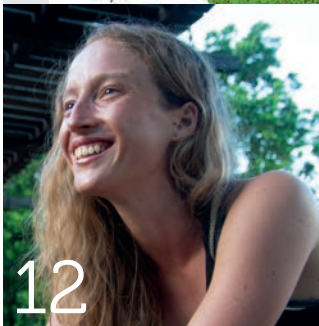
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bit.ly/34uXTdv

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bit.ly/2OR4GaW



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TOBY ROBINS, INTERIM CEO OF IEMA

Action stations

I EMA's growth rate since I joined as operations director in June has, for the best of reasons, restricted the time available for musing on the outside world. One message has got through loud and clear, though: public demonstrations have a valuable role to play in raising profile, showing politicians, policymakers, businesspeople and the public that issues must be added to agendas if we are to effect change. However, it does not matter how well-intentioned a demonstration is – it will not solve the problem alone. Politicians canvassing on the doorstep may encounter single-issue concerns such as flooding or plastics but, while this adds to the creation of a mandate, it demands solutions, rather than offering them. After all, demonstrations are not actions. Actions are provided by people with the relevant knowledge and skills to deliver the change that is required. That's where IEMA members come in.

It should come as no surprise that the increasingly strong mandate for change has translated into increasingly strong growth for IEMA's membership, and growing demand for our courses and training. This year we have trained people in 35 countries, and nearly 40 universities now have accredited courses. More and more corporates and public sector bodies are collaborating with us under our Partnership Programme schemes to deliver initiatives and training, in order to upskill workforces as the cry for change gets ever louder.

What has been most pleasing for me personally during the past couple of months, in my current role as interim chief executive, has been encountering the passion and enthusiasm of our members – especially those who are at the outset of their careers. This was shown by the 100 attendees at the IEMA Futures event in Salford, the focused commitment from young people at the NUS SOS Awards and workshop, the young professionals who arranged the inaugural Birmingham City IEMA Regional Hub Event, the hundreds of students who visited our stand at university careers fairs throughout the autumn, and the dedication of 40 young professionals who gave up their Saturday to join the Global Environmental and Social Assessment Group workshop.

These are the people who will not just drive the change we need, but will also deliver it – leaving me with ever-increasing confidence for both the future of our profession and the impactful delivery of IEMA's vision.

"The increasingly strong mandate for change has translated into increasingly strong growth for IEMA's membership"



IEMA Transforming the world to sustainability

IEMA is the professional body for everyone working in environment and sustainability. We provide resources and tools, research and knowledge sharing along with high quality formal training and qualifications to meet the real-world needs of our members. We believe that together we're positively changing attitudes to sustainability as a progressive force for good. Together we're transforming the world to sustainability.

IEMA

City Office Park, Tritton Road,
Lincoln, Lincolnshire, LN6 7AS
tel: +44 (0) 1522 540069
info@iema.net | www.iema.net

Editor

Sharon Maguire
sharon.maguire@redactive.co.uk

Assistant editor

Kathryn Manning
kathryn.manning@redactive.co.uk

IEMA head of commercial development

Emma Buyers
e.buyers@iema.net

Feature and news journalist

Christopher Seekings
christopher.seekings@redactive.co.uk
iema@redactive.co.uk

Sub-editor

Kate Bennett

Business development manager

Daniel Goodwin
tel: +44 (0) 20 7880 6206
daniel.goodwin@redactive.co.uk

Sales

tel: +44 (0) 20 7880 6206
sales@iema-transform.net

Designer

Callum Tomsett

Picture editor

Claire Echavary

Account director

Will Hurrell

Subscriptions

subscriptions@iema-transform.net
The 2019 annual subscription rate is £142.

Production manager

Aysha Miah-Edwards

Printer

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ROUNDUP

ENVIRONMENT &
SUSTAINABILITY
NEWS AND VIEWS

CONSUMER BEHAVIOUR

Westerners choose sustainability over growth

Three in four westerners believe that slower economic growth is a price worth paying for environmental protection, a survey of 15,000 consumers has uncovered. It was also found that 64% of Europeans and 53% of Americans think that companies will face a consumer backlash if they fail to take the necessary steps to go green.

However, businesses are perceived as being slow to respond to the environmental crisis, with a third of respondents unable to name a company that has changed the way it reuses and repairs products.

Seven in 10 said supermarkets should not provide single-use plastic packaging or plastic bags, while half are happy to repair a broken appliance if the costs are up to 30% of a replacement.

The findings come as activist groups such as Extinction Rebellion demand further corporate action on the environment, and suggest that customers are willing to bear some of the costs.

"Consumers are both pushing for change and asking for help to coordinate these efforts," said Jessica Exton, behavioural scientist at financial services firm ING, which carried out the survey.

Consumers from 15 European nations, Australia and the US took part in the study, which found that attitudes towards the circular economy differ across countries.

For example, a whopping 92% of Italians said they always separate their waste at home, compared to just 39% of Turkish people.

Moreover, around eight in 10 respondents from Luxembourg and Turkey said people in their country are excessively focused on consumption, compared to just 50% of Italians.

The researchers said that discrepancies in local circular activities might be partially explained by established local

norms – both cultural and social – and access to recycling and repair facilities.

And despite 34% of respondents naming plastic waste as the greatest environmental challenge facing the planet, 96% said they throw plastic away daily. A worrying 86% throw away up to five items each day.

"Consumers are conscious of the urgency of the problem at hand, but awareness and information don't automatically translate into changed habits," Exton continued.

"While consumers need structural support to enable fixing and re-using, sustainable decisions must also have a clear benefit."

Additional findings can be found here: bit.ly/2XZhmRm





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AIR QUALITY

Defra reports published

Since September, Defra has published four major reports on air quality and emissions in the UK. The National Atmospheric Emissions Inventory (NAEI) team, working on behalf of Defra, has produced two reports. The first is *Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 1990-2017*, which reports summary data and trends in emissions for oxides of nitrogen, sulphur dioxide, ammonia, volatile organic compounds, carbon monoxide, particulate matter, heavy metals, polyaromatic hydrocarbons and dioxins. Typically, the data shows continuing falls in emissions, apart from ammonia, where the reported emissions continue to rise.

It also published a report on mapping techniques for air pollution, *UK Emission Mapping Methodology 2017*. This report describes the emissions of pollutants and their sources, providing a spatial coverage.

The third report, *Ammonia Futures: Understanding implications for habitats and requirements for uptake of mitigation measures: Stakeholder feasibility workshops and supporting review*, was produced by Defra contractor Ricardo Energy and Environment. It provides an insight into the measures and techniques available to the agricultural sector, and how these could reduce emissions of ammonia in order to meet the targets for emission reductions required by the government's Clean Air Strategy 2019. All three reports are available at uk-air.defra.gov.uk/library

Lastly, Defra has published a report for ambient air quality in the UK for 2018 using measurements from 270 sites in rural, semi-urban and urban roadside locations, for the pollutants described in the pollutant inventories by NAEI. The results for 2018 reflect the trends in emissions and is available at uk-air.defra.gov.uk/library/annualreport

RICK GOULD, MIEMA CEnv is technical advisor at the Environmental Agency



ECOSYSTEMS

Noise pollution threatening biodiversity

Noise pollution is threatening the survival of more than 100 different species, interfering with the way they communicate and search for food, scientists have discovered.

The meta-study by Queen's University Belfast also found

that man-made noise has an impact on bird migration, potentially harming ecosystems. The research sheds light on consequences for birds, fish, mammals, amphibians and reptiles, and could give legislative bodies licence to regulate noise more effectively. "We need to develop strategies to protect animals from noise for their livelihoods," said study lead author, Dr Hansjoerg Kunc.

Noise from ships interfering with the way fish locate certain reefs is one example of the impact on animal behaviour, while birds will avoid migrating to areas of high noise pollution. Animals such as bats and owls rely on acoustic sounds when hunting for prey, while others use them to evade predators. Man-made noise is changing their methods.

Dr Kunc called artificial noise a "serious form of man-made environmental change and pollution", warning that all 100 species studied were negatively impacted.

POLLUTION

GHG concentrations break records

Concentrations of greenhouse gas (GHG) emissions in the atmosphere reached a record high in 2018, the World Meteorological Organization (WMO) has warned. It found that last year's increase in CO₂ was just above the 10-year average, while concentrations of methane and nitrous oxide surged. There has been a 43% increase in long-lived GHGs warming the climate since 1990, with CO₂ accounting for around 80% of this.

"There is no sign of a slowdown, let alone a decline in GHG concentrations in the atmosphere, despite all the commitments under

the Paris Agreement," said WMO secretary general Petteri Taalas.

Meanwhile, a UN Environment Programme report warned that GHG emissions must fall by 7.6% every year during the next decade to limit global warming to 1.5°C. It states that the world is heading for a 3.2°C temperature rise, and that collective ambition must increase fivefold to deliver Paris Agreement emission reductions.

"Failure to heed these warnings means we will continue to witness deadly heatwaves, storms and pollution," said UN secretary general António Guterres.

LEGISLATION

Environment Bill – where are we now?

The Environment Bill was published on 15 October – the first new environment act for a generation.

Its proposals are wide-ranging, covering: environmental governance; proposals for Northern Ireland; waste and resource efficiency; air quality and environmental recall; water; nature and biodiversity; and conservation covenants. Many of the specific legislative proposals IEMA has advocated have been brought forward, including a process for setting legally binding long-term environmental targets, extended producer responsibility for packaging waste, and biodiversity net gain for new developments. To develop such a broad package of measures at pace, against the backdrop of Brexit, is impressive, and a credit to those in Defra who have brought this together.

The Bill passed its second reading in Parliament on 28 October unopposed, although MPs acknowledged that improvements will be necessary to address weaknesses. However, the dissolution of Parliament for the general election on 12 December means that the Bill will need to be reintroduced by the next government.

The consensus among stakeholder groups is that this will happen. Timing is likely to depend on which party is in power and what their Brexit approach is. In the meantime, work is under way to identify and propose amendments needed to make the Bill 'world leading' and to translate the legislative provisions into actions on the ground.

We'll keep IEMA members up to date and involved in the next stages as they develop.



UNFCCC

IEMA event at COP25

The UN Framework Convention on Climate Change (UNFCCC) secretariat was established in 1992 when countries adopted the UNFCCC. The secretariat organises and supports up to four negotiating sessions each year, the largest being the Conference of the Parties (COP), which is hosted in different locations around the globe. COP25 is being held in Madrid, Spain, from 2-13 December 2019 under the presidency of the Chilean government and with logistical support from the Spanish government. The COP serves two main purposes:

1. To review the implementation of the Convention, the Kyoto Protocol and the Paris Agreement, respectively; and
2. To adopt decisions to further develop and implement these three instruments.

UNFCCC climate change conferences have grown in size during the past two decades, from small working sessions to the largest annual conferences currently held under the auspices of the UN. The intergovernmental negotiations

involve officials from governments all over the world at all levels, as well as huge numbers of representatives from civil society and the global news media.

For COP25, IEMA has collaborated with ISO and other partners to secure an official side event titled 'Carbon Neutral Transitions and Standards as a Measure, Reduce, Compensate Toolkit'. This event includes a keynote on Costa Rica's leadership, examples via the UNFCCC Climate Neutral Now programme, the role of international standards, and IEMA profession-based experience and information. Nick Blyth, IEMA policy lead, is presenting, drawing on recent surveys and IEMA workshops on the challenge of transitioning to 'net zero' and the (in-practice) use of IEMA's Greenhouse Gas Management Hierarchy. This important 'insight work' follows IEMA's declaration this year of a climate and environmental emergency, and has been supported by the IEMA Climate Change and Energy Network.

➔ unfccc.int/cop25

TRANSPORT

The future of mobility and the Fourth Industrial Revolution: Are we really ready?

In October, PBA (now part of Stantec) teamed up with IEMA to host an event in Exeter exploring the future of mobility and transport. It concluded that an entirely new mindset is needed to respond to global megatrends of rapid urbanisation, climate change and technological breakthrough.

Delegates were introduced to PBA's EV charging infrastructure concept (shortlisted at the recent IEMA awards), Foot Anstey's Mobility Hub idea that would replace the need for car-dominated development, and the Met Office's ideas on integrating weather forecasting into smart technology and meeting the challenges of exponential data storage needs. They also learned about the evolution of transport planning, and gained a public sector perspective from Devon County

Council and South West Railway's Sustainability Strategy.

While the spread of speakers resulted in a range of perspectives, there was consensus that a more proactive ethos is required when it comes to embracing new technology. Opportunities are developing exponentially compared to the rate at which new technology is being deployed. What is slowing things down, and what is the solution?

As an industry, we should be asking 'what do we want to happen?' rather than 'what do we need to do to comply?' These questions reflect the fact that policy is lagging behind technological advances. Industry, regulators and decision-makers will need to adopt a collaborative approach if we are to ensure equal financial access



to grants and funding for a socially sustainable approach.

Finally, at what point will the price of carbon take its true place as an influencer in decision-making? We're on the right track, but there's a long road ahead. Look out for similar events in the future.

EMISSIONS

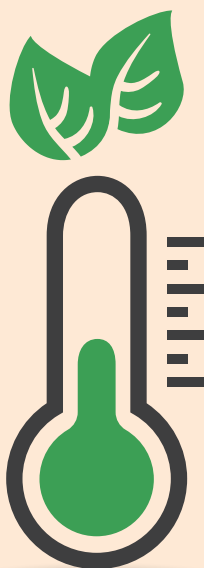
Pledge to Net Zero initiative launched

As we strive to realise the UK's commitment to bring all greenhouse gas emissions to net zero by 2050, IEMA has joined other environmental experts to launch the Pledge to Net Zero initiative.

"The transition to net zero carbon emissions is the defining challenge of our time," said Martin Baxter, IEMA's chief policy advisor. "We are fully supportive of the environmental services sector pledging credible emissions reductions which align with the urgency of addressing the climate and environmental emergency."

Pledge to Net Zero is the first industry commitment in the UK developed for the environmental services sector. It aims to make the sector a leader when it comes to taking action on climate change. IEMA has created this initiative together with the Society for the Environment, the Association for Consultancy and Engineering, and the Environmental Industries Commission, as well as leading environmental consultancies WSP and AECOM.

By signing the Net Zero Pledge, organisations are setting a precedent for more people to recognise the importance of this target. Demonstrating the power of partnership will allow us to transform the world to sustainability.



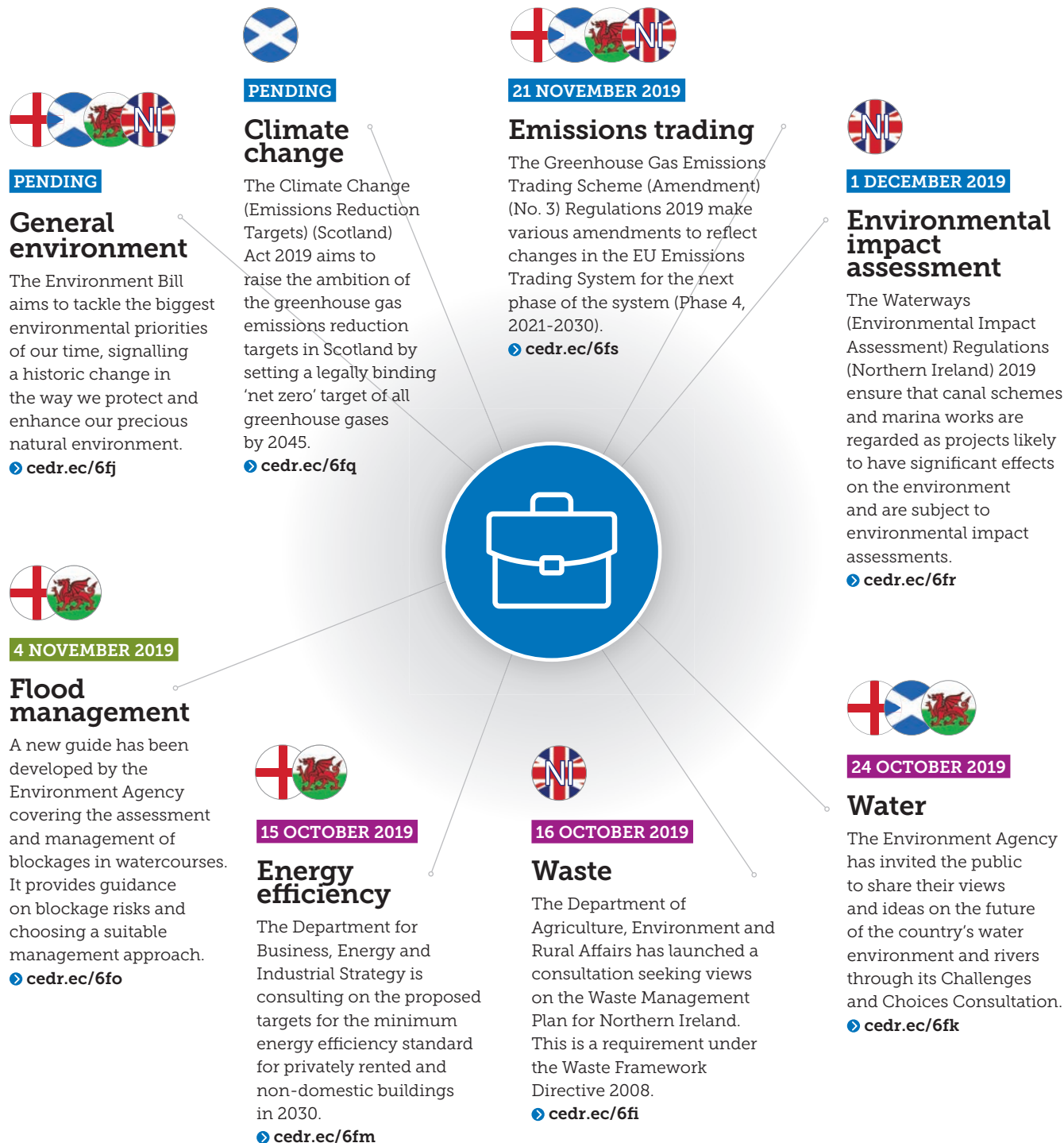
IMPACT ASSESSMENT

Rufus Howard to lead IA transformation

IEMA is delighted to announce that from November, Rufus Howard, FIEMA CEnv will be supporting IEMA with policy leadership, providing IEMA and members with expert advice and foresight on impact assessment (IA). After completing terms as chair of IEMA's IA Network and on the IEMA Strategic Advisory Board, Rufus brings extensive experience within the field of IA from UK and international perspectives. Key upcoming priorities are supporting the IA Steering Group with the delivery of the new IA Strategy, and a renewed focus on member content from IA-related webinars, guidance and events. To stay up to date with IEMA's latest IA activity, you can join the IA Network by sending an email to IA@iema.net

NEW REGULATIONS

THE LATEST

■ LEGISLATION ■ GUIDANCE ■ CONSULTATION


➤ The man failed to safely store a number of 45-gallon drums containing pollution, hazardous and combustible wastes

INCOURT

WASTE

Man charged more than £12,000 over illegal waste operation

A Sunderland man has been ordered to pay more than £12,000 after a hearing at Sunderland Magistrates Court.

He was prosecuted by the Environment Agency for operating outside the requirements of three exempt waste activities, including illegally storing mixed waste onsite, storing hazardous waste inappropriately and failing to keep accurate and correct details of waste transfer documentation.

The man was also prosecuted for failing to safely store a number of 45-gallon drums that contained polluting, hazardous and combustible wastes. These were located near to a local burn, and a short distance from a major railway line.

The drums were initially fly-tipped onto his property, but he failed to take appropriate steps to remove the items and stored the drums outside for several years without any regard for the risks to the environment and neighbouring premises. He also ignored advice and guidance given

by the Environment Agency and continued to operate his waste company in breach of the rules.

The defence told the court the man had gaps in his knowledge and was keen to undertake training. He also intended to remove some of the offending waste from the site but had been prevented from doing so by a faulty clutch on his vehicle. They also told the court he did not know what to do with the drums of fly-tipped waste.

The court found the man's operation of the facility without a permit was deliberate and described his behaviour in failing to take the steps as "reckless at the very least". He was fined £1,999, and ordered to pay a victim surcharge of £120 and costs of £10,800.

Jamie Fletcher, area environment manager for the Environment Agency, said: "The successful prosecution and level of fine shows how the Agency is always looking to clamp down on unlawful activities and businesses who aim to bend the rules."



CASE LAW

Appeal against Secretary of State dismissed

The appellant appealed against a decision that it had been lawful for the Secretary of State for Environment, Food and Rural Affairs to issue guidance in relation to the licensing of supplementary badger culling by Natural England.

The Secretary had adopted a policy to permit licensed culling of badgers. The Protection of Badgers Act 1992 gave them the power to grant a licence for badger culling to prevent spread of disease.

In 2017 the Secretary produced guidance empowering Natural England to issue licences, allowing supplementary culling to take place to prolong disease control benefits. The judge concluded that the Secretary had acted for the proper purpose.

The appellant claimed the judge's finding turned on the Secretary's subjective view of whether it would prevent the spread of disease. He argued that there was no evidence to support the policy, and that the judge's approach was inconsistent with that of previous case law.

The judge concluded the appellant had been wrong to suggest guidance could only be rendered unlawful if the Secretary's true purpose was other than to prevent the spread of disease. There was nothing in the Protection of Badgers Act to state that the procedure was lawful only if the outcome was certain.

It was confirmed that the Secretary had issued lawful guidance and had been entitled to rely on scientific opinion. The appeal was dismissed.



OTHER NEWS

Government invest in smart waste tracking

As part of Defra's £20m GovTech Catalyst fund, the government is awarding £1m funding to two UK companies.

Anthesis, a digital specialist, and Topolytics, which provides waste analytics, have been chosen to build prototypes for the UK's first comprehensive digital waste tracking system. The prototypes will include all international waste shipments and it is hoped the new system will provide more effective tracking of waste, from shipment through to final destination.

Waste crimes cost the UK economy around £600m every year, with current systems for tracking waste labelled outdated.

An independent review led by Lizzie Noel and an advisory panel gave recommendations for a strategic approach to serious and organised waste crime. They found that the absence of digital record-keeping can be abused by criminals who mislabel waste to avoid landfill tax or illegally export it.

The Environment Bill recently introduced to Parliament included

compulsory electronic tracking to target illegal movements of waste. It has also previously been part of the Defra publication *Our waste, our resources: a strategy for England*.

Anthesis plans to use QR codes on mobile devices to record the ID of waste consignments uploaded to its 'Vastum' blockchain system, in order to eliminate errors. Alternatively, Topolytics plans to use data from devices, including apps and sensors on waste containers or vehicles.

The prototypes being made by Anthesis and Topolytics could be available for testing within the next 12 months.





A PERILOUS ROAD AHEAD?

Filmmaker Eilidh Munro documented the building of a controversial road through the Peruvian jungle and found a community divided. She talks to **David Burrows** about giving a voice to indigenous communities

M

anú National Park in Peru is a wildlife filmmaker's dream.

Sprawling across 1.5m hectares through a massive

altitudinal gradient, the World Heritage Site is home to what Unesco calls an "unrivalled variety of plant and animal species", including spider

monkeys, emperor tamarins, ocelots, pumas and the elusive jaguar. "I saw one," says Eilidh Munro. "It was the best moment of my life." The encounter lasted "just two seconds" and she didn't capture it. She has no regrets, though: "In the rainforest you have to work hard for your rewards, but sometimes you are given a gift and it doesn't have to be on camera."

Munro, 29, is no stranger to hard graft. A self-taught photographer and filmmaker, she spent evenings and weekends over a number of years building up a portfolio while working for an advertising agency. "I was obsessed," she tells me over a cup of mint tea in her home city of Edinburgh. She picked the brains of other filmmakers and commissioning editors, learned how to edit material and spent weeks on expeditions, trying to find the perfect shot or footage: "You can't ask an animal to do what they just did all over again." This month sees



the first screening of her biggest project to date.

The focus of *Voices on the Road* is not the reserve's animals, though – it is the people who live in Manú. What we learn is that life can be hellish, even in a natural paradise. "These people have never been asked what life is like in the middle of the rainforest," says Munro. "No clean water. No sewerage. No way of leaving in a health emergency. No access to markets to sell their products. I wouldn't care about

the ecosystem if I lived there and had kids."

She is remarkably candid, and passionate without being preachy. Indeed, watch the film as it does the festival circuit, and you see that it is the communities and their people telling the story. "The generosity people showed us, their time and their honesty were amazing," she explains. "It's a privilege to know about anyone's life."

Paved with promises

The 23-minute production – the result of 10 months' work by Munro and the journalist Bethan John, as well as biologist Shirley Jennifer Serrano Rojas – is not just about life in this rainforest, but the promise of a better one. This 'better life' is thanks to a road that would carve through Manú National Park and the neighbouring Amarakaeri Communal Reserve, linking some of the communities



Interview

isolated from the 'outside world'. Work started in 2015, but Peru's environment ministry and NGOs put a stop to it. Since then, regional governors have been pumping propaganda at the local producers: wealth will be created once they can sell their maize, bananas and other produce to new markets; there will be shoes and better education for their children; and there will be internet.

Those without access to the road have bought into the project, desperate for the promised gold at the end of it. Work on clearance actually continued illegally for a while – by hand, using machetes. "That's an insane amount of work," says Munro. "Some people really want this." It wasn't hard to convince them, though: "You can gain someone's trust pretty quickly if they've been ignored for so long."

Munro and John set out to tell this story: how the road was giving some people hope, but the benefits were being over-hyped and the damage under-played. It took months of planning and approaches to the leaders of each of the four communities affected by the development, but in November 2018 they arrived in Peru for a 40-day expedition. They only had a week in each community – Diamante, Isla de los Valles, Shintuya and Shipetiari – to get the interviews and footage. However, they didn't go in 'all cameras flashing', deciding to interview the community leaders first. "We didn't film for the first few days in each community because, whether you're filming animals or humans, you want to be discreet," says Munro. This approach, together with the team's proficiency in Spanish, put the communities at ease and led to some brilliant results, with the narrative guided by the locals.

"People said we were there a long time, but it was only a week in each place," Munro says. Still, it was intense. "You're in a different zone when you are filming in that environment. It's 40 days: three of us together, interviewing in Spanish all day long, eating together, sleeping in the same room side-by-side." This lifestyle is certainly not for the faint-hearted, but Munro clearly revels in it – even when there are no toilets, no running water and no electricity. "You get tired when it's dark so you go to bed, and when it gets light you wake up to an amazing orchestra of wildlife. I love that part of the job."

Munro's passion is clear – all those evenings and weekends have created opportunities

for her, but she isn't sure yet how to make a living from her work. Indeed, she is often at pains not to romanticise either her work or her relationship with those communities more than 6,000 miles away: "We were two single white women from the West; we are representative of what stopped the road. So we went into this wondering if anyone was going to speak to us."



Munro and Serrano Rojas show the children in Shipetiari how their camera works

Divided responses

Fortunately, they did, and the film captures how people are feeling: some pine for the promise of profit from the road; others are clearly petrified by the havoc it could wreak. In Diamante, which the road has not yet reached, there is hope for the promised "economic movement", as the community leader has put it. Head an hour upriver to

"THIS 'BETTER LIFE' IS THANKS TO A ROAD LINKING SOME OF THE COMMUNITIES OSTRACISED FROM THE 'OUTSIDE WORLD'"





📍 The most important hour of the day in the Native Community of Shipetiari: volleyball time

📍 Peque-peque boats knock together on the Manú River



📍 Curious Machiguenga children from the Native Community of Shipetiari play with the crew's GoPro and point out insects to film



Shipetiari, however, and access to the road for the past three years hasn't delivered the commercial farming opportunities people were promised. Those in Shintuya, who have had access to the road for years, are also struggling – they're not commercial farmers, and margins are often squeezed by middlemen. Alcohol abuse is also rife.

It is predicted that, by the time it is complete, the road will have caused 40,000 hectares of deforestation – the size of Edinburgh and Glasgow combined. This is down to the so-called 'fishbone effect', in which one major road leads to multiple subsidiary ones as people arrive and the land-grabbing begins. Then the loggers move in. For those already in these communities, logging is often the only way to make money, but it wouldn't be their first choice, given how dangerous it can be. Legal logging also involves paperwork being filled out in a city 12 hours away – an impossibly expensive exercise. As Munro says, the government isn't making it easy.

The road might not only accelerate logging – it could also entice cocaine smugglers and gold or gas prospectors. If, as is now being mooted, it goes beyond Diamante to the Interoceanic Highway, Manú would sit at the heart of the country's illegal gold mining operations. What has been approved so far, thanks to a change in local government and the environment ministry, is a 'footpath' to connect the communities. However, what's being cleared is 11m wide and 30km long – a road in anybody's book.

November 15, 2018 saw bulldozers decorated with balloons in the middle of the jungle while Latin pop music blared from speakers and drinks were handed around. Munro sees little to celebrate. This project of hers – which "grew arms and legs and became bigger than we ever dreamed of – shows that the

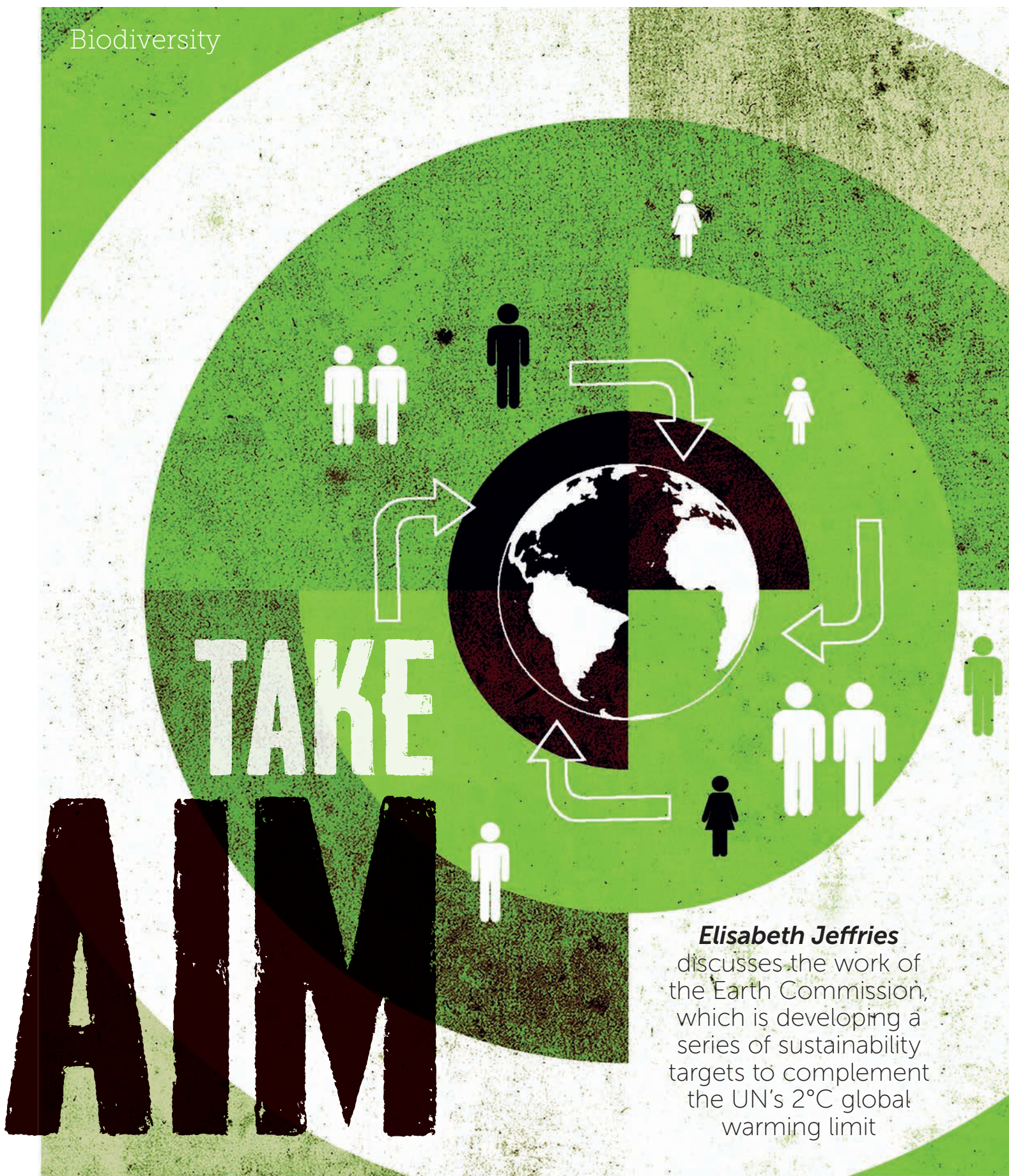
people living in this "natural gem" don't just need a path; they need a plan and empowerment. "The hope people have for change is in the hands of those who don't have their best interests at heart," she says. "It could all go to shit."

She is clearly upset at the thought, so I change the subject. What's next for Eilidh Munro, filmmaker? She says she's working on another project that could take her back to Manú, as well as some ideas closer to home in Scotland. However, she also needs to figure out how to make a living from her filmmaking; the expedition for *Voices on the Road* was funded through the SES 2018 Neville Shulman Explorer Award for Expedition Filmmaking, while IUCN Netherlands matchfunded a crowdfunder to provide the money for post-production. That isn't a long-term strategy, she admits: "I'm just starting on the journey to make a career out of filmmaking." There is little doubt she has a gift for it. 📽️

For screenings of *Voices on the Road*, see voicesontheroadfilm.com



The sun-scorched evidence of the global demand for timber in the world's top biodiversity hotspot



Elisabeth Jeffries

discusses the work of the Earth Commission, which is developing a series of sustainability targets to complement the UN's 2°C global warming limit

If elephants became extinct, the number of trees and shrubs in central African rainforests would decline by 7%. That was the conclusion of a 2019 study concerned with an unusual question: the impact of elephant behaviour on tree growth, and its knock-on effect on carbon stocks. Perhaps surprisingly, the scientists found that elephants increased the number of trees, shrubs and tree litter. Their presence encouraged the growth of fewer, larger trees with higher wood density.

Further exploration is needed to explain such interconnections, but a new cross-disciplinary initiative known as the Earth Commission, launched in October, aims by 2021 to extract what we already know about impacts of biodiversity destruction and put it to practical use in conjunction with climate policy.

Alongside biodiversity, the commission will focus on oceans, freshwater and land.

"We will provide the science, doing the same as we've seen for climate goals but applied to all other systems that regulate the planet," says co-chair Johan Rockström, professor in earth system science and director of the Potsdam Institute for Climate Impact Research (PIK) in Germany. "It's a task that has never been done before."

On target

A set of targets relating to land, water, oceans and biodiversity are among the team's most significant planned outputs. These would stand unofficially alongside the current UN target for a maximum 2°C increase in global warming.

More useful micro-goals for business and cities would emerge as a result. Companies trying to make efficient use of resources are not always sure where to start, as Nigel Topping, chief executive of non-profit We Mean Business, points out.

We Mean Business is part of a newly launched group known as the Science Based Targets Network (SBTN). This builds on the Science Based Targets initiative, which has concentrated on the impact of atmospheric emissions on the climate. The SBTN aims to develop methods and

resources that will enable companies and cities to set science-based targets for the more complex interrelated systems under investigation by the Earth Commission.

Currently, the commission knows limits expected for temperature increases, but not for impacts on land or water, for example. Its mission is to define such planetary boundaries and allow them to be applied more specifically to individual entities. At that point, the SBTN will follow through. "This is about how we take a universal target and, by basing it on science, understand what we need to do," says Topping.

Confectionery giant Mars is among the few companies that have attempted the task. Working with the World Resources Institute (WRI) in Washington DC, the company analysed

its footprint to develop sustainability targets not just for climate, but also for land and water.

Each target was based on scientific knowledge of the global carbon budget, water stress and other ecological limits – but it was very specifically adjusted to the firm, accompanying its own carbon emissions target shaped by UN climate goals.

"This is about how we take a universal target and, by basing it on science, understand what we need to do"

A new methodology

In the same way, the Earth Commission's work would provide broader goals that can be applied by a wide range of companies and city municipalities. "It would provide a different methodology for different sectors," says Topping. Using tools developed by the SBTN, companies could make better informed decisions about how and where to act to reduce resource pressures.

Overarching targets such as warming limits are too broad to be practical in everyday management, suggests Topping: "They don't represent the nuanced issues that businesses need to understand in order to take action in their value chain."

As yet, the Earth Commission has not selected which metrics to adopt, let alone decided how to use them to construct targets. Hectares deforested or volume of water salination could work as metrics for assessing some aspects of land use or water impacts, and these would then be shaped into macro-targets.



Biodiversity

“What will determine the outcome of the Paris Agreement is whether we are able to keep ecosystems intact”

The team working on the commission's findings then intends to drill one layer deeper. For companies dependent on agricultural resources, specific dilemmas need to be resolved, as Topping explains: “A brewer operating internationally might ask whether it needs to invest first in improved water management in sugar cane plantations in one country, or in the cultivation of hops in another.”

Individual micro-targets formulated with the help of the SBTN could allow a company to prioritise on the basis of scientific research, rather than guesswork. “The research will allow businesses to consider these issues more locally and contextually,” says Topping.

Material impacts

Management will still need to use its judgment, of course. Mars and WRI's project concluded that while it is possible to establish targets that are anchored in science, the process is not easy and depends on subjective views.

The selection of greenhouse gases as the starting point implied that greenhouse gases are Mars' most material impact on air. This may be a subjective judgment, however, because impacts on air are easier to define. It is more difficult to identify the most material impacts on land and water.

Land and water impacts are accompanied by different topographical characteristics relating to valleys, rivers and type of land, for example. Evaluating environmental impacts to water can involve measuring water quality, water availability and access to water.

Impacts to land are even more varied and can include soil health, habitat

change and biodiversity loss. In contrast, types of air impacts are fewer and less complicated to define for an individual organisation. This may encourage companies to select or prioritise their preferred targets.

The SBTN's application to the Earth Commission's mission is clearly not just about science; it is a challenge to some of the largest and most powerful companies on the planet. However, the Commission's findings could yield significant top-line messages for governments and businesses, indicating the need to adjust the agenda. The scientific basis for the commission's work overturns some assumptions about how to address climate change, as Rockström explains: “We particularly equate climate with the energy transition, when in fact what will determine the final outcome of the Paris Agreement on climate change is whether we are able to keep ecosystems intact,” he points out. “That's where the big machinery is in terms of stocks of methane and carbon.”

As a consequence, wildlife management and biodiversity conservation might eventually rank as highly as commercial decarbonisation in plans to stabilise the climate. ①

ELISABETH JEFFRIES is a freelance journalist.



The Earth Commission

The Earth Commission includes scholars from several major research institutions but is not yet mandated by multilateral organisations such as the UN. With a secretariat based at the Royal Swedish Academy of Sciences, it is collaborating with PIK and the International Institute for Applied Systems Analysis, which conducts scientific studies on environmental, economic, technological and social issues. So far, 19 scientists have been recruited. The Commission will build on existing analyses, such as those conducted by the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. The Commission and SBTN are part of the Global Commons Alliance, a network of NGOs, philanthropic funds and research organisations that aims to ensure Earth remains habitable. “We will fail on the climate agreement unless we take an integrated earth systems approach,” says Earth Commission co-chair Johan Rockström.



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Keeping the



Faith-inspired sustainability specialist **Kamran Shezad** and Chris Seekings consider the role religion can play in tackling climate change and environmental breakdown



pope Francis wrote of climate change in his second encyclical: "To develop an ecology capable of remedying the damage we have done, no branch of the sciences and no form of wisdom can be left out, and that includes religion."

Prominent Islamic, Jewish, Buddhist, Sikh and Hindu figures have also attempted to instil a spiritual imperative into the environmental discussion. With 84% of the global population religious-affiliated, harnessing these groups may be one of our greatest tools in tackling the crisis. Kamran Shezad, sustainability advisor at nonprofit

Muslim organisation the Bahu Trust, explains how people of faith are taking environmental inspiration from religious texts .

Divine power

"Faiths connect with people's emotions and personal lives, so are an excellent method of mobilising people," Shezad says.

"In addition to values and teachings, faith institutions hold a huge amount of assets globally and have the power to drive enormous change."

It is estimated that religious organisations control 50% of the world's schools, 10% of financial institutions and 8% of the planet's habitable land surface (bit.ly/2Dl17XP). There are 37m churches, 3.6m mosques, and many thousands of synagogues and temples worldwide. "They own a huge amount of buildings, and so have to make decisions about how they use energy, water and distribute food," Shezad explains. "They own half of all schools and educate a mass audience, and can lead by example on responsible land use."

Moreover, faith institutions have an estimated \$3trn invested around the world, with their purchasing power becoming increasingly apparent. The Church of England holds many millions of pounds in oil giants BP and Royal Dutch Shell, but is now one of numerous religious institutions supporting divestment from fossil fuel companies.

The moral high ground

Dr Fazlun Khalid is one of the most influential Islamic scholars on the environment, and founding director of the Islamic Foundation for Ecological and Environmental Sciences (IFEES). He drafted the Islamic Declaration on Global Climate Change, which calls on all Muslims, “wherever they may be, to tackle the root causes of climate change, environmental degradation, and the loss of biodiversity”.

“As Dr Khalid puts it, ‘Islam is intrinsically environmental’, but that does not mean all Muslims are,” Shezad says. “For example, Saudi Arabia is the world’s second-largest producer of oil and one of the greatest contributors to carbon emissions and climate change.”

Only the US generates more oil, according to the country’s Energy Information Administration, and it is also home, ironically, to the world’s largest Christian population. “Environmental faith-based groups are overwhelmed by the dominant economic model in the US, while Saudi Arabia is dependent on a single resource,” Shezad says. “However, I think faith groups are beginning to reclaim the moral high ground.”

Currently, more than 43 faith-based organisations have accredited status with the UN’s Environment Assembly. These groups vary considerably in size, with some promoting initiatives in their local areas and others facilitating partnerships at national or international level.

The UK-based Faith for the Climate Network was launched in 2014 to encourage collaboration between faith communities and help boost their work on climate change. “Faiths acting together is a powerful witness to the wider world about our shared responsibility to care for creation,” says Lizzie Nelson, Faith for the Climate coordinator. “We know that the best way to engage people is not through fear, or telling people what they ‘ought’ to do, but by engaging with their core values and identity. This is how faith communities have such a key part to play in the wider climate movement.”

A common home

These partnerships mark a remarkable reversal of the tensions witnessed between competing religions throughout history, with the environment firmly at the heart of this paradigm shift.

As part of The Time Is Now’s campaign on climate change, a mass lobby of the UK parliament was recently attended by the former Archbishop of Canterbury Lord Rowan Williams, chair of the Mosques and Imams National Advisory board (MINAB) Qari Asim MBE, Rabbi Jonathan Wittenberg of the New North London Synagogue, Vishvapani Blomfield of the Triratna Buddhist Order, and Prabhjyot Singh from EcoSikh.

“So many narratives in the media around faith are negative, focusing on abuse, conflict or religious extremism,” says Nelson. “But faith inspires people to act and work together for the common good.”

“The best way to engage people is not through fear, but by engaging with their core values”

On a global level, the Faith for Earth initiative was launched by UN Environment in November 2017, with three main goals: to inspire faith groups to advocate for the environment, to make faith organisations’ investments and assets green, and to connect faith leaders with decision-makers and the public.

“Coming together for climate action is a practical example of what people of faith are already doing day-to-day for the planet, and a vision of how we want the world to be,” adds Nelson.

Love thy neighbour

Footsteps – Faiths for a Low Carbon Future is a local grassroots organisation in Birmingham, bringing together various faiths to ensure the city is carbon neutral by 2030. It is also involved in the Brum Breathes campaign for cleaner air. “The impact is already showing great signs of its effectiveness,” says Footsteps chair Ruth Tetlow. “The ‘Golden Rule’ is a shared ethic across all faiths.”

Meanwhile, 18 of the Bahu Trust’s 22 mosques have installed solar panels and converted to renewable energy. Educational sermons have been developed, plastic-free events organised and community clean-ups of local streets carried out. This year,

it published a joint statement with the IFEES and the MINAB urging all Muslims to divest from fossil fuels and switch to renewable energy. “The Bahu Trust will now work with IFEES and MINAB to develop an educational programme for Muslim communities on how to ensure they are not invested in the fossil fuel industry,” says Shezad.

More examples include EcoSikh, which will this year plant 550 fruit trees along canals in England’s West Midlands to commemorate the 550th birthday of the

Sikh religion’s founder Guru Nanak. And Christian Climate Action – inspired by Extinction Rebellion and religious teachings – has been carrying out acts of non-violent direct action demanding change. “Faiths have a long tradition of expecting their followers to take self-denying actions to care for the earth and those suffering,” Tetlow adds.

A call to action

It was decided at this year’s UN’s Environment Assembly that a formal coalition would be set up to strengthen engagement between religious leaders and help achieve the Sustainable Development Goals (SDGs). The coalition will be composed of a ‘Council of the Elders’, bringing together high-level faith leaders such as the Pope and Grand Imam of al-Azhar, while a Council of the Youth will mobilise young faith leaders from every continent to act as global ambassadors.

“Collaboration is Goal 17 of the SDGs,” says Jeffrey Newman, Rabbi Emeritus of the Finchley Reform Synagogue. “There is more that we share together than divides us, and we are now faced with the greatest potential calamity for life on Earth.”

CEOs of faith groups will also form part of the coalition, while a faith-science consortium of theologians, scientists



and environmentalists will connect faith teachings to caring for natural resources.

"People argue that religion is incompatible with science and that they conflict with each other – I don't buy that argument," Shezad says. "Many of the greatest scientists of our time have been inspired by their faith and science. I would say that religious texts are complementary to science, and provide solutions to safeguarding the planet."

Faith groups are also preparing for further international collaboration at next year's COP 26 climate summit in Glasgow. "Faith for the Climate is beginning to gear up and make early preparations so that the network can efficiently lead its member organisations and ensure the faith presence is effective," Shezad adds.

One for all

Although the escalating climate crisis has helped bring groups together more than ever, collaboration between faiths is not that new. In 1986, Prince Philip – then president of WWF International – invited leaders of the world's five major religions to discuss how faiths can help protect the natural world. Organisations like the IFEES and Alliance of Religions and Conservation have been active ever since.

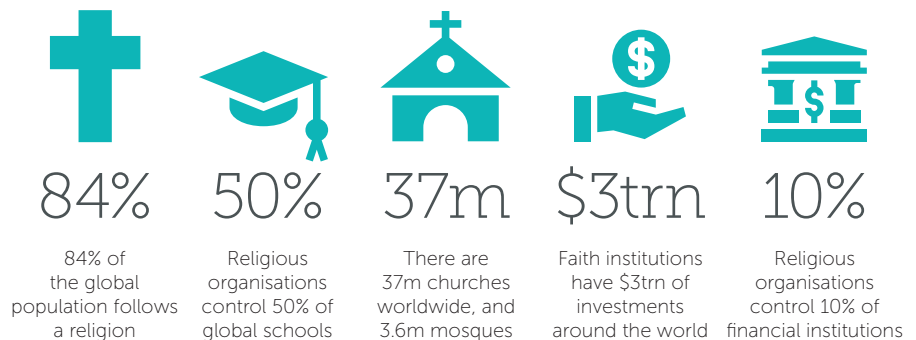


"Many of the greatest scientists of our time have been inspired by their faith"



A good influence

Globally, religion has the capacity to be a powerful force for environmentalism



The problem is that this has not translated into meaningful enough action among the upper echelons of society, particularly in the West.

"In a lot of Western countries, politicians do not make the connection between environmental protection and religious texts," says Gopal Patel, director of the Bhumi Project, a Hindu environmental group. "Political leaders

from the Hindu, Buddhist, Sikh and Jain backgrounds probably do make that connection more, but how much they care about protection of the environment compared to economic growth, now that's another question. All sectors of society need to work to address the crisis."

Although she does not practice a particular religion, conservationist Jane Goodall has spoken of a "great spiritual power" that she feels when out in nature, and this year called on all faith-based organisations to join the climate movement.

"The practical work on sustainability and protecting the environment is universal and does not require a faith belief," Shezad explains. "In a conversation with Dr Khalid, a secular person questioned whether a 'God' would subject this planet to climate change. Dr Fazlun responded by saying: 'Welcome aboard, let's save the planet first and we can then argue about God.'" 

High-profile UK faith leaders attended climate campaign group The Time Is Now's mass lobby of the UK parliament

Dr Iyad Abumoghli, Faith for Earth's principal coordinator, speaks at an event for the initiative



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Nutrients are essential for biological systems, but excessive amounts can create problems of algal blooms (and eutrophication) in

rivers, lakes and bathing waters. In the UK, phosphorus has been the major reason for failure of Good Ecological Status for the European Water Framework Directive (WFD). Although levels of 0.25 milligrams per litre (mg/l) or even 0.1mg/l are now technically achievable, is this always desirable from the perspective of energy use and the resulting carbon emissions? And how are nutrients monitored in water?

In the UK, as elsewhere, point source discharges of industrial wastewater into surface water are regulated. A company wishing to discharge wastewater must apply for a permit, which sets the limits for the constituents and volume of discharges in order to protect the receiving water body. In response to the UK government's Red Tape Challenge in 2011, the Environment Agency (EA) committed to using flexibility within water quality permitting. The EA in England has begun trials to assess innovative ways of regulating discharges using flexible catchment permitting and nutrient balancing.

At full stretch

Flexible permitting uses a range of options that can be used individually, together or interchangeably, but the EA is open to new ideas and proposals. Traditionally, industry will design wastewater treatment systems to overperform against a permit limit, in order to reduce the risk of non-compliance. A water company with

an ammoniacal nitrogen limit of 3mg/l may design wastewater treatment processes to achieve 1.5mg/l. This buffer drives extra cost, energy use and carbon emissions.

In contrast to permitting point source discharges individually,

New methods and sensors for measuring nutrient levels in water systems can help prevent harmful eutrophication, says
Rosa Richards

catchment permitting allows discharge permits to be set up collectively to the whole catchment scale, using this overperformance as a stretch target (*Figure 1, overleaf*). This is achieved through an operating techniques agreement (OTA) to link multiple

permits. If one site does not achieve its stretch target but another over-achieves, the target load reduction in the catchment can still be met overall (Table 1). The OTA is linked to the permit by a specific condition, and enforcement action can be taken if the agreement is not complied with. "This can be a more efficient and effective way of achieving water quality objectives in a catchment," says Barrie Howe, national senior regulatory advisor at the EA.

Indeed, a cost benefit analysis of a trial by Wessex Water (2017-2020) in the Bristol Avon catchment has identified savings of £23m, as well as carbon emission savings (Table 1). So far, says Howe, the results are "very promising".

Traditionally, end-of-pipe techniques were used to achieve water quality objectives in water bodies. Catchment nutrient balancing (CNB) uses alternative methods to reduce nutrients, such as land use changes; these types of solutions are encouraged by the

WFD. Buffer strips can reduce nutrients entering rivers from agricultural run-off, while a carefully sited settlement

pond on a tributary can prevent sediment pollution of the receiving river. Industry can use these kinds of measures to augment treatment at wastewater treatment works (WwTW), with OTAs used to link measures to the permits. This can allow water quality objectives for the catchment as a whole to be met while reducing cost and carbon emissions – as well as providing other ecosystem services benefits, such as reduced siltation or habitat creation. These innovative approaches are proving to be successful in saving money and carbon emissions while still achieving sufficient protection of water bodies.

"The EA is expecting to receive many more proposals for flexible catchment permitting in the coming years," explains Howe. "We are investigating the application of flexible permitting to chemicals, metals and organics in future."

Table 1: Case study of a Wessex Water trial in the Bristol Avon Catchment

Year ending	Phosphorus load contribution from WwTW (tonnes per year)	Target catchment annual phosphorus load reduction (tonnes per year)
Baseline	138.1	NA
31/12/2018	106.7	31.4
31/12/2019	94.0	44.1
31/12/2020	92.0	46.2

"We are investigating the application of flexible permitting to chemicals, metals and organics"

Special measures

In order to evaluate the effectiveness of measures to control pollution in catchments, monitoring is vital. The EA mainly uses handheld meters for spot tests and telemetered sondes

(water sensors connected to telemetry for continuous monitoring and transmission of results) to measure the common water quality parameters of temperature, conductivity, pH, dissolved oxygen, turbidity, ammonium and chlorophyll. They also use probes to measure oxidation or reduction potential, blue-green algae and dissolved organic matter. Phosphorus levels are harder to assess and require expensive equipment; an online soluble reactive phosphorus analyser is currently being trialled.

The optical probes for dissolved oxygen, turbidity and chlorophyll work well and are low maintenance, but nutrient monitoring is more difficult, says Jerome Scullin, senior field scientist at the EA. "Measuring phosphorus is difficult as we are still using large semi-portable instruments that are labour intensive," he explains. "The phosphorus sensor involves wet chemistry, so we still need site visits every couple of weeks to top up reactants, and the fluidics in the sensor are quite small, which has its advantages but is pretty useless in winter where there's a danger of freezing."



Table 2: Case study of a Wessex Water trial in the Bristol Avon Catchment

A Permit no.	B Site name	C Baseline annual phosphorus load (tonnes per year)	D Target annual phosphorus load (tonnes per year)	E Target annual phosphorus reduction (tonnes per year)	F Permit phosphorus concentration (total P mg/l) or measured concentration if no permit limit	G Stretch target – total P mg/l	H Permit dry weather flow 1.25 ml/d	I Date target load will apply
102272	Bath	12.3	9.9	2.5	1.0	0.8	33.8	01/01/2017
011987	Beckington	0.8	0.8	0.0	5.04		0.4	
102735	Bowerhill	2.0	0.5	1.5	2.0	0.5	2.7	01/01/2017
010528	Box	1.1	1.1	0.0	4.27		0.7	
102190	Bradford on Avon	2.7	1.9	0.8	2.0	1.4	3.8	01/01/2017
012129	Brinkworth	0.5	0.5	0.0	4.83		0.3	
103731	Calne	4.3	1.1 (1.9)	3.2 (2.4)	2.0	0.5	5.8	01/04/2018
102712	Cam Valley	4.8	4.8	0.0	6.0		2.2	

Only a quarter of the Bristol Avon Catchment achieved Good Ecological Status in 2016, with phosphorus load the main reason for failure. Wessex Water has installed ferric sulphate dosing at its larger WwTWs to remove phosphorus. Another way to manage phosphorus is to use operational measures to optimise existing dosing processes, but this has less certain outcomes. Wessex Water approached the EA on whether flexible permitting would be an option. The trial began in January 2017. Stretch targets have been set, but there is no penalty if they are not met. The target catchment annual phosphorus load reduction (Table 1), which is the sum of all target annual phosphorus reduction figures for the catchment (column E, Table 2), is the critical target that must be met. However, each site still has an individual permit (column F, Table 2) to catch environmental breaches.

Example has
2 WwTWs,
1 water body

There are some advanced top-end sensors on the market to measure phosphorus in real time, such as the Hydrocycle-PO₄, with built-in intelligence that flags up when data quality starts to reduce and maintenance is needed. This sensor can be adjusted to measure water quality in freshwater or seawater. Scullin says that monitoring ammonium also has its challenges: "Although the ion-selective electrode is small, cheap and very portable, it suffers from interference and drift that are characteristic of those sensors."

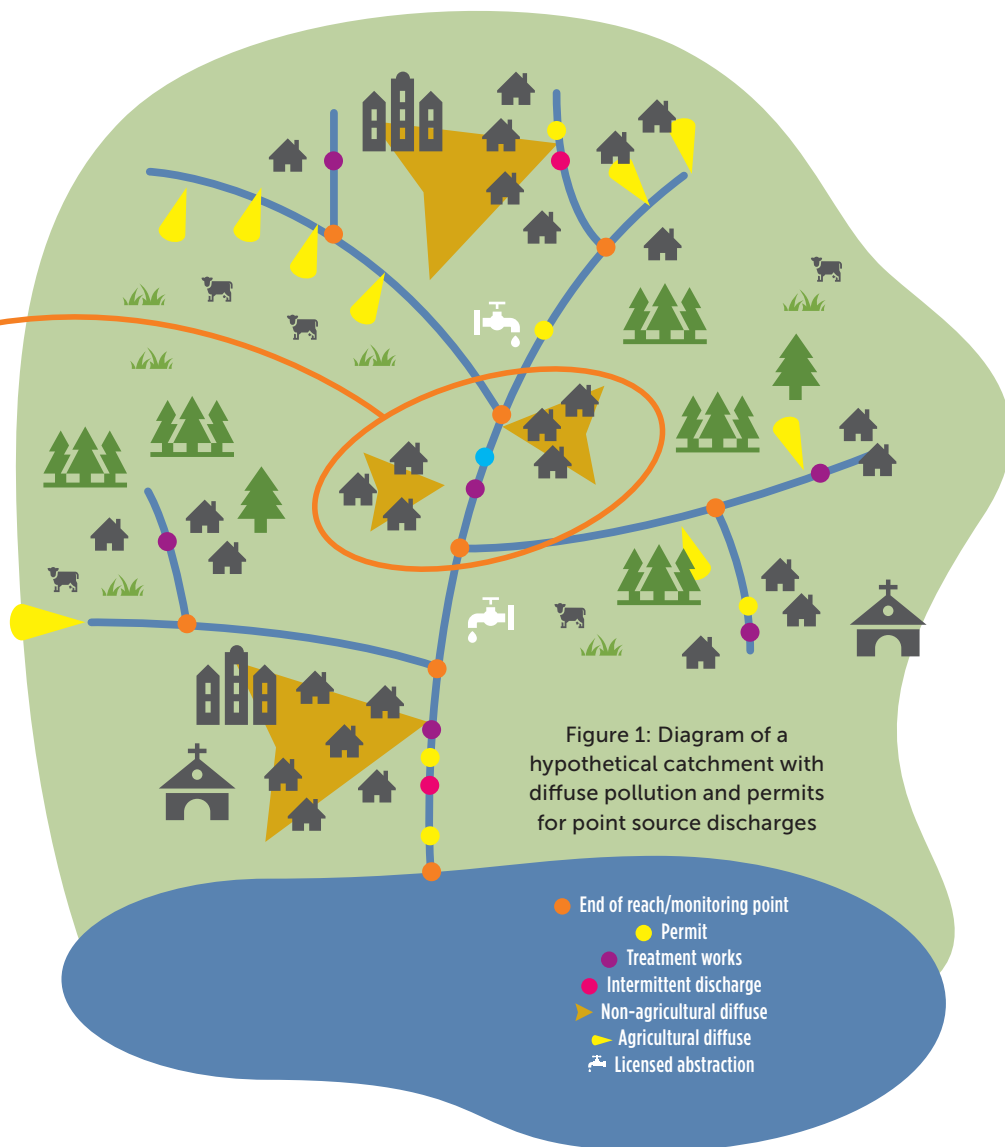
There are developments on the horizon for measuring nitrate and nitrite. In response to a US Environmental Protection Agency (EPA) Septic System Sensor challenge, TE Labs in Ireland has developed an online nitrate and ammonium sensor called Ecosens Aquamonitrix, which combines microfluidics (tiny quantities of fluids used in small tubes) with a LED detector to measure the absorption of wavelengths of light by water samples mixed with reactant. Accuracy so far is proving very good. Aquamonitrix is currently undergoing performance testing, and ISO 4034 Environmental Technology Verification verification reports and statements are due to be completed in February 2020. Multiple online units could be connected to cloud storage systems so that they can be accessed by customers to monitor different sites.

The University of Southampton is also working on a microfluidic sensor system, this time using oil droplets. The system miniaturises wet chemistry reactions combined with detection of absorption of light using a UV LED detector. It provides

"Measuring phosphorus is difficult as we are still using large semi-portable instruments"

low-cost, on-site, real-time measurement of nutrients at high frequency, and with low reagent use and a high limit of detection. A combined nitrate/nitrite sensor has already been developed and field tested. At the time of writing, a phosphate sensor is due to be commercialised by the end of 2019, and an ammonium sensor will follow in 2020; the system will then be adapted to detect other nutrients, pollutants

Figure 1: Diagram of a hypothetical catchment with diffuse pollution and permits for point source discharges



or biochemical molecules. A data management and sharing protocol has already been developed for data transmission purposes.

The EA is leading the way with innovative ways to regulate wastewater discharges, including flexible catchment permitting and CNB. Monitoring is vital and although nutrient monitoring has its challenges, developments will soon mean on-site, real-time monitoring is possible with transmission of data to a central database via telemetry.

ROSA RICHARDS is an independent environmental consultant specialising in water policy and monitoring. She is a freelance science writer and programme manager of the Sensors for Water Interest Group (SWIG). This article is based on a SWIG workshop on developments in nutrient monitoring, held in July 2019. [🔗](#)

TRANSPORT TODAY

The Travel Diaries



This weekend I'm off to Dublin to see two old friends. It promises to be fun. At least, the bit when I am actually there will be – bookending the beers, banter and burgers is a painstaking 10-hour journey. This is because I'm not flying; as one of my pals says, I'm "doing a Greta".

I'll get in the car at 3am tomorrow morning for the three-hour drive to the ferry port near Stranraer (no trains at that time in the morning). I'm then quite looking forward to a couple of hours aboard the boat, reading my book and drinking coffee. Then there are some ferry-to-train logistics to overcome – and then a two-hour train from Belfast to Dublin.

I'll do it all backwards on Sunday, leaving mid-morning in order to get back home by midnight. A flight would have bought me more time with my mates and saved me money – and also have been much, much easier to plan (booking trains across the border is incredibly difficult; I can only imagine what it'll be like after Brexit).

I have found the whole thing stressful. Eco-anxiety is now a thing, but in relieving my concerns about climate change, have I just added to my pile of everyday stresses (travel logistics and costs, time away from family, not enough time with friends)? At least I'll be saving carbon – though less than I'd hoped, given that solo six-hour round trip in the car. I do wonder how many other people would bother.

Take the government's workforce. In the *Greening Government Commitments 2016 to 2020*, the very first commitment (1a) under reducing greenhouse gas emissions is "Reduce the number of domestic business flights by at least 30% from the 2009 to 2010 baseline." The latest report, for 2017-18, showed a 28% reduction (4,800 fewer flights). Not bad. But look at the detail and the picture is more mixed. For example, 11 out of the 12 departments actually performed worse in 2017-18 than they did the previous year, with five reporting more flights than the baseline year.

There were excuses. The Foreign and Commonwealth Office cited "planning for the Commonwealth Heads of Government Meeting in London in 2018, as well as specific projects with the Ministry of Defence and the Department



"A STUDY FOUND THAT 48% OF THE FLIGHTS TAKEN BY A GROUP OF FREQUENT FLYERS WERE UNIMPORTANT"



for International Development involving travel between London and Scotland (where much of DfID is based)". Hang on: "Between London and Scotland"? By train it's around four hours from London to Edinburgh, and just over five to East Kilbride (where DfID has its offices). Why are so many people flying when there is a perfectly good train?

Defra has seen a "reversal in performance". In 2016-17, it posted a 29% reduction in domestic flights against a 30% target by 2019-20. In 2017-18, this had fallen to 14%. Defra staff numbers have swelled since the EU referendum – is Brexit fuelling climate change via increased flights? That's a bit of a leap, but the way things are going, the government is likely to miss its target. Defra's annual report for 2018-19 shows it has clawed back some of the gap, with flights down 19% compared to 2009-10, but it's a long way from 30%.

We have to be careful when we flight-shame. There is a difference between someone who flies without thinking it through – a study in the *Journal of Air Transport Management*, published in September, found that 48% of the flights taken by a group of frequent flyers were unimportant – and someone who doesn't have the time or money to avoid flying.

As the US-based nature writer Emma Marris tweeted earlier this year: "Don't shame people for making less environmentally responsible choices because they are broke, busy, stressed, etc. Our systems MUST change to make the green option the easier/cheaper option. Personal sacrifice, guilt and shame will never get us where we need to be."

I'll be looking at political parties' manifestos to see how they will be helping me to fly less without the stress. Perhaps there will be time in the 10 or so hours I spend on public transport this weekend? 

DAVID BURROWS is a freelance writer and researcher.



Widen the net

Sustainability professionals were elated at the prospect of a biodiversity net gain (BNG) requirement for new developments when it was confirmed in the Queen's Speech earlier this year, under the UK government's Environment Bill. These plans were put on hold with the announcement of a general election and dissolution of Parliament, although we can expect the legislation to gain royal assent sooner, rather than later.

However, there is still debate over how best to deliver net gain, and whether current plans go far enough to tackle the scale of the environmental and biodiversity crisis. The stakes are high, and getting this right could help unlock trillions of pounds for environmental protection.

The next big step

Although BNG is in its infancy, there are already plans for a broader environmental net gain (ENG) requirement. This was first proposed in the government's 25-Year Environment Plan, and would encompass air pollution, waste, flood risk and various other environmental impacts. It could be transformative for natural resources,

Delivering optimal sustainable development through environmental net gain is a source of much debate among policymakers and ecologists.
Chris Seekings reports

forcing developers and planners to consider how they can improve the wider environment. However, there are fears that biodiversity could suffer in the pursuit of broader goals.

"There is a risk there," says Natural England's principal advisor on net gain, Nick White. "If you take a classic engineering approach to a problem, it might give you an environmental gain in some form but damage biodiversity."

There is a consensus that BNG must be consolidated before ENG is a realistic prospect. The argument goes that enhancing biodiversity is fundamental to environmental improvement, and must never be traded for other goals. "Habitats are the building blocks from which other aspects of the environment can be improved," White says. "BNG is a non-tradable component, and we expect it to be at the heart of a wider approach."

Preventing trade-offs can be difficult. Alison Smith, senior research associate at the University of Oxford's Environmental Change Institute, gives recreation as an example of an area in which biodiversity could be compromised. "If you create a new football field, that could involve biodiversity loss, so that's a trade-off," she says. "However, BNG and ENG are usually in synergy. The main threats to biodiversity are the developments themselves, not ENG."

IEMA has developed 10 principles for BNG on developments, one of which refers to the Mitigation Hierarchy. This recommends developers do all they can to first avoid impacts on biodiversity, with offsetting a last resort. However, the idea of favouring net gain on developments is a point of contention.

A licence to trash?

Some experts are worried that offsetting could give developers an excuse to destroy wildlife and woodlands. Various

campaign groups adopted the phrase 'licence to trash' after the government proposed biodiversity offsetting in 2013.

White says that offsetting on its own could lead to "ecological deserts", with biodiversity gains pushed out to certain areas. "You could see all the benefits of a development going elsewhere, with no net gain locally," he explains. "For both BNG and ENG, we think it is important that there are benefits to communities, contributing to placemaking."

White argues that focusing on delivering gains on-site would make developers think more about how to incorporate greening components – bringing aesthetic, air quality and energy efficiency benefits. "By retaining the gains on-site there is an opportunity to ensure surrounding communities can benefit. Off-site delivery – in part or in whole – may be the best outcome where on-site is not possible or does not make ecological sense. However, we encourage developers to look on-site first."

Others take a more forthright view. David Hill CBE, chairman of the Environment Bank, believes there is little evidence that focusing on-site brings considerable gains. "Offsetting does not promote a 'licence to trash'," he says. "New developments are done on areas of low biodiversity value. High-value areas should be screened out if the planning system is working." Hill claims that on-site benefits involve 'prettifying' areas for residents (which he agrees is important to sell houses and provide a pleasant area for people),

but provides very little biodiversity uplift. Conservation bodies are starting to see more value in offsetting.

"What has on-site biodiversity creation provided?" he asks. "It is about making sites look attractive, but developers will do that anyway to make their schemes competitive in a buyers' market. I am more interested in getting species and habitats back, and funding from BNG should be used to create a restoration economy where large-scale habitat creation and long-term management can reverse the green concrete of our present countryside."

Money, money, money

The Environment Bank has looked at the costs of delivering benefits off-site versus on-site and found that the latter is 100 times more costly. "If you ask

the proponents of on-site if they have done the specific costing per hectare, they will fudge it," says Hill.

Additionally, on-site benefits are often neglected because they are not

managed properly, failing to adhere to IEMA's principal of "creating a net gain legacy". "If you are constrained on your requirement to have net gain on-site, there has to be an agreement to manage that site for 30 years. It must be a legally binding document that is enforced, with developments monitored every year."

Proposals for BNG recommend that sites deliver 10% more 'biodiversity units' using the Defra biodiversity metric. The Environment Bank calculates that a scheme for 2,800 houses on 100 hectares would have, on average,

"Habitats are the building blocks from which other aspects of the environment can be improved"



Net gain

a value of around 390 biodiversity units. Applying the 10% rule, that scheme would have to deliver 429 biodiversity units under net gain criteria. "How do you deliver all those units into 100 hectares along with 2,800 houses?" Hill asks. "This is a question that has never been answered by policy-promoters in government."

Just delivering 20% of the 429 biodiversity units on-site would result in 683 fewer houses, according to Hill's calculations, costing developers around £50m of average land value. "You could offset those 430 units into something like a 100-hectare habitat bank, costing just £5m – the difference is phenomenal."

What worries Hill is the potential for backlash from developers if they are forced to provide maximum net gain on-site and confronted with the economic realities of this. He argues that offsetting is the only way to mobilise funding on the scale needed. "The investment could be equivalent to lottery funding," he explains. "Big landowners see environmental markets and offsetting as a fantastic opportunity. They are not interested in marginal biodiversity on-site. If we are going to do something serious, we need a lot of money."

"Government needs to support a proper market for offsite provision by, for example, habitat banking – otherwise developers will find it hard to effectively deliver their BNG requirements."



Measuring up

Despite recognising the potential for offsetting, Smith argues that 'licence to trash' remains live, and that safeguards are needed in the metrics used for valuing natural capital. The University of Oxford and Natural England are developing an Eco-metric for ENG to help enable better consideration of the losses and gains in ecosystem services from development. This will measure 18 ecosystem services, including water availability and quality, carbon storage

and flood risk. "We have to be clear about the guidance that comes with the Eco-metric tool, which has safeguards to avoid a licence to trash," Smith says. "The challenge is ensuring those safeguards are understood and implemented."

Pre-emptive trashing is another challenge, with landowners depleting nature on-site before putting it up for development, knowing they will not have to offset the damage. "This is a big danger, and no one has come up with an effective way of avoiding it," Smith says.

"And if you cut down a woodland and replant it somewhere else, what happens to all those species in the original woodland? Offsetting is better than what we have at the moment, but it is not stopping all the damage."

Smith is also sceptical as to whether mandatory ENG is feasible. "It is difficult to get net gain across all ecosystem services. There is a limit to what you can do on a housing estate, for example, with the roads, pollution, noise and light. I think it is about making gains and losses transparent, and optimising environmental benefits in line with mandatory BNG."

There are fears that rushing through the Eco-metric could confuse businesses and planning authorities that are still getting to grips with BNG plans. Certain issues still need to be ironed out, such as the multipliers used to account for the time that habitats take to reach their 'target condition'. "I think you will see a voluntary process within the next two years, but I would hesitate to put a timeframe on a mandatory requirement," White says. "There has been a lot of interest in ENG from IEMA members, but I think it needs that voluntary usage first so people have confidence in it."

Raising ambitions

There are also hopes that ENG could help with the transition away from Common Agricultural Policy subsidies after Brexit.

"If you cut down a woodland and replant it somewhere else, what happens to all those species in the original woodland?"

"The net gain mechanism would allow farmers and landowners to generate an income stream for conservation," Hill says. "This would enable large-scale conservation programmes to no longer be the domain of NGOs and that is critically important to really restore nature at scale. The NGOs will not achieve that on their own."

Moreover, there is an ambition for ENG to be used for sustainable development beyond the built environment. It is thought that a metric could be used to create net gains in corporates' supply chains. "I think that the ENG process is valuable to wider corporate entities that want to demonstrate natural capital accounting to shareholders," Hill says. "They know that some regulatory mechanism is coming and want to do something voluntarily to show they are investible."

There are already plans in Europe for an overarching body that takes money from high-net-worth individuals and industries such as aviation to fund ENG in a more strategic way. "You have to try and create an investment vehicle for pension funds and the corporate sector. We have an existential threat with climate change and biodiversity loss, and can only address it with large-scale funding. Trillions of dollars are required every year, and that needs overarching cooperation across countries."

There are many initiatives currently in place for offsetting, such as the Woodland Carbon Code and the Carbon Offsetting and Reduction Scheme for International Aviation. A new governance framework may be needed to deliver a more joined-up approach. But the polluter should always pay, Smith says. "Developers ought to fund any damage they cause, and airlines should pay for damage from their emissions. Any future framework needs to recognise that."

Despite the challenges and debates, net gain could be a game-changer for sustainable development. "BNG is reshaping how we think about development process, and pushing through ENG would be significant in the wider context around moving to net zero," White says. "We can't carry on the way we have done, and ENG would be a huge step forward." 



Wild West End

Jess Kennedy, MIEMA CEnv, Arup sustainability associate director, talks about the green space project that won IEMA's Biodiversity and Environmental Net Gain Award

WILD WEST END HIGHLIGHTS

- Wild West End is a unique partnership between six large landholders: The Crown Estate, Grosvenor Britain & Ireland, The Portman Estate, Great Portland Estate, The Howard de Walden Estate, and Shaftesbury.
- Findings from 2018 surveys show that the project has delivered an additional 2,500m² of green space since 2016, equivalent to almost 10 tennis courts. This includes more than 60 green roofs, 14 green walls, 10 garden squares, two pocket parks and one allotment.
- Bird surveys results indicated a greatly improved healthy diversity of urban-adapted birds in the area, including goldfinch, robin and the great spotted woodpecker. The black redstart was also spotted – one of the UK's rarest species. Additionally, at least four bat species were recorded in 2018.

What was your role on the project?

I have been a sustainability advisor to The Crown Estate since 2014, which was carrying out an urban greening strategy for its London portfolio with Arup's ecologists and landscape architects. This developed into the idea to create a broader network of green spaces by partnering with surrounding landholders. My role began by approaching the surrounding landholders to pitch the idea and outline what the objectives would be.

And what were those objectives?

We had a vision of creating a network of green space 'stepping stones' connecting parkland in the West End. We had three objectives: improving wellbeing for residents; enhancing biodiversity and ecological connectivity; and promoting the benefits of green infrastructure.

Did you achieve those goals?

We are monitoring progress every two years with the London Wildlife Trust, a strategic partner. We created a 'value matrix', which takes the different functions green spaces provide, such as biodiversity and wellbeing, and establishes what 'good' looks like for each. We set

criteria for different types of green spaces so we could create a level of consistency. We have also done before-and-after surveys at public realm installations.

How has the Wild West End been received? It has been well received by Westminster City Council and the local business improvement districts. There has been a lot of interest, especially about green roofs, so the feedback is really positive. The Crown Estate has done a lot of work targeted at the public through its Summer Streets events, and has employed a theatre group to act out the concept of Wild West End, which helps children understand the benefits.

Was it difficult creating partnerships between landholders?

They are like-minded organisations with similar goals in terms of long-term stewardship. It is about finding ways of creating mutual benefit, and they could all share the same objective of adding value to their estate while contributing to the broader benefit to the local environment.

What challenges did you encounter?

It's hard to retrofit green space into dense

urban areas. We were trying to put green roofs into buildings that are heritage listed, so there were challenges. There are also difficulties putting these spaces in the public realm because there are lots of parties you have to bring together to work on those sites. I think one of the benefits is that we can share lessons learned.

What was most crucial to your success? The ability to create something bigger than the sum of its parts, and having a vision people could buy into. Prior to Wild West End the different partners were installing green space, but it was done in isolation. When it is part of a broader network, the benefits become more apparent. There isn't another partnership like this that we are aware of, and we hope it's a model for others.

What did you think of IEMA's award ceremony? I thought it was a really well run event – I liked the MC, I thought he did a great job! It is encouraging to see IEMA set up these awards, and Arup will certainly be interested in entering more projects next year. I think it is good to bring the environmental community together and celebrate its achievements. 

CONNECT

SOCIAL AND COMMUNITY NEWS FROM IEMA

MEMBER SUCCESS

Laura's planning a bright future

IEMA Futures ambassador Laura Archer wins top award, and reveals what comes next on her road to success

IEMA member Laura Archer was presented with the Royal Town Planning Institute (RTPI) South East Young Planner of the Year 2019 award at the South East Awards for Planning Excellence 2019, held at the Spinnaker Tower, Portsmouth on 21 November. Laura is a planner at Barton Willmore, as well as vice-chair of RTPI Planners and chair of the South Coast Young Planners Network. She is also a member of IEMA Futures and makes regular contributions to *Transform*.

We spoke to Laura to find out what winning meant to her. "After a busy year completing a masters full time while changing jobs and managing all my other activities, the award really is the icing on the cake! After moving to the South East region on my own a few years ago, the networks helped me to meet people, and I have so many to thank for supporting me. I think it's always good to take a step back and remind yourself of how far you have come!"

In 2020, Laura is keen to use the award and the networks she is involved with to continue to promote planning as a career for younger generations.

She is passionate about the environment and digital

technologies, and will soon be hosting a webinar, Digital Environmental Impact Assessments, on behalf of IEMA Futures.

What is next for the South Coast Young Planners Network? "We hope to maintain the momentum, develop stronger relationships with universities and schools and plan joint events with other institutes such as IEMA and the Royal Institution of Chartered Surveyors. We are also organising Planning Sans Frontieres, a fun team challenge day, and a CPD day in Brighton. So there is lots on the agenda for 2020 already!"



Laura with Ian Tant MRTPI, president of the RTPI

QUOTE UNQUOTE

Exciting discussions on youth leadership to drive [#sustainability](#), and fighting for [#transformativechange](#) at [@IEMAfutures](#) event at [@SalfordUni](#) [@IEMANET](#)



Fantastic day organised by [@IEMAfutures](#) Great to listen to young professionals discussing [#youthleadership](#), [#SustainableConsumption](#) and fighting for [#transformativechange](#) Great ideas to take back to the IEMA board [@NICH769](#)



Really enjoyed the first presentation Communicating [#ClimateChange](#) at [@iemagnet's](#) [#Sustainability](#) and [#ClimateChange](#) theatre [#EMEX](#) [@CRAIGLOVEENVIRO](#)



Congratulations to all our [#GreenImpact](#) National Award Winners! [@SOSUKCHARITY](#)



Excellent start to the Northumbria University MSC Safety Health & Environmental Management professional body social evening discussing [@iemagnet](#) [@IEMAfutures](#) and IOSH. [@SHARONENV1](#)





Visit www.iema-transform.net
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Connect

Why did you become an environment/sustainability professional?

A combination of an academic interest in design, science and engineering and outdoor pursuits from my scouting experiences. My father was a landscape gardener and Scout camp service team manager, so the environment was embedded into my background.

What was your first job in this field?

Sewerage modeller, Water Research Centre. I loved computer modelling, even if it was to transport sewage!

How did you get your first role?

A placement in my first degree in civil engineering. My second job was working at van building LDV as part of my masters in environmental management. In 2000, I was headhunted by South Staffordshire Water to be environmental manager.

What does your current role involve?

Supporting companies in the utility and rail contracting industry to achieve their corporate certifications and accreditations. This involves auditing, training, and risk reviews. I also do mentoring and development, and teach NEBOSH environment certificate courses.

How has your role progressed?

ISO has become less dominant to the various industry schemes, but all are based on the same model.

What's the best part of your work?

Seeing companies go through their three-year maturity development cycles and helping people to achieve their objectives, whether individual or corporate.

What's the hardest part of your job?

Convincing operations directors that they cannot tolerate poor vehicle driving performance by their employees just because they are the hardest workers.

What was the last development event you attended? IEMA ISO 14001 Transition Consultation.



CAREER PROFILE

Darren Male

FIEMA

Director and principal consultant,
The QUENSH Consultancy

What did you bring back to your job? Deeper understanding of ISO 14001 requirements.

What are the most important skill(s) for your job? Being knowledgeable, having great attention to detail, and being friendly and supportive in delivery.

Where do you see the profession going? With all the current focus on environment issues following increased media attention due to David Attenborough, Extinction Rebellion protests, Greta Thunberg petitioning on climate change, and increased awareness of local air quality issues, I am awaiting to see if interest in environmental issues increases among buyers and contractors.

Where would you like to be in five years' time? I love providing training, mentoring (and

"You know you are delivering a moral and ethical service"

talking!), so delivery of more training while supported by extra consultants (I currently employ two) delivering in the field.

What advice would you give to someone entering the profession?

Ensure that your communication skills are good and that you are able to talk confidently to all levels of the business – workers, supervisors, managers and directors. People learn through stories.

How do you use the IEMA Skills Map?

At Fellow level, I mentor people interested in environmental issues. I am a Full Member Mentor and Fellow Assessor, and I use the IEMA Skills Map to guide people along their journey.

If you had to describe yourself in three words, what would they be?

Energetic Peter Pan!

What motivates you? Achieving positive outcomes. In environmental management you know you are delivering a moral and ethical service to the benefit of all.

What would be your personal motto? Same as scouting: do your best, do your duty.

Greatest risk you have ever taken?

I could say the outdoor pursuits I do, but being honest: he first year of running my own business (2005), or the first year as Group Scout Leader (2012) – they were the hardest years of my life.

If you could go back in history, who would you like to meet?

James Lovelock (still alive at the age of 100), best known for proposing the Gaia hypothesis, which postulates that the Earth functions as a self-regulating system. ①



TRANSFORM

FOR ENVIRONMENT AND SUSTAINABILITY PROFESSIONALS

Share your expertise

Our aim is for **TRANSFORM** to deliver original and expert commentary across a wide and diverse range of industries and sectors. IEMA members are crucial to the development of the magazine. As experts in your respective fields, you can share invaluable insight covering some of the most topical concerns of today.

We welcome contributions, from features and opinions to comment and reviews. In keeping with the spirit of community, we are also keen to promote IEMA network news and events.

Your skills and expertise can encourage and influence others.

For enquiries, article proposals and submissions, please contact our team: media@iema-transform.com

Putting **TRANSFORM** magazine at the forefront of discussion and debate on environmental and sustainability issues



DATES FOR YOUR DIARY iema.net/events

16 DECEMBER 2019

New ISO on Climate Change Adaptation – Introducing ISO 14090

This rescheduled webinar by IEMA and BSI introduces *ISO 14090: Adaptation to climate change – Principles, requirements and guidelines*. Launched in 2019, *ISO 14090* was developed with wide international consensus as a UK-led global standard. Here, the experts will talk us through what's inside *ISO 14090* and how it can be used by organisations to create a resilient business now and into the future.

➤ To register: bit.ly/ISO14090R

17 DECEMBER 2019

Derby: Closed Loop Recycling in Business

Rolls Royce uses more than 20,000 tonnes of high-value metal alloys each year, which is why it works to reuse as much metal as it can through a closed-loop recycling programme. This is the perfect opportunity to learn more about closed loop systems, find out about what Rolls Royce and others are doing in this field, and network with fellow professionals and peers.

➤ To register: bit.ly/LoopDER

4-5 FEBRUARY 2020

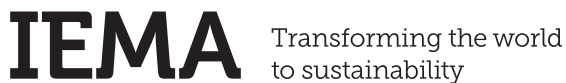
edie Sustainability Leaders Forum

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We believe in the power of sustainability to make a real and positive difference for individuals, businesses, communities, society and ultimately our planet. Together, through the knowledge and skills of experts we're transforming the world to sustainability.

Our year in numbers

