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Autumnwatch comes to CAT!

How we can help nature thrive

A double emergency: climate and biodiversity

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EDITORIAL

Peter Tyldesley

A light in the dark

"As the days shorten, and the nights grow longer, nature can be our candlelight in the darkness to guide us through. And, as with any flame, we can do our bit to nurture it in its time of need."

These were Iolo Williams' closing words in Autumnwatch, broadcast this year from CAT as one of four live locations across Britain.

As many of us have found this year more than ever, nature can bring joy and solace in challenging times. Seeing native species like dormice and pine marten return to somewhere like CAT, which just 50 years ago was barren slate, can be a much needed source of hope and inspiration as we work together to build a sustainable future for all humanity as part of a thriving natural world.

November gave us a few other reasons to be hopeful.

When Donald Trump leaves the White House in January, we'll no longer have a climate denier in charge of the world's largest economy, and America will re-enter the Paris Agreement. This is a pivotal moment for global climate action.

On this side of the Atlantic, we've seen the beginnings of important policy announcements from the UK Government, from the end of the sale of new petrol and diesel cars to investment in off-shore wind. Whilst none of it is ambitious enough given the scale of the climate and biodiversity crisis, it's an important start – a place from which to push for more ambition and a faster pace of change.

This coming decade is critical for curbing our emissions. As this issue reaches you, the UK is due to announce its renewed 2030 emissions strategy. As the host of the major summit (COP26) next year, the UK must set an example in raising the climate ambition of each and every participating nation – and then move swiftly to turn policy announcements into effective action.

Thank you for your support at this critical time. If nature can be our candlelight in the darkness, our own actions as part of a global movement for change can help the sun to rise on a better tomorrow – and in that lies real hope for humanity and our amazing natural world.

Peter Tyldesley Chief Executive Officer

Aike Davidson Photograpy/Creative Commons

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CAT news

Autumnwatch comes to CAT

"Here at the Centre for Alternative Technology in Mid Wales, it's all about forward thinking. This is a place with the future survival of our planet at its very core."

That's how nature presenter Iolo Williams introduced CAT to millions of people across the UK when he joined us this October to broadcast BBC Autumnwatch live from our eco centre.

Nature on our doorsteps

Celebrating the rich variety of the UK's wildlife, the popular BBC series inspires people to care about the nature on their doorstep, and to do what they can to help protect and restore the natural world.

On our screens for eight nights over two weeks, from the end of October and into November, Autumnwatch was broadcast from a range of locations across Britain. Whilst Iolo was live from CAT, Michaela Strachan was based in Tentsmuir Forest in Fife, Gillian Burke in the RSPB Old Moor Nature Reserve in South Yorkshire, and Chris Packham was close to his home in the New Forest.

Transformation and regeneration

Iolo's base for the programme was in and around the old

quarry on which CAT is built, which has been transformed over nearly five decades from barren slate into a green oasis, rich in wildlife.

> It is a living example of how we can step in and help bring nature back from the brink, making it the perfect

base from which to inspire and educate people in solutions to the climate and biodiversity crisis.

lolo described the transformation:

"The Centre, or CAT as it's known, sits in the Dyfi Biosphere Reserve, and over the years has become world famous, since it opened in 1974, as an eco centre that looks for practical solutions for sustainable living. There's an emphasis on renewable energy and working alongside nature, and there's a big focus here on education, particularly educating future generations."

"It's hard to believe, but where I'm stood now was once a massive slate quarry. It was at its height in the 1880s and the 1890s. It gradually declined, and finally closed in the 1950s.

"Now, as ever, what man discards, nature takes over. Initially it would have been the lower plants – the mosses, the ferns – then came the shrubs, and finally the trees. And the whole landscape here is stunning. We have lakes, we have pools, and of course a variety of habitats like that attracts wildlife, some of it common, some of it pretty scarce: otters, goshawks, red kites... the variety here is absolutely amazing. It really is a stunning landscape and a brilliant place to be."

Our sensitively managed woodlands are now a haven for wildlife, including rare species such as pine martens, willow tits and dormice – with one of our resident dormice playing a starring role in the final programme of the series as it fattened up for its winter hibernation.

You can read about the wildlife of CAT in Dulcie Fairweather's article on pages 11-14. Find out more in her blogs and view livestreams and clips from our trail cameras on our website at www.cat.org.uk/autumnwatch





The UNESCO Dyfi Biosphere

The UNESCO Dyfi Biosphere, where CAT is based, is an area recognised and respected internationally, nationally and locally for the diversity of its natural beauty, heritage and wildlife, and for its people's efforts to make a positive contribution to a more sustainable world.

On arriving at CAT, lolo told us:

"I'm so excited to be returning to CAT in the beautiful UNESCO Dyfi Biosphere to present this year's Autumnwatch. There is such an abundance of wildlife in Mid Wales and it's great to see it flourishing at a site that was once an industrial slate quarry.

"But even where wildlife is thriving, we know that the effects of climate change are already having an effect on biodiversity in the UK. We need to take action now, as a nation, or some of our wildlife could be lost forever."

Help nature thrive

Throughout the broadcast, we shared information and advice online, exploring how people can help nature thrive in their local area, and highlighting the bigger picture changes that are essential for tackling the climate and biodiversity crisis.

As lolo said in the final episode:

"As the days shorten, and the nights grow longer, nature can be our candlelight in the darkness to guide us through. And, as with any flame, we can do our bit to nurture it in its time of need."

You can read more about how we can nurture and protect this flame, and why this is vital for both people and wildlife, in this issue of *Clean Slate*. Take a look at the Autumnwatch pages on our website for more tips on helping nature where you are, and to see more of the wild nature that has found a home at CAT.

We'll continue to share views of the CAT landscapes and wildlife on our website and across our social media over the next few months. Follow us to enjoy glimpses of dormice, badgers, bats – and perhaps even a pine marten – and please share with others using #HelpNatureThrive.

Keep in touch:

Web: www.cat.org.uk/autumnwatch Twitter: @centre_alt_tech Facebook & instagram: @centreforalternativetechnology #HelpNatureThrive



CAT news

Wild encounters with lolo Williams

What inspires lolo Williams? Eight-year-old nature lover **Gabriel Goodsell** caught up with the Autumnwatch presenter to find out about his favourite animal encounters and to get his top tips on wildlife spotting.



How did you get into wildlife?

That's a really good question. I've been interested in wildlife from as far back as I can remember really. When I was four, five, six, seven years old, I used to go out for walks, bird watching and looking for fish and snakes and frogs and toads and anything and everything.

If you could be a different animal what would it be?

That's a really difficult question... I think it would have to be a raven. A raven is a big crow, with a whacking great beak, so I've already got the big beak, look!

What I like about ravens is that they appear to enjoy life. When they're flying along, they'll go over on their backs, and over again... and they'll cronk all the time. So if I was to come back, I'd want to come back as an animal that has lots of fun, and I think that would have to be a raven.

What's your best animal moment?

My favourite animal moment would have to be seeing an orca, or a killer whale, for the first time ever, and that was filming for Springwatch about six or seven years ago now, up in Scotland. Seeing a pod, a group of them, but in particular seeing the bull, the big male, and the dorsal fin was about six foot, two metres tall. It was a big powerful animal. I'd always wanted to see orcas and it made it extra special the fact that I saw it here in Britain, not abroad.

What tips would you give to a young person interested in nature?

My advice to you is just go

outside, all the time. When I was your age, I've got to be honest with you, I didn't like school very much. I just wanted to be outside. I wanted to learn about the things around me: about the birds, about the mammals, about the reptiles, the amphibians, the plants, the fish. And whenever I was out there, whether it was building dens with friends, racing our bikes, I'd look around and learn things all the time...

And then learn how to communicate with people, how to tell stories, and how to recall some of the things that you've seen, and pass that on to others as well. And, in doing that, if it's your passion, then you will love life. 🚯

About the author

Eight year old Gabriel loves exploring all the woodlands and wild spaces around CAT and the Dyfi Biosphere, as well as giving the nature in his back garden a helping hand with bird feeders and bird boxes. Gabriel's dad Rob is CAT's woodland manager.

Find out more about what makes Iolo tick, from wolves to Welsh rugby – watch Gabriel's bilingual interview on our website at www.cat.org.uk/autumnwatch.

Do you know a young person who would like to be a nature presenter? Take a look at our autumn family activities for ideas and inspiration on helping children appreciate and benefit from the natural world. Available in Welsh and English from www.cat.org.uk/catathome

CAT at Home – activities, events and advice online

As we head into the winter months, with the likelihood that we'll be staying at home a lot more than usual, CAT continues to provide inspiration and advice with our #CATatHome online activities, events and information.

Join us for free webinars exploring all aspects of sustainability or take part in our 'Zero Carbon Britain: Live Online' two-day course looking at how we can reach net zero greenhouse gas emissions.

Keep the kids, grandkids, nieces and nephews entertained and inspired with our family activities designed to help them connect with nature and environmental solutions, and check out our free online information service for tips on eco-friendly solutions for your home and garden.

We've had a fantastic response to our #CATatHome series, which we began developing during the spring lockdown to keep sharing solutions while CAT was closed. The series has allowed us to reach hundreds of thousands of people across the world with skills and knowledge to help address the climate and biodiversity emergency.

To watch recordings of past online events, see what's coming up, and view all of our #CATatHome activities and information, visit www.cat.org.uk/ catathome

What else would you like to see CAT doing to share sustainability solutions? Drop us a line at media@cat.org.uk – we'd love to hear your ideas.

Visiting CAT this winter

In the last issue of *Clean Slate* we shared with you the news that the CAT visitor centre was once again open to students and visitors, with lots of changes in place to protect staff, volunteers and all of our guests.

Our students returned to site for study visits in September and October, with smaller groups than usual and more studying done via distance learning. However, with COVID-19 again on the increase, from late October we switched back to teaching entirely by distance. As we already offer our postgraduate MSc courses via distance learning, this is a straightforward transition, although we are really looking forward to welcoming students back to the immersive, handson learning experience that the CAT site offers as soon as it is safe to do so.

We opened the doors of our visitor centre at the end of August, following a huge effort by our gardeners and estates team to tidy up a site that had gone a little wild and been ravaged by a roving band of escaped sheep during lockdown. We had to close for just over two weeks during the Wales firebreak from 23 October, reopening from early November.

As we expect to be very quiet in December and January, with no students, no events and fewer people making trips to the area, we have decided to close the visitor centre for this period.

This isn't an easy decision for us, as the urgency of the climate and biodiversity crises makes it essential that conversations about positive solutions don't pause because of COVID-19 – in fact, there's a vital opportunity for investment in the economic recovery to prioritise net zero solutions.

However, closing makes sense financially given the low expected footfall during this period and the pause in on-site teaching. The furlough scheme allows us to protect jobs and livelihoods during this quiet period, and we'll be topping up the amount paid by the scheme so that our staff continue to receive their usual salary.

Meanwhile, we will continue to share solutions online, and we really look forward to welcoming everyone back to CAT in the spring.

Thank you so much to you, our amazing supporters, for helping us through this challenging time. Your kind donations and ongoing support through your membership of CAT are always essential to our work sharing solutions to the climate and biodiversity crises – never more so than now.

If you'd like to make a one-off donation or set up a regular direct debit to support our work, please visit www.cat.org.uk/ donate – thank you.

Talking zero carbon with local councils

During the autumn CAT's Zero Carbon Britain Hub and Innovation Lab team continued to work with Ashden climate charity to deliver interactive webinars exploring tried and tested solutions to the climate and biodiversity emergency.

Aimed at local councils and

communities, these online events present projects that have been successfully trialled in one local area, sharing their knowledge and experiences with others across the UK.

Webinars have covered natural climate solutions, from peat bogs to urban community gardens, home insulation schemes, better transport systems, and more. You can view past webinars on our website at www.cat.org.uk/webinars

Also aimed at local authority climate action was November's 'Climate Emergency UK' conference, where CAT's Paul Allen gave the opening address to 350 councils and community groups, sharing our vision for a Zero Carbon Britain. As part of the same event, our Innovation Lab Manager Dr Anna Bullen ran a two-part 'mini lab' workshop exploring barriers to effective climate action and how these can be successfully overcome.

Learn more about the work of CAT's Zero Carbon Britain Hub and Innovation Lab at www.cat.org.uk/zcb and follow us on twitter to find out about upcoming events: @centre_alt_tech.

Sharing solutions at Wales Climate Week

In November, CAT took part in online events as part of the Welsh Government 'Wales Climate Week'. Bringing people across Wales together to tackle key climate issues, the event marked a year until the United Nations Climate Change Conference COP26 and the new All Wales Low Carbon Delivery Plan.

The online series of free events included live broadcasts and interactive events from national and global policymakers, pioneers and innovators, discussing and interrogating the actions for tackling the climate emergency in the context of a global pandemic.

As part of the event, CAT's Paul Allen took part in a panel discussion exploring the question 'Climate change – whose responsibility is it?' Paul presented CAT's Zero Carbon Britain research to show that we can reach net zero greenhouse gas emissions using technology available today.

Keep up to date with what's happening at CAT by bookmarking our blog at www.cat.org.uk/news and following us on twitter (@centre_alt_tech) and facebook and instagram (@ centreforalternativetechnology).

Calls for climate action on the road to COP26

As this issue of Clean Slate reaches you, the UK is due to co-host an event that marks a critical milestone in the run up to the UN climate talks in Glasgow in November 2021. CAT's Head of Policy and Communications **Sarah Jenkinson** looks at what to expect.

On 12 December, the fifth anniversary of the Paris Climate Agreement, world leaders will come together for an online summit that the UN is calling "the sprint to Glasgow".

The pressure is on to show increased ambition and to strengthen emission reduction commitments. Nations are due to announce stronger 2030 climate targets by the end of the year, but their delivery, strength and effort remains uncertain.

Known as 'nationally determined contributions' (NDCs), these targets are aimed at collectively keeping global temperature rise 'well below 2C', and aiming to keep it within 1.5C. Under the terms of the Paris Agreement 'ratchet mechanism', they are revised and strengthened every five years.

The world has already warmed by 1.1C, and current pledges are estimated to add up to 2.2-3.4C of warming by 2100. We urgently need world leaders to set more ambitious targets and – crucially – we need to see detailed plans for how pledges will be turned into immediate climate action.

Beyond the 10-point plan

It is expected that the UK NDC will be based on recommendations from the Climate Change Committee, due a few days before December's meeting. Pressure is growing on the government, with climate experts and campaigners calling for emissions cuts of between 70% and 75% by 2030. As host of COP26, the UK must show real leadership and help set the pace of change.

COVID-19 has taught us we can pivot, and we can pivot fast. As we go to press, Boris Johnson has just published his '10-point plan', which offers some good news, including increased support for offshore wind and a bringing forward of the date for the end of sale of new petrol and diesel cars to 2030.

However, if we are to meet the scale of the challenge, the government will need to show commitment to strong investment, and rely less on technologies that are as yet unproven at scale.

By the time you read this, Rishi Sunak will have published the results of the 2020 Spending Review, another important moment to look for commitment to investment in climate solutions, whilst the UK's detailed roadmap to zero is due to be published next year.

Zero carbon solutions

Evidence across sectors shows that the low carbon economy is gathering pace. CAT's Zero Carbon Britain scenario demonstrates how we can reach net zero greenhouse gas emissions using only proven technology: by powering down energy use through changes to buildings, transport and industry; by powering up clean energy supplies; and by transforming diets and the way we use land.

If done well, investment can reap rewards that go beyond action on climate, offering a range of other benefits including creating new jobs across the UK, improving health and wellbeing, and creating more space for wild nature to thrive.

Keep an eye on the CAT blog at www.cat.org.uk/news and follow us on social media for updates and to get involved.



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Your views



Train tickets too pricey

Dear CAT

As someone who is concerned about the environment and quality of life, I would much prefer to travel by train than drive on our overcrowded roads. I believe that we as a country should make better use of public transport for longer journeys.

A recent round trip of about 500 miles from my rural home to another rural area to visit family cost just over £60 in diesel. This could have been split between four passengers, although on this occasion only I travelled. I investigated the possibility of making the same trip by train in October – fares were between £150 and £303 depending on route. I visit my family up to six or seven times a year, which would cost in the region of £1000-£2100 in total. Unfortunately, I cannot justify this type of expenditure, much as I love to see my relatives.

It may be possible to spend more time searching separate train companies to find cheaper fares for each section of the route, but surely if I have to do this to find an affordable fare, then the system is broken.

How is the government seriously going to encourage the public out of their cars and onto the trains with this level of costs?

Chris Wilderspin

Local climate action partnerships

Dear CAT

Paul Allen's article on local authority responses to the climate emergency (*Clean Slate* 117) provides some useful examples. I have come to the conclusion that we need to move on from talking about 'climate action plans' as this is proving to be a weak measure of progress.

Paul writes about 'Team local'. I think the creation of local climate action partnerships is an absolutely key step and we need to look for, or design, good models and then push them.

The contrast between Manchester, which has a staffed agency led by seconded council staff with significant local enterprises on board (but still little leverage or resources), and Shropshire, which has a volunteer-led partnership receiving warm words but no practical support or leadership from the council, is illuminating.

A strong partnership organisation could be the engine to really drive areawide emissions reductions.

Paul mentions health boards; with the recent commitment to zero carbon from the NHS, their local sustainability officers - with a health remit - could be extremely valuable partners who can help shape the work around co-benefits. Partnerships might also have the potential to find workarounds for council resource crises, perhaps through pushing for the repurposing of Local Enterprise Partnerships, designing schemes for Community Investment Bonds, or introducing small climate action levies modelled on Business Improvement District membership fees.

This seems to me to be a fruitful topic for a piece of detailed work for your Zero Carbon Britain Hub. *Cllr. Julian Dean* Shrewsbury

Editor's note: Look out for a followup article in the next Clean Slate that explores how local authorities and communities can go about creating effective zero carbon action plans and how best to implement them.

Promoting passive solar Dear CAT

I find the standard of UK domestic architecture very depressing, and specifically the woeful lack of use of passive solar.

I have recently renovated a southfacing integral conservatory that forms part of my house, using the best building standards available. Over the past two winters it has – and this is not an exaggeration – halved my fuel consumption, as well as greatly adding to my comfort.

If you have any opportunity to promote the use of passive solar, may I encourage you to consider it? It is a massively under-used national resource. My opinion is that every newbuilt house should have a passive solar space wherever possible, and as much thermal storage mass as possible. I am lucky here, as the internal wall of my conservatory is 70cm-thick granite – and it grows wonderful tomatoes! *Steve Rickaby*

Editor's note: If any of our readers would like to know more about reducing energy use by making the most of passive heat gain from the sun, you'll find advice from our Information Service at www.cat.org.uk/info – or drop us a line at info@cat.org.uk.

Opinions expressed are not necessarily those held by CAT. We reserve the right to edit letters where necessary.

The gift of sustainability

If you're looking for a unique gift to send to loved ones, CAT Gift Membership is ideal for anyone who cares about climate change and wants to know what they can do to help.

Choose from individual, joint or family membership, and they'll become part of CAT's growing community of changemakers. Visit our website or contact Penny Rowland on 01654 705988 for more information.

Write to us

We'd love to hear your thoughts on the topics covered in this issue and other environmental solutions – and don't forget that our Information Service is here to give advice on what you can do in your own home.

Write to us at *Clean Slate*, Centre for Alternative Technology, Machynlleth, Powys, SY20 9AZ or email members@cat.org.uk.

If you'd like your letter to be included in *Clean Slate* please mark it 'For publication'.



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CAT's rich tapestry - creating space for nature

CAT's habitats are carefully managed to create a place where wild plants and animals can thrive. **Dulcie Fairweather** introduces some of the amazing species that have found a home at CAT, and shares some tips on what you can do to help wildlife in your home or garden.

There is an age-old saying that "variety is the spice of life" and, in respect to our natural world, it couldn't be truer. Here at CAT, it's in our nature to ensure our wildlife will thrive for generations to come. Our response to the ongoing biodiversity crisis is to provide the diversity that flora and fauna so desperately need, to provide training and inspiration to help others to do the same, and to push for the bigger picture changes that have to happen to address the climate and biodiversity crises.

A healthy mosaic

The CAT eco centre is ideally situated right in the heart of the Welsh countryside, in the foothills of southern Snowdonia, just on the edge of the National Park. From hazel coppiced woodland to wildflower meadow, we sensitively manage our 40 acres to be a healthy mosaic of habitat that benefits many species.

CAT has conducted biodiversity surveys over many years as part of our land management plans so we have a good idea of the variety of wildlife on the site.

Lesser horseshoe bats, dormice, pied flycatchers, wood warblers, yellowhammers, red kites, buzzards, otters, polecats and pine martens – just some of the species that have found a home amongst CAT's woodlands, ponds, gardens and buildings. And the plant life is just as rich, with lichens, liverworts, ferns and mosses reclaiming the old slate surfaces, and heath, woodland and meadowland adding to the rich tapestry.

About the author

Dulcie joined the CAT woodland team as Natural Resource and Volunteer Officer in August 2020. She has spent the first few months of her role setting up camera traps and footprint tunnels in preparation for Autumnwatch.

She has a BA (Hons) in Marine and Natural History Photography, a course that placed heavy emphasis on environmental subjects and concerns.

Bats in our basement

CAT is home to no less than five types of bat, and we consider it an absolute privilege to boast a roost of one of our most endangered species – the lesser horseshoe bat. Historically the lesser horseshoe bat had a much wider distribution across the UK, but now the total population of about 15,000 individuals is confined to Wales and western England, with a further 12,000 in western Ireland.

Like every British bat species, lesser horseshoes live complex seasonal life cycles that are dictated by changing temperatures and availability of food. They hibernate from September/October until April and frequently into May. While they naturally roost in caves, the increasing human encroachment into their habitats has driven them to make homes in man-made structures, including roofs, tunnels, attics and cellars. It is vital to their conservation that potential roost entrances should be left unobstructed.

Insect apocalypse

One of the biggest threats to lesser horseshoe bats is reduced insect availability. These bats have an incredibly low body mass with small fat reserves, making them particularly vulnerable to starvation.

An alarming 41% of insect species are threatened with extinction – meaning food chains are under threat as never before, and the three-quarters of human food crops which need insect pollination are also precarious.

Causes of insect declines are much debated, but most scientists believe that it is the result of a combination of man-made stresses, including habitat loss, chronic exposure to complex mixtures of pesticides and the beginnings of the impacts of climate change. The consequences are painfully clear; without insects, a multitude of birds, bats, reptiles, amphibians, small mammals and fish would vanish.



Lesser horseshoes are one of Britain's most endangered bats.

Habitats for roosting and foraging

Loss of foraging habitat may also be responsible for the decline in lesser horseshoe bat populations. They prefer shrubland, valleys, open grassland and woodland edges. Where habitat is fragmented, linear features such as hedgerows and treelines are important corridors between roosts and foraging areas.

Farmers, growers and land managers are advised to consider and test alternative approaches to practices that pollute or strip natural capital. Policymakers must incentivise restorative farming that provides public benefits and helps nature thrive at the same time as securing productivity for future generations of farmers.

Here at CAT our habitat management is key to supporting our local population. The woodland team uses traditional methods to manage broadleaved woodland, ponds, outgrown hedgerows and tree lines, and we run courses helping others to learn these wildlife-friendly techniques.

Sleeping beauties

With their golden-sand fur, big black eyes and long, feathery tail, there is no doubt that the hazel dormouse has the "aww" factor.

You would have to be incredibly lucky to spot a dormouse in the wild, as these minute creatures are rare, strictly nocturnal and spend most of their time either asleep or high up in the trees. Remarkably, they can spend as much as seven months of the year asleep.

Here at CAT, we are delighted to have these endearing animals on site - we even have wildlife cams capturing their behaviour.

Plight of the dormouse

Once widespread in Britain, the species has seriously declined in both population and range over the past 100 years – making the hazel dormouse one of Britain's most endangered animals.

Dormice are confined predominantly to southern England and Wales and, where dormice remain, their distribution is patchy. The State of Britain's Dormice 2019 reports that, since 2000, the population has fallen by a half (51%). Having already vanished in 17 counties across England, the population of dormice is decreasing on average by 3.8% each year.

The loss and fragmentation of ancient woodlands, climatic difficulties and reduction in traditional forestry methods have been recognised as their main threats.

Lost in fragmentation

Dormice prefer structurally diverse habitats: they are more numerous in woodlands with varied tree heights and prefer to move through areas of woodland edge and dense vegetation. They are a species that will not leave the safe canopy of trees to cross large, open spaces and are reluctant to come to the ground.

But changing woodland practices and the subsequent loss of connectivity have forced populations to become isolated, lose genetic diversity and, therefore, become more vulnerable to extinction.

The composition and structure of woodland habitats are crucial elements in ensuring the survival of the hazel dormouse. Ultimately, dormice benefit from a diverse woodland understory where they can nest, feed, and raise their young. Coppicing, particularly of hazel, provides a perfect habitat for dormice, with well-linked branches which act as pathways, lots of different shrub species and not too much shade from large trees overhead.

Other traditional management practices include glade creation and small-scale tree felling, but sadly these methods are becoming less common, leaving less suitable woodland for the dormice.

Furthermore, the UK's increasing loss of hedgerows has meant that woods that have lost their dormice will not be repopulated.

A changing climate

Fluctuations in weather patterns, caused by climate change, are disrupting the species' hibernation cycle. As our winters become milder, the dormice become more vulnerable to waking up earlier or more frequently than normal. They use weather cues as a guide to the best time to become active. For a hibernating animal, timing is critical. It can be catastrophic to awaken prematurely when their food is scarce.

Our rapidly changing climate and its future impact on the species paints a troubling picture for the already rare hazel dormouse. Habitat loss and climate change are taking their toll on the hazel dormouse.



A little good news

Thanks to reintroductions programmes, there are some pockets of new hope for the hazel dormouse. Dormice have been returned to 12 counties in England where they had previously been extinct. And, at 96 of 336 sites analysed by the People's Trust for Endangered Species populations are stable or increasing.

At CAT, we are extremely proud of how we sustainably manage our habitat, opting to use traditional methods rather than heavy machinery. On our Quarry Trail, we dedicated a whole section to dormice by encouraging the growth of a dense understory with lots of honeysuckle and hazel. Hazelnuts provide a great source of fat for dormice; so hazel trees are an ideal environment. Climbing plants like ivy and honeysuckle offer good links between the shrub and canopy layer as well as providing additional habitat. We have also built and installed nest boxes for the species to use.

Through our sensitive woodland management, we believe that our efforts have paid off – especially with the captivating footage of the dormice we have been treated to recently. They have been filmed feeding in preparation for the long winter months ahead. Our hazel coppice is a sanctuary for our population of dormice, and we will continue to manage our woodland for the benefit of this lovable species.

A helping hand for hedgehogs

We haven't managed to catch them on camera, but footprint trails and scats are testament to a healthy hedgehog population at CAT. This is positive news given that hedgehogs are – as of this year – on the IUCN Red List (a database of the world's threatened species).

From an estimated 30 million individuals in the 1950s, numbers have fallen to 1.5 million in 1995 to a mere 500,000 in 2018, according to the Mammal Society's latest population review.

The definitive reasons for falling hedgehog numbers are unknown, although there are numerous candidates which are all involved to a varying extent.

The clue is in the name

Hedgehogs rely on hedgerows, a component of their name, as they provide an important role as wildlife corridors. They are fundamental in allowing critical dispersal between isolated habitats. Traditional roughly grazed pasture is an ideal habitat for hedgehogs with edges and hedges to provide shelter and plenty of worms and insects for food.

Sadly, to the great detriment of the hedgehog, there has been a dramatic loss of the UK's hedgerows since the Second World War. Field enlargement, excessive use of fertilisers and pesticides in intensive farming, a decline in traditional management techniques like hedgelaying, and general neglect has led to a substantial decline.

Measures desperately need to be taken to increase the quantity and quality of hedges, so that they can continue to support a wealth of wildlife, particularly the hedgehog. This could be achieved by restoring and planting more hedgerows, field margins and grasslands to increase the abundance and diversity of invertebrates. Farmers should be rewarded for wildlife-friendly farming practices and be given access to support to help them transition away from intensive farming.

UK hedgehog populations are declining at an alarming rate.



Climate impacts

Global warming is also posing an existential threat to hedgehogs. As hibernating mammals, the uncertainty caused by the warmer, wetter winters predicted under existing climate models for the UK may have detrimental impacts on hedgehogs.

Wildlife hibernate because there is not enough food available to justify the energy expenditure of foraging. But our changing climate and subsequent warmer winters may cause hogs to wake up more often during a season where food is at its lowest. Without enough sustenance to replace the energy they use trying to forage during winter, hedgehogs may starve.



Connect with your neighbours to create wildlife corridors.

~

HughWarwick-hughwarwick.co

Creating corridors

Road collisions are the most urgent threat to hedgehogs, with the Mammal Society estimating a staggering 167,000 – 335,000 animals killed annually. Their research suggests that fatality probability increases where there is a combination of favourable habitat and human dominated areas. Using data collected from the public, high risk areas are continuously being identified, with possible solutions such as reduced speed zones and building bridges or tunnels.

With more roads and housing developments being built, we are seeing a huge loss of connectivity between green spaces, leaving hedgehogs isolated and more vulnerable to local extinction. A successful campaign lobbied for a condition to planning guidelines that require hedgehog highways be included in new developments. Small holes of 13cm² will be included in the base of fences of new builds, nationwide. This is a fundamental victory for the hedgehog, but more needs to be done. The system needs reforming to ensure that nature is factored into all future planning decisions.

Woodlands for woodcock

CAT is home to a number of bird species on the IUCN Red List of endangered species. Willow tits, hawfinches, lesser spotted woodpeckers, and, in the summer, pied flycatchers, spotted flycatchers and wood warblers.

Also on this list is the beautiful woodcock, a fairly large wading bird that often frequents the site. Large they may be, but woodcock are both nocturnal and expertly camouflaged with mottled plumage – making them extremely difficult to spot!

Hunting and habitat loss

Woodcock distribution covers much of Britain and Ireland, however there has been a severe decline in the population size and breeding range of woodcock since 1970. Numerous issues pose a threat to the species, including recreational disturbance by dogs and walkers, reduction of earthworms due to soil acidification, fragmentation of woodland and decline in suitable habitat. Game shooting is another source of contention for woodcock. The presence of woodcock on the red list causes heated debate; how can this still be a game species?

It is during its breeding display flight, known as roding, that woodcock is most frequently seen. In 2013, a survey conducted by the British Trust for Ornithology and the Game & Wildlife Conservation Trust indicated a decline in roding males from 78,000 in 2003 to 55,000. Each autumn, the number of woodcock in the UK rises massively, with an influx of up to 1.4 million birds.

Some like it damp

After conducting our own woodcock survey on site, we manage our land to create vital spaces for their feeding and cover. This fleeting bird probes the damp ground for earthworms and beetles to eat. Therefore, our woodland offers wet floor glades and easy access to damp fields so they can get their beaks stuck in for a feast.

In autumn, and over winter, we will be managing the landscape to help these birds as best we can to get through the trials of winter.



The magnificent woodcock is a frequent visitor to CAT.

Meet more of CAT's wildlife and get additional tips to #HelpNatureThrive in Dulcie's Autumnwatch blog series at www.cat.org.uk/news

Help wildlife on your doorstep

Whilst big changes are needed, what you do in your backyard can have a positive impact as well. Whether you have a window box, a patch of lawn or a small backyard, here are some of my top tips to give wildlife a helping hand.

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1) Be messy

Despite what you may have been told while you were growing up, being messy isn't necessarily a bad thing. Nature isn't neat or tidy either.

Whether it's piling leaves and logs for hedgehogs to shelter in or leaving seed heads and other food sources for birds to forage, by approaching our backyards differently we can both help and appreciate the natural world from the comfort of our own home.

2) Provide bird feeders and bird baths - but keep them clean!

A great way to encourage birds into your garden is to provide bird feeders and bird baths. But this is one area where it is extremely important not to be messy – regular cleaning will help prevent the spread of disease.

3) Connect with your neighbours

In a time where we may ourselves feel more isolated than ever, perhaps take the opportunity to reach out to your neighbours to encourage wildlife friendly features.

Well-connected green spaces, linked with surrounding gardens, will provide a larger territory to roam across and reduce the need for wildlife to cross roads.

As well as being a proven method for helping animals like hedgehogs, creating highways between gardens is also a great way to develop a good relationship with your neighbours and improve your local community.

4) Plant for pollinators

Even if you've only space for a small window box, you can plant flowers that will attract bees and other pollinating insects, giving plants, wildlife and people a vital helping hand.

5) Build a pond

If you have space, one of the best ways you can help wildlife thrive is by creating a water source, such as a pond. They're a great habitat for newts, frogs, dragonflies, birds and hedgehogs. Even a small pond is beneficial for wildlife. Make sure it's accessible and there is an escape route should an animal fall into the water.

If you're interested in making your own small pond, there is a fun family activity 'how to' guide on the #CATatHome section of our website – www.cat.org.uk/catathome

Photographs featured are stock images - take a look at our website for video clips of CAT wildlife.



lolo Williams picks his favourite nature sites in Wales and across the UK. Daniel Butler tells of barn owls in his pastoral exploration of mid-Wales. We celebrate the centenary of screenwriter and evolutionary anthropologist Elaine Morgan. Sarah Philpott shows us how to eat well and sustainably, and award-winning journalist Will Hayward takes a hard look at Wales in a global pandemic.

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Letting the light in

In a small pocket of neglected woodland near CAT, a huge cast of characters have been caught on film. **Julie Brominicks** celebrates the wildlife of Mid Wales and explores what we can do to help nature thrive.



B arely audible or visible, the stream is a mere ripple of light down the bank to my left, and the still air is wet, with a hint of autumnal decay. Suddenly, a yellow goat willow leaf falls with apparent purpose to join the others already decorating a young self-seeded Douglas fir. An hour passes. A full hour, in which the falling leaf and a distant robin's alarm call have been pretty much it for the action. You might think it a desolate spot.

You might even assume, as I once did, that this pocket of woodland is lifeless. It's a neglected patch right enough – a fragment of old estate (not far from Coed Gwern, CAT's woodland) where, at some point in the twentieth century, conifers were planted on a steep slope between streams that flow into Afon Dulas, the river that flows past CAT.

Now rhododendron has crept in, and beneath a dozen dark Douglas Firs, the duff floor is soft as stale bran flakes. A spindly stand of Norway spruce survives somehow on boggy ground and a few western red cedars, Wellingtonia and noble firs snaffle the light. The goat willow, like one or two other straggly broadleafs, struggles for expression between the conifers. But this abandoned pocket is more alive than it seems.

Return of the native

Over the last two years, a wildlife camera strapped to one or other of the trees here has given us enough footage of a pine marten (sometimes two pine martens) to break my laptop. And not just pine martens either – but more of the rest later.

Pine martens have been rippling through my mind since 2008, when barely anyone knew what they were, and I spotted one on the track half a mile from the conifer pocket.

Nowadays, pine marten sightings are increasingly common thanks to a reintroduction programme by the Vincent Wildlife Trust (VWT) who orchestrated the translocation of some fifty pine martens from Scotland to Wales over a three-year period. These animals have swelled the extant Welsh population which was too small and scattered due to historic persecution and habitat loss, to survive without intervention. As volunteers, my husband and I were equipped with a camera by VWT, to help monitor the project's success.

Within two weeks we had footage of a sleek chestnut mammal with a buttery bib, elfin face and liquid black eyes. Over and again we watched it, and we are no less enchanted now, despite the deluge of footage. The camera has revealed pine martens marking trees with scent glands on their bellies. (Once I arrived in the conifer patch to find the air aromatic as Christmas, like a cinnamon scented candle.) We have watched footage of pine martens alighting on branches that appear too fragile to support them. Pine martens frisking their tails, akin to how red squirrels communicate. Pine martens climbing trees, or descending head first. Pine martens guzzling the pears we leave on a stick. Pine martens taking eggs we

wedge in a crevice (to cache somewhere nearby in a den – they favour mature trees with cavities), with a delicate manner at odds with their fearsome canine teeth. It is this consummate grace that bewitches me most. The movement of these predators whose omnivorous diet includes birds, voles and grey squirrels, is dainty. They climb, bound, jump and run, but mostly they seem to ripple.

Pine martens are not the only mustelid in the valley. Weasels we've seen once or twice in the scrub. Badgers snuffle through the conifers on their way to richer foraging grounds. We have caught them on camera, busying along the track made by their frequent passage. Otters, while not resident, do make occasional forays upstream from Afon Dulas, and have left their spraint on rocks within sight of the conifers. In autumn, they fish for salmon in the falls at Ceinws, just a mile from CAT. Last summer we saw one in Pantperthog, not far from our stream's outlet, near Coed Gwern. We were drying ourselves after a dip when it swam past with the current, mid-stream, two feet deep but lucid, limbs tucked in, serpentine and bubble-veiled.

Enchanted encounters

Back in the conifer pocket, the camera has revealed a fox (the pine marten's only remaining British predator, save for golden eagles), and a proliferation of grey squirrels, bank voles and wood mice enjoying the fruit and nuts we leave out whilst simultaneously avoiding becoming dinner themselves. Wood mice have at times been prolific, especially in autumn, when they cache food for winter. I have more than once sat through some fifty short films of wood mice - only to find the camera batteries have expired before the pine marten rocked up. But mice too, are fascinating, as they shimmy up several metres of conifer trunk. Who knew they climbed so high?

Birds, it seems, are regular visitors to the conifer pocket. On my way there, I've disturbed tree creepers climbing ivytwined ash, bullfinch and goldcrests in the scrub, buzzards, ravens, woodcocks, and a sparrowhawk at speed. But most of the birds caught on camera – blackbirds, robins, song thrush, wrens, great tits and pied flycatchers (in early summer), apparently wait for me to leave before making an appearance.

Jays (aptly named sgrech y coed – 'screech of the woods' in Welsh), are abundant in this valley, due largely to the acorns of sessile and pedunculate oaks. Yet despite their vociferous cackling, a flash of blue and white is generally all we see. Fix an apple to a stick in the conifer



The camera in the conifer pocket

has revealed a diversity of life we hadn't known was there. Although nothing can beat a real life encounter with wildlife – the 2008 sighting of a pine marten is still more precious to me than two-years-worth of footage – the camera has opened our eyes and enriched our knowledge.

pocket however, and the camera grants us a good look at their resplendent pink and dazzling blue plumage.

My favourite avian visitor has been a tawny owl negotiating a root ball as carefully as Professor Yaffle climbing a pile of books. But the one that left me breathless was a goshawk. We had seen large birds circling high overhead in spring and wondered. Then in late March this year, as if to defy lockdown, one turned up on camera, and stayed moments on a prostrate trunk, long enough to beguile us with its steely gaze



Pine martens are making a welcome return to Wales thanks to a translocation project that has brought some 50 individuals from Scotland to boost the population.

and striped trousers, before powerfully taking off. I saw them for real in May, whilst photographing bluebells. The pair cruised over my shoulder, looking this way and that, using the gap between trees carved out by the stream, tilting their wings like fighter jets.

A mosaic of landscape

The presence of life in the conifer pocket is complex. While conifer plantations tend to be species-poor in comparison to mixed woodland, birds like siskin, crossbills, goldcrest, firecrest, and goshawks do benefit from a mosaic of landscape which includes conifer plantations, particularly well-managed ones. This pocket is not well managed. The species within owe much to its small size and surrounding landscape.

The stream's watershed includes vast spongy grasslands at the foot of Tarren v Gesail, commercial conifer plantation, rough sheep-grazed pasture, steep sessile oak woodland, and a vertiginous rockwalled gorge. The valley downstream of the gorge is largely mixed woodland beech, sessile oak, ash, rowan, sycamore and holly opposite the conifers, while downstream, young larch, birch, beech, oak, horse chestnut and wild cherry have been planted around morsels of ancient woodland - a creaky old oak or hazel coppice stool here, a straggling wych elm there. Other indicators of ancient woodland include dog's mercury, bluebells, wild garlic, wood anemones, hard ferns and scaly male fern.

There are no plans I know of to restore the conifer pocket to ancient woodland. Nor do I know of any plans to harvest its timber, though I could be wrong. Meanwhile, its proximity to the stream, acidification of soil, dominion over native species and the biodiversity they support, are concerning. But its inappropriate siting isn't without advantage. There is no vehicle access. The spruce is so spindly, the boggy wet ground beneath is richly cushioned by moss, ivy, ferns and wood sorrel. Storms frequently topple the conifers on steep slopes, and the trees on which we fix the camera are surrounded by a theatre of root balls and prostrate moss-clad and fungied trunks, felled like giant spillikins. In short, the plantation has not entirely stopped the light getting in, allowing old seed banks to germinate.

A glimpse of the past, a vision of the future

Woodland stores carbon, cleans the air, controls flooding, provides us with timber, benefits our own mental and physical well-being, and should be wildlife rich.

When the glaciers retreated at the end of the last Ice Age, most of Britain became gradually covered with biodiverse woodland, punctuated by areas of scrub and grassland kept in a state of flux by herds of grazing herbivores. The woodland was not continuous, and didn't grow on the highest peaks. Nevertheless it covered most of Britain, till Neolithic peoples began the process of woodland clearance to grow crops and graze livestock that continues to this day.

ALC: NO PARTY NO.

Now the UK has just 13 percent woodland cover, and is one of the most tree-impoverished and biodiversity-poor countries in Europe. One third of all woodland species are in decline, with one in ten at risk of extinction.

The camera in the conifer pocket has revealed a diversity of life we hadn't known was there. Although nothing can beat a real life encounter with wildlife - the 2008 sighting of a pine marten is still more precious to me than two-yearsworth of footage - the camera has opened our eyes and enriched our knowledge. We tread more carefully, more appreciatively, now. And though we know we are seeing just a fraction of what biodiversity was once here and even what could be here again, if more woodland was planted across Britain, and ancient woodland and struggling species restored, nevertheless it is thrilling, and cause for celebration though not one to be taken for granted. 🗈

About the author

Former CAT education officer Julie Brominicks (married to and not to be confused with CAT's cryptic crossword setter Brominicks), still lives in Pantperthog. She now writes about landscape for a living, mainly for BBC Countryfile Magazine. Keep your eyes peeled for her book 'The Edge of Cymru', out soon(ish). www.juliebrominicks. wordpress.com Centre for Alternative Technology Canolfan y Dechnoleg Amgen

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Restoring ancient peatlands

The UNESCO Dyfi Biosphere, where CAT is located, is home to a wide range of important habitats. At Cors Fochno, just a few miles from our eco centre, Natural Resources Wales and partners have an ambitious project to restore one of the great raised bogs of Wales. Project Manager **Patrick Green** tells us more.

ors Fochno is one of the largest actively growing raised bogs in the lowlands of Britain, with peat up to eight metres deep in places. It is part of the Dyfi National Nature Reserve near Borth in Ceredigion, and is a key part of the UNESCO Dyfi Biosphere Reserve.

Lowland raised bogs are amongst the rarest and most threatened habitats in the UK, there were over 4,000 hectares (ha) of the habitat in Wales but only 1800 ha are left today.

Raised bogs get their name because of their domed shape. They are areas of peat that have built up over 12,000 years and can be as deep as 12 metres. The bog at Cors Fochno was formed around 5,500 BC when part of the estuary floodplain was covered with forest. As sea levels rose, this forest was replaced by reed swamp and then peat bog. At low tide ancient tree stumps can be seen on the beach nearby.

A look back on Cors Fochno's history

Over Cors Fochno's 7500-year history there have been many events that have affected its growth.

In wetter periods the peat will have grown at 1mm a year, but in drier ones, growth will have been slower

The most dramatic changes have been in the last 300 years as people drained large areas of the bog for drier, more productive agricultural land around its edges or dug peat to be used as a fuel. The Afon Leri river that used to meander around the western side of Cors Fochno was canalised and now runs into the Dyfi estuary, rather than directly into the sea. The bog vegetation was often burnt to help with these activities, resulting in large amounts of carbon being released into the atmosphere.

From the mid-20th century, Cors Fochno began to be recognised as a rare and special habitat by visiting scientists and those from nearby Aberystwyth University, and they expressed concern about the damaging effects of the regular fires. Thankfully, the designation of Cors Fochno as part of the Dyfi National Nature Reserve helped reduce the number of fires and there have not been any major ones since 1985.



Squelching on the bog

If you walk onto the squelchy surface of an undamaged raised bog, the most abundant plants to be seen are the wonderful sphagnum mosses. They are the habitat engineers of raised bogs and as they grow upwards their old remains decompose very slowly under the waterlogged conditions and eventually form a dark brown soil called peat.

They are famous for their amazing ability to hold water due to their morphology and cell structure. They can hold more than eight times their own weight in water and are made up of almost 95% water.



However, in Wales, most of our active raised bog sites have suffered due to extensive drainage in the past and this has caused invasive plants to take over and crowd out the important plants like sphagnum mosses.

This is why Natural Resources Wales (NRW) is now running a sixyear pioneering and ambitious project which aims to restore seven of the very best examples of raised bogs in Wales – the EU-funded LIFE Welsh Raised Bogs Project, with additional financial support from the Welsh Government and Snowdonia National Park Authority. Almost 4 square miles (over 900 hectares) will be restored to a better condition. This represents 50% of raised bog habitat in Wales and 5% in the UK.

There are many different species of sphagnum moss – with 16 recorded at Cors Fochno, and you can spot them in a multitude of colours including claret red, chestnut brown and golden yellow.



Each species prefers slightly different conditions, some grow in low hummocks, some in high hummocks and some in lawns. One species called sphagnum cuspidatum likes to grow in pools and is often referred to as "wet kittens" as it resembles wet fur when it is removed from the water.

One of the most distinctive features in the central undamaged area of Cors Fochno is the presence of golden 'lawns' of the rare – but here plentiful – sphagnum pulchrum, whose name translates as 'beautiful sphagnum'.

Restoring by innovating

We're using some pretty innovative methods at a scale that has not been seen in Wales before. For example, we will be building over 60km (60,000 metres) of low-level (25cm in height) banks of peat, also known as 'bunds', on our sites, at a scale that has not been carried out in in any UK peatland project before.

We are also using a wetland harvester machine across a wide variety of sites and conditions. Despite its weight it will float on very wet areas and allow us to get to parts of the site never accessed before.

This mowing work has cut back invasive grasses like purple moor grass (Molina) to restore the habitat's important plants, such as the iconic bog rosemary and the beautiful large-heath butterfly. And the work is already paying dividends as we've seen the return of orchids, not seen here for decades.

Cors Fochno is the main home for another rarity in Wales, the impressive insect-eating plant, the great sundew. Sundews ensnare their prey with a sticky substance on their leaf hairs. The sticky substance contains enzymes which digest the insect and enable the plant to absorb the nutrients it needs that are so lacking in this unusual habitat.

Carbon sponges and natural flood buffers

Peatlands like Cors Fochno are one of the most effective carbon sponges on Earth and, in peak condition, they help tackle climate change by storing vast amounts of carbon that would otherwise be released into the atmosphere.

It can take around 1000 years to make 1m of peat, and although this is a painstakingly slow process, this capacity for long term carbon storage is essential.

But damaged peatlands have the opposite effect – they are a major contributor to greenhouse gas emissions, as the peat which stores the organic carbon is exposed to the air. Peatlands' ability to soak up substantial volumes of water means that they also act as a natural buffer against flooding.

Working with the community

The drive to repair them will also improve drainage systems, cut invasive species, remove scrub and introduce light grazing – this all takes place in partnership with local communities, landowners and contractors.

We're also hoping that the project promotes social and economic benefits for the community too. We're offering volunteering opportunities so that people can improve their skills for potential jobs in similar industries, as well as gain increased confidence and self-esteem. And, of course, we're encouraging people to visit to enjoy this wonder of nature.

My aim is that the benefits of this work will continue long after the project and will have a positive impact for generations to come.

About the author

Patrick Green is NRW's Project Manager for the LIFE Welsh Raised Bogs Project and leads a team of seven staff working across Wales on lowland raised bog restoration, education and engagement work. The six year project aims to restore seven of the most important lowland raised bog sites in Wales to good condition.

Learn more about the project: To keep up to date with the LIFE Welsh Raised Bogs Project follow on Facebook @CyforgorsyddCymruWelshRaisedBogs or Twitter @Welshraisedbog

Declaring a double emergency

We are facing several crises at once, with climate, biodiversity and COVID-19 all requiring urgent action. **Paul Allen** argues for an integrated response.



e are in the middle of a biodiversity and climate change emergency – and the two are inextricably linked. Climate change is driving nature's decline, and the loss of wildlife and wild places leaves us illequipped to reduce carbon emissions and adapt to change.

The 2019 State of Nature report found that 1 in 6 species are at risk of extinction. The UK's mammals, in particular, are faring badly with more than 26% of species at risk of disappearing altogether. Not only do we face losing our abundant wildlife, but also what a thriving natural world provides us with – clean air, clean water, healthy soils, food crops, natural flood defences and beautiful spaces to enjoy.

Therefore, in addition to the rapid decarbonisation of the energy, industrial and transport sectors, enacted through a just and inclusive transition, the emergency response must include a major investment in nature. This year, the role of nature as an essential tool for addressing the threats to climate, biodiversity and sustainable development has taken centre stage in public discourse. The call for ambitious action to put nature into recovery and embrace natural climate solutions is building, and already some local councils are showing leadership and declaring both a climate and ecological emergency.

A holistic approach

November 2020 marked the first anniversary of Bristol City Council becoming the first in the UK to declare a climate and ecological emergency. The local decline of many birds, insects and some mammals prompted Bristol to declare an ecological emergency, to add to their climate emergency declaration the year previously. The city has now published an ecological emergency strategy to set out a way forward to creating a wildlife-rich ecologically resilient city – which also includes a 30% target for land to be managed for wildlife by 2030. They have also recently announced that their plans to reduce the carbon and ecological footprint of the city have been backed with a £4 million financial package. The money will fund a new three-year combined Climate and Ecological Emergency Programme, which complements Bristol City Council's green actions on travel, housing, energy, nature and other sectors. More recently, Dorset, Denbighshire and Wrexham councils have also declared joint climate and ecological emergencies.

Importantly, councils must rise to this double emergency with a holistic approach. The two emergency declarations cannot result in two teams with two separate action plans; useful as that might be, with limited time and finite resources they would be missing a vital opportunity to multi-solve both challenges at the same time, using a joined-up team, joined-up thinking and inter-related policies.



Multi-solving 21st century challenges

If we brainstorm across silos, we find that investments in action on one emergency can also help us rise to the other emergency by offering important co-benefits.

If done wisely, action planning can even go beyond these two emergencies, and reveal actions which help make us more resilient to other emergencies, such as the current pandemic. By exploring visionary 'inter-emergency' action plans we can also 'future-proof' the UK to be more resilient to both the forseen and unforseen emergencies of the 21st century.

Restoring and protecting nature makes good sense for the planet, but also makes good sense for people. Not only can natural climate solutions be rolled out in ways that combat land degradation and put healthy and nutritious food on people's tables, but they also deliver economic benefits, create jobs in rural communities and build resilience, all at the same time.

As the world grapples at the international and national levels with the impact of the COVID-19 pandemic, the climate and ecological crises everything remains inter-connected. Working together at the local level, in our own communities, we have the opportunity to demonstrate an integrated response as part of a green recovery. CAT's Zero Carbon Britain Hub is supporting councils, citizens and organisations who have declared a climate and biodiversity emergency, to help build their knowledge and skills to deliver an integrated approach to decarbonisation and nature restoration. This truly is a win-win.

Councils taking action

A wide variety of councils have declared a double emergency, and here we highlight several interesting examples.

1) Chelmsford City Council has launched a Climate and Ecological Emergency Task Group, which has been established to coordinate effectively the council's internal response to the climate and ecological emergency. So, as well as working to improve the cycling and walking infrastructure, to reduce traffic congestion and journey times, the same action plan also explores actions for improving the environmental quality, attractiveness and recreational potential of public spaces, rivers and waterways and associated green corridors in the city centre and surrounding areas.

To increase engagement, their Future City project is a green festival of ideas on how to grow a sustainable Chelmsford, involving organisations from across the city. This digital festival ran throughout October, and jointly tackled the themes of climate change, biodiversity and sustainability.

2) Cardiff Council has unveiled an ambitious new plan designed to drive Cardiff towards becoming a carbon neutral city by 2030. 'One Planet Cardiff' calls upon businesses and citizens to join forces with the council to make the changes happen. As well as the necessary climate actions, such as improving building performance and rethinking transport, Cardiff's one planet plan also includes a major tree planting exercise, with the potential for a local tree farm to supply saplings, plus work on raising awareness among school children about nature and biodiversity. On top of this, council-owned land is being made available for community groups to grow food, with the possibility of a "food park" being explored, and Cardiff market will be revamped into a "sustainable and local food market".

3) Dorset Council. Having declared a joint climate and ecological emergency last year, Dorset Council launched its action plan this September. This presents eight integrated areas for action to ensure that the council's services and estate become carbon neutral whilst also working on the creation of suitable high ecological value areas on council land, including bee-friendly, wildflower, hedge and woodland planting zones. A 'Climate Change and Ecological Emergency Executive Advisory Panel' has been set up. Made up of elected members from different political parties, the panel is responsible for gathering information and working with officers to make recommendations to Dorset Council's Cabinet.

4) Denbighshire County Council have also declared a climate and ecological emergency and have been developing plans to transition to becoming a net carbon zero and ecologically positive council by 2030.

5) Eden District Council in Cumbria declared a climate emergency and an ecological emergency in July 2019. Their integrated plan aims to make Eden District carbon neutral by 2030, whilst also evaluating the ecological impacts of all Eden District Council's decisions and actions. They have pledged to refuse any initiatives that will result in the degradation of the natural environment and biodiversity and to actively promote the safeguarding and improvement of the natural environment.



Joined-up thinking works – a recent report 'The Co-benefits of Climate Action' revealed that cities citing the cobenefits of their climate action reported 2.5 times more climate actions than cities that did not.

So, let's support and encourage our councils to think across silos and to develop inter-emergency action plans that build support with more diverse stakeholders and better use of scarce resources, maximising our resilience to multiple social, environmental, and economic challenges.

About the author

Paul Allen is CAT's Zero Carbon Britain Knowledge and Outreach Coordinator. Paul has led CAT's research into net zero scenarios for over 12 years, coordinating the development of six reports and liaising directly with government, business, public sector and the arts to share findings.

Find out more about CAT's Zero Carbon Britain Hub and Innovation Lab and how you can get involved at www.cat.org.uk/zcb

"Natural climate solutions" We aren't seeing the wood for the trees

Political ecologist **Dr Scott Leatham** warns that we must sensitively restore nature, but we cannot rely on actions like tree planting alone as a solution to climate breakdown.

he declines and collapses in the abundance and variety of life on Earth is accelerating. As we enter the sixth mass extinction, the planet is also warming at unprecedented rates. Whilst our talk, our understanding, and even our targets have increased, real action, proportionate to the scale of the challenge, is rare and insufficient. As impacts have increased, such as in droughts and floods, fires and crop failures, they have fallen unequally across the world, hitting the poorest hardest. Those least responsible, with the fewest resources to adapt or build back, are in the most immediate danger.

Focusing on isolated sites of intervention, like tree planting and peatland restoration, can be important actions, but they will not be sufficient – and depending on who is driving that agenda, they can make things worse. Only by questioning the economic system and imagining new ways of living prosperously will we tackle ultimate drivers of ecosystem and climate breakdown. "Such action must begin immediately" a recent major scientific review notes, "and address the root economic, social, and technological causes of nature's deterioration".

What are "natural climate solutions?"

Natural climate solutions, in theory, can help bridge connections between biodiversity, climate action, and community engagement. They are fast becoming a new discourse within mainstream conservation circles, local and national governments, and big companies. But natural climate solutions are not all made equally – like many environmental issues, there is a wide range of views.

Done sensitively and appropriately, by and for place-based communities, by restoring nature we can increase the natural stores of greenhouse gas emissions, such as in wetlands and woodland. In urban areas, this includes trees and other "green infrastructure".



Focusing on isolated sites of intervention like tree planting can be important, but will not be sufficient.

Natural climate solutions are already set to be discussed at the UN COP15 – major global talks on biodiversity – with the host country, China, saying a new deal must include natural climate solutions. Those talks are to agree the global "post-Aichi framework" for biodiversity, and it's worth pointing out that the world failed to meet every single goal under the original Aichi framework. It may be an understatement to say global governance has not improved since.

Climate change and the loss of life on Earth are deeply interconnected. As one worsens, so does the other: the destruction of forestry, wetlands, and seabed releases further greenhouse gas emissions that contribute to global warming. Increased risks of fire, drought, ocean acidification. and extreme weather drive further collapse while imperilling communities. "Net-zero" pledges often rely on the processes by which ecosystems act as sinks for greenhouse gas pollutants. As long as we increase the rate that these ecosystems soak up and store carbon, the theory goes, we can continue to release it, albeit at a reduced rate. While that potential has been noted. it is not a coincidence that some of the loudest voices arguing for this approach have been fossil fuel industries.

In places, we've even seen oil companies make deals with seemingly climate-progressive governments to plant trees as petrol and diesel are purchased. What environmental consciousness has emerged in recent years risks being channelled into approaches that cause vet more damage. There are, of course, more genuine approaches to "natural climate solutions" grounded in sincere care and an understanding of the many wrongs of climate inaction. Bringing communities together to restore, through local consent, knowledge, and actions, lost ecosystems and lost connections to nature is essential if we are to develop sustainable ways of living. But this means treading a tightrope: to advocate the numerous, irreplaceable, and lifesupporting benefits and wonders that nature brings us while guarding against the powerful interests who claim that these increased benefits justify continued climate pollution.

But could they work?

Natural climate solutions – viewed in the narrow sense of offsetting emissions through restoring nature – need land. Exactly how much land is less clear. The United Nations will soon embark on the "decade of ecosystem restoration", a 10-year project that will incorporate the Bonn Challenge of restoring 350 million hectares of land by 2030. That's nearly the size of India. It will, in theory, sequester 13-26 gigatons of greenhouse gases (measured in carbon dioxide equivalent, CO₂e). That's a significant range that hints at the complexity and unknowns when it comes to calculating overall carbon storage in ecosystems. But the bigger problem is that we're emitting around 50 gigatons every year.

By 2030, according to the UN Environment Programme's 2019 emissions gap report, we will be emitting about 56 gigatons of CO₂e even based on our current commitments to reduction. 7%). There is simply not enough land to plant over or re-wet, or time to do it in, to accommodate the emissions of an evergrowing economy.

Nature 2.0: Under New Management

Deployed at any kind of scale to make a dent in global emissions, then, would require colossal areas of land, but this issue of land use goes further than the quantity needed. Indigenous activists and communities, geographers, historians, political ecologists, and others, have long pointed out the relationships between land management and forms of

For natural climate solutions to make a dent in global emissions would require colossal areas of land.



That means the decade of ecosystem restoration – the largest ambition of its kind requiring numerous international commitments – may not even make up for the cumulative growth in emissions between now and its target date, let alone make a dent in current emissions. At the very best, it will be around 6 months' worth of 2030 emissions. Worth having, but not a solution. Meanwhile, even seemingly ambitious policy approaches, including "net-zero" pledges, fall far short of what is required.

Importantly, this does not show the fallacy of restoring nature, or even of the decade-long programme – which will have numerous other benefits including adapting to locked-in climate changes – but of relying on such efforts as solutions to greenhouse gas pollution. Climate action does not have the time. The UN also warns that the window for keeping warming below 1.5 degrees Celsius is rapidly closing – by 2025 it will be "almost impossible" to meet the required 15.6% annual reductions (we are currently failing to meet the required

political violence, erasure, occupation, and control. When we talk of large-scale natural climate solutions we are talking of managing nature to right the wrongs of a historically high-consuming, largely Western minority. This is introducing yet new ways and logics by which to know, modify, and control nature and land, and frequently by extension local people's livelihoods. In this approach, restoring nature relies on an everincreasing agency over land rooted in deeply unequal structures of power and resource possession. That is, it risks contributing to the socioeconomic and political foundations of unequal exchange that have propelled climate change risks and exposures by allowing those who can afford it (individuals, companies, states) the ability to offset their damages onto others. If restoration takes place based on sequestering carbon for a price, the geography of who has money and who has land becomes a significant political issue.

Restoring nature is vital because of the multitude of life-support systems it

provides. Seeing nature for just its carbon benefits risks concentrating on those aspects which deliver sequestration to the exclusion of other considerations – including local, Indigenous, and subjective values. If carbon storage is paid for in order to fund the restoration, as is frequently suggested and already widely carried out, the restorers will achieve greatest value by storing the greatest amount of carbon in the smallest amount of space due to the cost of land. At this point, it ceases to be nature restoration and becomes an for ecosystem services" framework, where carbon storage is an ecosystem service). In a direct way, putting a price on nature. Whilst touching on a broader debate, it's important to note that such lines of thought have tended to ignore the fact that if a service can be done more cheaply, it will be – think of outsourcing. Basing the restoration and conservation of nature on market mechanisms, then, is to place two bets: one, that a cheaper solution will not be found that outperforms the 'natural service' – leaving it without funding. And



intensive carbon crop. We currently lack the knowledge to fully understand the implications of this - recent studies show some tree planting, for example, having zero net storage of carbon. This includes swathes of Scotland - the area set to receive the vast bulk of UK tree planting in coming years. If we count all afforestation as sequestration, as we currently do, and that sequestration hasn't actually taken place, we risk the accuracy of our data and we overestimate our action. This isn't wholly speculative: the same market signals already contribute to monoculture timber plantations and intensive farming. Carbon-focused restoration, if mediated through the market, will favour management practices which boost carbon storage density - ignoring other benefits, for us or other species. Our history of sufficiently regulating similar practices does not offer much hope.

A common suggestion is to then price other benefits: flood prevention, pollination, and so on, so they aren't left out of decision-making (the "payments two, that all the unknown, unquantifiable, and inexpressible values of nature will somehow be incorporated into those few parts that might be known and might be quantifiable without dramatic market failures. These aren't bets that we should take when the ante is so high and the record so poor. We must find means of valuing nature that go beyond carbon, commoditising, and markets, to build resilient efforts to reverse nature's quickening collapse. This isn't radical: in reality, we place tremendous value on things all the time without putting any price on them, from spending time with family to helping people during crises.

We can do better than just planting trees

Essential though it is to sensitively restore nature (and, crucially, allow natural regeneration), this will never be sufficient for tackling climate change without first and foremost confronting the drivers and injustices of its collapse. How can we focus on restoring nature at a large scale when we lack the tools and the human-nature relations to care for what already grows? How will what we restore be safe? Moreover, this tendency to view funding nature restoration as absolving big climate polluters of environmental guilt is to fundamentally misjudge the nature, complexity, and scale of the sustainability crisis. To the polluter, natural climate solutions are not an agenda that begins with stopping the harm – it's an agenda that begins with finding outlets for it, ways of absorbing it, ways of excusing it and obscuring actors' responsibility for it. That isn't sustainable.

The complex linkages between life on Earth and climate change risks being reduced to two products that can be traded. We see this in the claim to "offset" carbon with tree planting and in the ongoing failure to address the ecosystem impacts of low-carbon technology. Aside from ethical concerns, evidence shows both restoration and eliminating emissions are necessary, but neither is possible without confronting the systemic drivers of endless growth and profitmaking from limited resources. While we can (and should) isolate particular processes as sites for action and intervention, we also need to take a step back - to see the wood and not just the trees; to think systemically about the real drivers of ecosystem collapse.

Whether it is relying on managing nature as a carbon farm, on propping up failing market systems, or in excusing wealthy states for their historical and current climate responsibilities by buying up carbon credits in Majority World countries, natural climate solutions fail to undo harm. In their worst guise, they contribute to it. Nevertheless, we need to reimagine how, why, and for whom we value, restore, and coexist with and within nature. That may well come from community actions to restore. Those that focus on the relationship between the systems we rely on for food and clean water and how we use them, how we comprehend the intergenerational gifts of restoring ecosystems, could help foster understandings of sustainability not based on trading carbon credits but on mutual survivability and conviviality. GS

About the author

Scott is a political ecologist who has recently joined the CAT team as a Senior Lecturer in our Graduate School of the Environment. He lectures on social and political science aspects of sustainability. Outside of CAT, Scott is a Research Fellow with the Wellbeing Economy Alliance and works at the University of Edinburgh.

Renewable energy cooperative creates UK's first net zero domestic housing microgrid

Bristol Energy Cooperative (BEC) is creating the UK's first community-owned, net zero, domestic housing microgrid at a new development in Bristol. The project will be part-funded by the public through a £2 million share-offer, which the not-for-profit organisation is currently running.

The new microgrid will combine energy efficiency with onsite renewables, heat pumps for heating and hot water, and battery storage; all linked together through smart technology. The residents will get most of their energy from shared onsite solar generation, topping up from the grid when needed, and exporting any excess energy to it. No gas boilers will be required.

Work is already underway on the microgrid at the Water Lilies housing development in the Lawrence Weston area of Bristol, which developers, Bright Green Futures, will complete in 2021. This first microgrid forms part of the 'Microgrid Foundry'; a joint venture between Bristol Energy Cooperative, Chelwood Community Energy and Clean Energy Prospector, which is aimed at developing a number of microgrid domestic housing sites across the South West.

Andy O'Brien, BEC co-founder/director said: "The technology for net zero housing schemes is available now, but big housebuilders seem reluctant to adopt it. This simply isn't good enough in a climate emergency, so we decided to take the lead. In our opinion aiming for net zero should be the norm for all new housing developments."

The community share offer which will fund this project will also help create Bristol's first hydro-electric generator, which will be installed near Bristol Temple Meads station, at Netham Weir. This will use the natural force of the water falling across the weir to spin twin turbines, which will produce enough energy to power 250 typical homes. The scheme will cost around £2.4 million and will run night and day throughout the year, with peak output in winter; a time when solar energy generation is at its lowest.

Will Houghton, BEC's Project Developer at Netham Weir, said: "The climate emergency makes the need for renewable energy ever more urgent, so we're rising to the challenge with this share offer. We're inviting people across the UK to invest in BEC with as little as £100, to help tackle climate change, support local communities and earn a projected 3.5% return on investment."

The not-for-profit organisation will add these new net zero schemes to its existing 16 community-owned renewable projects installed across the South West. These currently have a combined annual electricity output of over 9 Gigawatt hours, which is enough clean energy to power over 3,000 homes.

For more information please see: www.bristolenergy.coop



3D visualisation of the Water Lilies housing development



BEC's Netham Weir hydro site



BEC's Lawrence Weston solar farm

Building with nature in mind

How can we make our own homes and buildings as wildlife-friendly as possible? **Gwyn Stacey** looks at what we can do as householders and at the role the building and architecture professions can play in helping nature thrive.



S olastalgia: "The distress induced by environmental change and the degradation of one's home place." Currently under review for inclusion in multiple dictionaries.

Our homes are often the place we find shelter, comfort and security, both physically and mentally in our lives, that space to call our own, to inhabit as we wish.

Meanwhile our skies and lands are emptying, the cacophony of noise from our natural environment quietens. A collective sense of distress continues to dawn on us: the solastalgia begins to ache our souls.

In the world of design and construction we continue to build, clearing and levelling landscapes, laying foundations, erecting structures, and sealing them up for energy performance. It feels like an inherently damaging activity to be a part of, and yet we do need to continue building. We need to be more selective about how and when we choose to build but the need to maintain, renovate, retrofit and, when appropriate, build to enhance our collective wellbeing and standard of living, rebalancing the injustices of how and where we dwell is undeniable.

So how can we build in a nature friendly way? How, as a homeowner or tenant, can you mitigate your impact on nature? The good news is that there is a huge amount we can do as individuals, in every part of our lives. As architects, designers and housebuilders there is even more we can think about.

Make space for wildlife

Whilst it's vital that we look at the wider picture, including protecting areas of wilderness, improving agriculture and land management, tackling climate change, and taking part in collective actions to push for change at a policy level, what we do in our own homes and gardens can also have an impact.

If you are lucky enough to have a house

where swifts, house martins or bats (to name but a few of the many species that might use our homes as their homes) already choose to roost or nest, then make sure you take good care of them by leaving them be. If they are a nuisance, producing a mess, take pride in clearing up after them or install a shelf to catch any droppings. Tell your neighbours, and sit out together to marvel at the wonders of the wildlife on your doorstep.

For those that do not have any wildlife nesting in their home but are fortunate enough to have a garden, this is where you can have great impact in encouraging biodiversity. Look at the borders of your garden. Think like the wildlife that you want to see in your garden. If you were a hedgehog, a fox or a great tit, would you be able to get into the garden? Would it be enticing? Are there places to take cover from humans or their pesky pets? Install hedgehog highways, replace fences with hedges and get rid of that plastic grass!

Next, look at what's within your



garden, follow some basic principles to encourage wildlife; celebrate variety and diversity of planting, expand the edge space where habitats come together, and avoid tidying up where possible. You can apply this thinking right down to window planters or pots on a balcony to encourage the birds and bees right to your window.

You can go one step further and give nature a home by installing nesting or roosting habitat for some of our native species. Speak to local wildlife enthusiasts and ecologists to see what species are present nearby and if installing a nesting or roosting habitat would be appropriate for your home.

We also need to be aware when inviting wildlife into our gardens and near to our buildings that human structures can present a hostile environment. Our windows become mirrors, and can look like holes through which to fly or identical rivals to ward off; unwoven building membranes can entangle the tiny claws of bats, and drains are the unfortunate pitfall for our amphibious friends. Minimising the dangers to wildlife from our buildings and their infrastructure is key; we can do this by installing drain guards, mesh and other tools. If your windows are prone to bird strikes you can make and install your own window manifestations (stickers on your windows) or add blinds internally.

Enjoy dark skies

One of the biggest impacts from our homes and built environment is our excessive and inefficient use of lighting, affecting the natural rhythms of a range of animals, including ourselves.

Install hoods over all external lighting, directing it only where it is absolutely needed. If you are replacing outside lights look out for fixtures that are directional and low level. For internal lighting, something as simple as closing the curtains or turning off the lights in the rooms you are not using will help any wildlife present outside, save your energy and give you a much better view of the beautiful night sky!

An architect's perspective

There is a great deal the architectural profession needs to do to improve how it works with and encourages nature friendly building. There is a need to understand the holistic issues of material specification and choice, master planning, landscaping and detail design, and how at every level these decisions have an impact on wildlife.

Materials are specified for a range of reasons, including aesthetics, and thankfully embodied carbon (the carbon emissions from the manufacturing process) is now becoming a material consideration that is widely accepted within the industry. But we need to understand the further hidden impacts from harvest or extraction, processing and manufacture, and examine whether these are causing ecological harm through unsustainable management or release of pollutants. Only when looking holistically at material choice can we make informed ecological decisions.

The simplest way to reduce our impact on material and resource use is to prioritise retrofit over new build. Improving energy efficiency through retrofit or building to a very high level of thermal performance will have a knockon benefit to wildlife by ensuring we minimise the impact of our homes on global heating and climate breakdown.

Another issue related to careful use of materials is when wildlife chooses to nest within, and not upon, buildings. This is of particular concern with 'natural building' techniques as the materials are inherently familiar and hospitable for wildlife to nestle into. This can cause serious harm to the fabric of a building, reducing thermal performance and longevity, both of which are hugely important when considering energy conservation and the embodied carbon of construction.

You can avoid your home becoming a mouse nest or bug hotel by making sure you hire a builder that is experienced in using natural materials, and look to provide opportunities for more suitable habitat creation through careful design and detailing.

Conversations and collaborations

Compounding the issues for architects attempting to navigate projects through the unpredictable natural environment is that during their seven years of training they will rarely, if ever, have a conversation with or hear from an ecologist.

This is something we actively try to address in teaching our Masters in Architecture at CAT. As with all of our 'technical education', we do not seek to make our students expert in other fields but to raise their understanding and awareness to a position whereby they can have an informed conversation with a professional. It is these informed conversations between ecologists and architects which provide opportunities to proactively make our built environment more nature friendly.

A helping hand

There is a huge amount that can be done to improve our built environment and homes to make them more nature friendly, as part of wider efforts to combat the climate and biodiversity emergency.

Nature needs any helping hand we can give it so we must embrace every aspect of both reducing the impact of construction on the natural environment and in creating space for nature in our homes and gardens.

When thinking about buildings, the built environment and the impact of our lives on the wildlife we share the planet with, we need to think from an ecocentric point of view, considering the needs of every species, and not just those of our own.

About the author

Gwyn Stacey is a Senior Lecturer on CAT's MArch Sustainable Architecture course. He is a former student of CAT's Professional Diploma in Architecture and now, alongside his role at CAT, is developing his practice work with a community focus in rural Wales, and working with and supporting conservation organisations.





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CAT stories

CAT's extended family of members, supporters, students, graduates and volunteers are a constant source of hope and inspiration. Meet some of our amazing changemakers – and get in touch to tell us your CAT story!



"It was an extraordinary time of learning, inspiration and huge amounts of fun! I met so many wonderful people who have remained close friends, and in doing so found my feet for the direction my life was to take from there. Almost daily I reflect on my time at CAT, for which I am hugely grateful, and the extent to which the experiences and friendships I found there have shaped my values and choices."

Lewis was a CAT gardening volunteer between 2005 and 2006, returning to work in our biology department for a year in 2009.

Following his time at CAT he joined the Field Studies Council, working with young people to help them connect with nature, and developing his understanding of the value of outdoor and environmental education. He followed this work into PhD study looking at mainstream and alternative outdoor and environmental education. Lewis is now a research fellow at Exeter Geography Department where he is currently working on a project called 'Education at a Time of Emergency', which explores how best to update educational responses to the climate and ecological emergency.



Mike is currently studying our MSc in Sustainability and Ecology. Prior to starting the course, his background was in social care and he was also an active committee member and volunteer in a community woodland near to him in North Wales. Through his volunteering experiences, he was involved in tree planting and habitat creation and he developed an interest in ecology, which inspired him to study at CAT to deepen his understanding and knowledge of the subject.

Since then he has also been involved in setting up a new tree nursery with the North Wales Wildlife Trust and is part of the team looking after the Countess of Chester Park, a community space where they aim to enhance the environment and provide access to nature for local people.

Mike said "My studies at CAT have translated across into the conservation work I'm involved in, and it feels good to have an understanding of the theory as well as the hands-on practice of conservation and ecological restoration. I look forward to further studying and researching woodland ecology, community woodlands and their contribution to carbon storage and improving tree growing and planting methods."



Lizzie has been practising sustainable construction for over 20 years, on her own projects and as a consultant, designer and builder, in Wales and in Spain.

Originally an artist and a teacher of photography at universities and colleges, Lizzie side-lined this so she could focus on creative construction or 'functional sculpture'.

Whilst studying for CAT's MSc in Sustainability and Adaptation in the Built Environment she explored ways of building using local resources and sustainable materials, with her research focusing on Gaza and migrant routes to Europe from Western Africa.

Lizzie, who graduated from CAT in 2018, also founded a project building compost toilets and edible gardens with volunteers in migrant camps in Almería, Spain.

Now resettled in Wales, she works as a sustainability consultant and runs an 'Incredible Edible' scheme in Porthmadog, educating people of all ages in sustainable food growing methods and working to increase and maintain biodiversity. She also returns to CAT to share her knowledge as a visiting lecturer and has taught short courses in building with local, sustainable and repurposed materials.

This is just a small selection of the thousands of members of the CAT community who are making the world a better place. We love hearing about the work you are doing, the groups you are forming and how CAT's practical work is guiding and inspiring you. Please do get in touch to tell us what you are doing – we'd love to hear from you. Contact members@cat.org.uk with your CAT story.

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The first correct entry pulled from a hat wins a £20 voucher for the CAT EcoStore - store.cat.org.uk.

Please send your completed crossword entry by 25 January 2021 to *Clean Slate* Crossword, Centre for Alternative Technology, Machynlleth, Powys, SY20 9AZ.

Solution will be published in the next issue of Clean Slate.

117 winner: Alan MacMillan

Across

- 4 Charge individual seen disturbing mole (6)
- 7 Underground development cured endless rail confusion (8)
- 9 Ultimately destructive, they gnaw away at things (8)
- 10 See 6 Down
- Calluna Vulgaris Nulla that's Greek to you and me (5)
- 12 Petrel departs with bone, goes off miles before returning (9)
- 14 Birds heading off to get flounders (7)
- 16 Puzzle, 80% complete, what is another word for earth? (7)
- 21 Exposed snakes then ran (9)

23/25 His March broadcast

- features a family of wolves! (5,7)
- **26** Where it's freezing over in the south, bird's getting number outside (4,4)
- 27 Sign of 5 hip regret running around (4,4)
- **28** Autumnwatch presenter and Goodie releasing single that's most peculiar? (6)

Down

- 1 Youngster or two under parent's wing (6)
- 2 Tortilla recipe bordering on Mediterranean? (8)
- **3** Great parliamentarian attending football final (5,4)
- 4 Marketing department needs bird to hunt (5)

- 5 Getting on with a German, a German good to hang around (6)
- **6/10** Web-footed creature going in all over the country for a lucky dip? (8,7)
- 8 Direction men go in to observe sizeable woodland creature? (6)
- 12 Really Wild's first broadcast (3)
- **13** What gets turned into timber by forestry company (9)
- 15 What emerges from a broken drain outside church (8)
- 17 Hospital attends to adult thrown off tree (8)
- **18** Swallow not the first to flutter (3)
- **19** Creature simple to free? Not so! (6)
- 20 Take a look around pasture (6)
- 22 Shock about working with American goddess (6)
- 24 Winger's additional weight contributed to strain (5)

Clean Slate 117 Solution



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any years ago we designed a leaflet to let our supporters know they can leave a gift to CAT in their will. We called it, 'What will the world be like when you are pushing up the daisies?' A lighthearted take on the most serious of subjects: life, death and regeneration.

Many variations on this question arise at CAT because everything we do is about connecting the past to the future. Regeneration is our legacy and the legacy of all those who are part of our wide community.

Our eye is always on the future. What will the world look like in three or four generations? For humans, our grandchildren, other animals and the natural world that surrounds us? We work on environmental solutions that provide humans with a good quality of life, in harmony with the natural ecosystems that support us.

A living reminder of regeneration

The CAT site, for the thousands of visitors, school groups, Masters students and volunteers is a living reminder of regenerative and sustainable living.

The oak trees in our woodlands are home to over 400 species of animal and will long outlive us all.

The circular water system that flows from our reservoir through our hydro system and reed beds provides a home for wildlife and clean renewable energy along its journey, and is an education resource that our students learn from, transferring the principles to large scale practice in cities and towns.

Our retrofitted slate cottages offer a reminder of the people who worked here when the site was a working slate quarry and highlight the ways you can reuse materials from your local area.

Our modern low impact timber frame buildings sequester

carbon in their beams and frames, and are built with materials that can be reused or returned to nature at the end of the building's life.

The soil we've created from compost and careful stewardship over many years is brimming with life, giving nutrients to grow food in abundance, helping us teach volunteers and students how to design large scale food and farming systems that enhance and protect biodiversity.

All of our work and education, and all of the gifts and donations from our supporters, are about protecting the future and regenerating our life support systems.

We know that our supporters are here with us, learning and sharing solutions, because we all care about what happens to future generations and to the life-giving systems that they will depend on.

Leaving a gift to CAT in your will

Leaving a gift to CAT in your will is one of the most useful ways you can support CAT's work. CAT relies on donations from our members and supporters to continue reaching people with the solutions to the biodiversity and climate change crises. Whatever complexities arise CAT will be here long into the future helping solve the difficult environmental questions in the most practical ways.

Many people leave a gift in their will to CAT – whether as part of their overall estate or as a direct fixed sum gift. We are happy to help with any questions you might have about how to go about this process, if this is a way you feel you can help.

Please contact me on 01654 704950 between Mondays and Wednesdays or email tanya.hawkes@cat.org.uk – I'll be very happy to chat. 🚯



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