

REWILDING



CLIMATE CRISIS REPORT



10 WAYS REWILDING CAN HELP BEAT THE CLIMATE CRISIS

RSK



IN THE UK ALONE, 15% OF SPECIES ARE AT RISK OF VANISHING FOREVER

In November 2021, the UK is hosting COP26, so all eyes will be on us as we seek to deliver against our climate commitments and recover from the coronavirus pandemic.

However, we are also living in the midst of the sixth, and most devastating, mass extinction event the world has ever seen, with the current rate of extinction between one hundred and one thousand times higher than the pre-human background rate.¹ In the UK alone, 15% of species are at risk of vanishing forever.²

As we seek to adapt to climate change and sustain our society, we can no longer treat nature and its resources as expendable. We all rely on the 'ecosystem services' provided by a healthy environment to thrive, so it is in all of our interests to make sure we turn the tide on the environmental degradation that has gone on for far too long. Restoring natural habitats through 'rewilding' not only enhances biodiversity, as it enables threatened species to recover, but it also provides numerous other benefits, from cleaning up our water and reducing flooding to removing damaging carbon dioxide from the atmosphere and regulating the climate.

The World Economic Forum estimates that nature is responsible for half of global GDP (\$44 trillion) and that shifting to a nature-positive economy in key sectors could create 395 million jobs by 2030.³ Restoring nature isn't just altruistic – it makes sound economic sense too.

Why does Britain need to rewild? ⁴

Britain is one of the most ecologically depleted nations on earth. Once, species like bears and wolves roamed wild but we've seen populations of our most critical species plummet by 60% since 1970.⁵

Agricultural intensification, ever expanding urban development and an increasingly polluted environment have all taken their toll on our biodiversity, with economic development leading to a hugely depleted landscape largely devoid of birdsong and the hum of insects.

While global average forest cover is 31% and the European average is 37%, ours is just 13.2%. What's more, just 7% of Britain's native woodlands are "in good ecological condition",⁶ putting further strain on biodiversity and limiting much-needed public access to green space.

While our countryside might appear green, around 70% of it is either arable or agriculturally improved grassland with limited biodiversity.

In 2017, the UK government set the target of reaching net-zero emissions by 2050 and earlier this year committed to cutting emissions by 78% by 2035.⁷ Making the shift to renewable energy and low-carbon technology will of course help us get closer to that point, but harnessing natural assets is the missing piece of the jigsaw puzzle. For the UK to deliver against its climate targets, government and business alike must understand how our natural environment is inextricably linked to the climate and must proactively work to restore it.

[1] Natural History Museum, 2019 [2] Independent, 2019 [3] World Economic Forum, "New Nature Economy Report II: The Future Of Nature And Business", 2020 [4] Rewilding Britain, "Why we need rewilding" [5] The Guardian, "Populations of UK's most important wildlife have plummeted since 1970", 2019 [6] The Woodland Trust, "State of the UK's Woods and Trees", 2021 [7] www.gov.uk, "UK enshrines new target in law to slash emissions by 78% by 2035", 2021



COMMON MYTHS ABOUT REWILDING

There is currently great interest in rewilding and nature-based solutions but there are many misconceptions around.

Myth 1: Rewilding is all about reintroducing large predators

In fact, few rewilding schemes in the world involve the introduction of large carnivores such as wolves or bears. There is an argument to say that the loss of these apex predators is one of the drivers of ecosystem damage. When there are no predators, the number of herbivores, such as deer and rabbits, can rise too high, damaging some of the habitats that they feed on through overgrazing. However, this isn't easy to fix by simply returning wolves to the wild. Such species need huge areas of wilderness to roam across and our landscape in the UK would be unable to support a viable population. Although we may try to introduce species that have been lost, such as water voles, this is not the main function of rewilding.

Myth 2: Rewilding can only be done on a huge scale

The aim of restoring ecosystems is to have natural habitats that are bigger, better quality and more joined up. So yes, there is a place for the big iconic rewilding sites, such as those we see at Knepp Castle or Alladale in the Scottish Highlands. However, long

and narrow green corridors that link bigger sites, such as along our transport or energy infrastructure, would be incredibly valuable. Just as important, however, are the small 'stepping-stone' sites that act as links for wildlife to move through the countryside. One example is WildEast in East Anglia, where anyone can pledge to rewild 20% of their garden, churchyard, schoolyard or farm to contribute to an effective regional network. In fact, we need a wide diversity of types and sizes of site.

Myth 3: Rewilding will result in dense forest cover

There are lots of advocates for 'pure' rewilding: when people don't interfere at all and let natural processes take over. Over time, land left to nature in the UK will scrub over and will develop into woodland. While we certainly need more woodland cover to tackle the climate crisis, we live on a small island and we need to compress a lot of land uses into a finite amount of space. If we take this as the only standard for rewilding, then we will miss out on lots of opportunities to benefit both wildlife and people. The key lies in spatial planning: identifying the wilderness areas where nature can take control but also taking every opportunity to deliver real benefits to nature alongside healthcare, education, transport and growing our food. This shouldn't be a polarised debate between rewilding and conservation management; it's a spectrum of solutions.



TOP TEN REWILDING GOALS

A focus on restoring habitats and enhancing biodiversity, whether or not we call it rewilding, is providing a solution to many of society's environmental and economic problems. From improving air and water quality and reducing flood risk to sequestering carbon and improving our well-being through the restoration of wild habitats, rewilding our landscapes provides so many benefits.

1. GREENING OUR TOWNS AND CITIES

Rewilding isn't just for the countryside. We can use the same principles to bring life back to our towns and cities.

THE BROADMARSH TRANSFORMATION, NOTTINGHAM

The challenge

Centuries of industrial growth have cemented Nottingham's status as the economic and cultural anchor of the East Midlands region, with an estimated urban population of nearly 800,000. Unfortunately, all this growth has also transformed the city's environs, shifting a once-verdant wetland to a landscape of grey concrete.

As a result, many of the region's native species have vanished from the city, flora and fauna alike. The reed warbler's distinctive 'churr' can be heard in the reedbeds of the surrounding countryside but it has been silenced in the city of Nottingham itself. In the past, the pale purple heads of the Nottingham spring crocus grew wild all along the banks of the River Trent; now the blooms are rare in the city, growing in just three colonies on the edge of University Park.

The ousting of nature from Nottingham has had a negative impact on the city's human residents

too. Research shows⁸ that the human brain is wired to seek natural environments: trees and grass, for example, send a primal signal that a place is habitable, with plentiful food and shelter. Without access to green space, city-dwellers are more likely to suffer from mental illnesses including depression, anxiety and insomnia.

A nature deficit can also have developmental consequences, both physical and mental, on young people. "Indoor parenting" has been labelled as a major cause for the significant climb in youth obesity, self-harm and mental health disorders in the UK over the last three decades. US researchers have found that an environment-based education – focused on getting children to learn outside the classroom, in nature and the community – has significantly helped children to develop skills in problem-solving, critical thinking and decision-making. Engaging with nature also leads to reduced stress; lower blood pressure; improved cognitive functions; enhanced mental stamina and focus; decreased violence and criminal activity; and increased learning rates.

[8] [New Scientist, "Green spaces aren't just for nature – they boost our mental health too"](#)



The solution

In December 2020, the Nottinghamshire Wildlife Trust unveiled a plan to bring nature back to the city's Broadmarsh Centre,⁹ replacing a notoriously bleak shopping hub with a natural green space. And in July 2021, award-winning urban designer Thomas Heatherwick signed on to lead the project.

The new space will draw inspiration from centuries-old city maps and will resurrect pedestrian routes that have become obstructed over time. This will increase Nottingham's connectivity to Sherwood Forest beyond, the legendary home of the city's folk hero Robin Hood.

The rewilding project at Broadmarsh is part of a larger movement for green growth across the UK, a goal the trust hopes will be subsidised by the government, which has earmarked £12 billion to fund projects that support a "green industrial revolution". Though the trust's vision was initially met with resistance from Nottingham City Council, an outpouring of public support for the new green space pushed the project forward and planning is now under way.

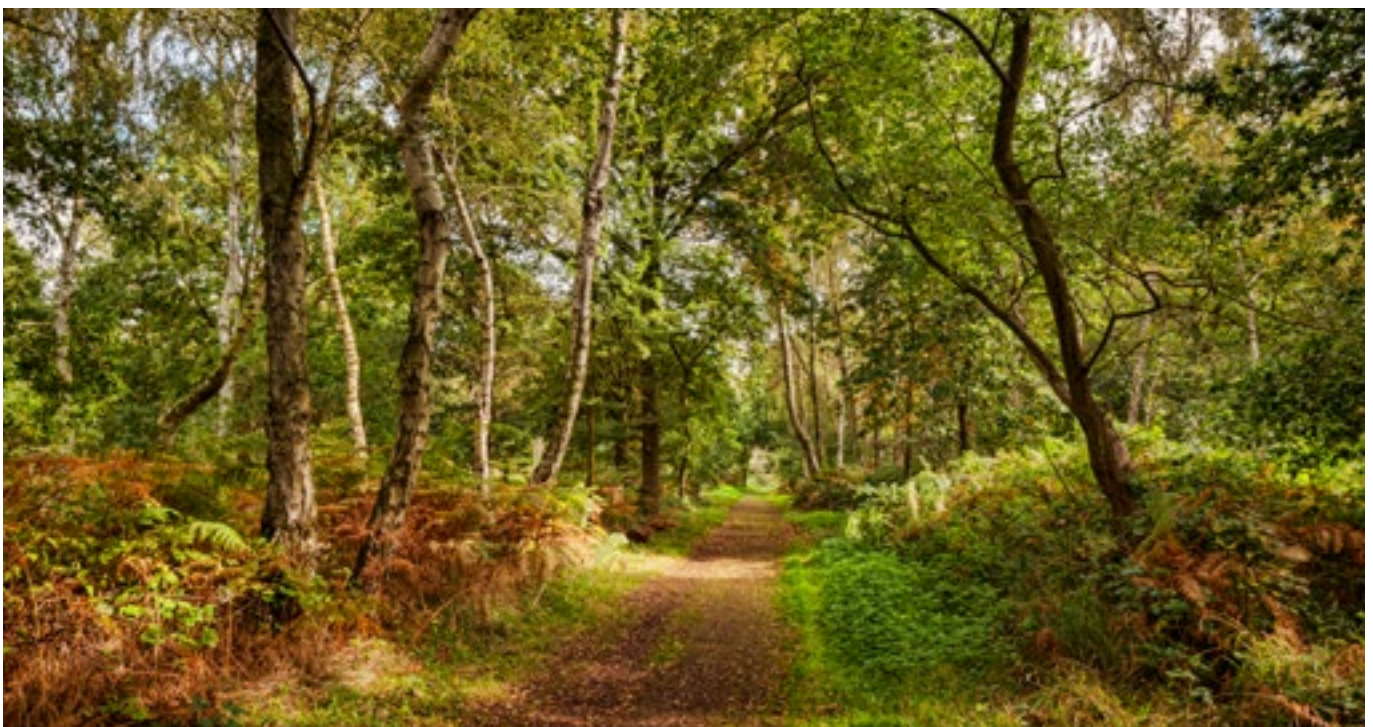
The benefits

Nottingham has set an ambitious goal for itself: to become the UK's first carbon-neutral city, a goal it is working to deliver by 2028.¹⁰ Currently, however, the city comes in 18th in the UK's green city rankings. The Nottinghamshire Wildlife Trust hopes that its rewilding project in Broadmarsh will provide a significant step in the right direction towards rebuilding the city's biodiversity and meeting its emissions reduction target.

It is anticipated that there will be further benefits from Nottingham's new green space:

- improved health and developmental outcomes for the city's residents
- the reintroduction of native species to the local ecosystem
- increased pedestrian mobility and connectivity to surrounding areas
- opportunities for outdoor communal gatherings
- new spaces for urban farming, including in the city's centuries-old cave system
- increased economic viability of businesses in the area and a possible spike in new investors.

Greening our cities, towns and other urban spaces will be a key component of the green revolution, not only because of the carbon and biodiversity benefits it will bring but also, critically, as it connects urban populations with nature. This will bring well-being benefits and an understanding of the importance of preserving and restoring our natural habitats and species.



2. NUTRIENT NEUTRALITY AND HOUSING DEVELOPMENT

Rewilding and habitat creation can be used to offset the impacts of development while enhancing the environment for people.

THE SOMERSET LEVELS AND MOORS

The challenge

Certain nutrients (especially phosphorous and nitrogen) deriving from wastewater and agricultural intensification can be damaging as they flow through waterways and into the sea. This can result in an increased nutrient burden within the water (known as eutrophication) leading to a significant growth of algae and other aquatic plants. This can prove extremely disruptive to biodiversity, as a wide variety of plant and animal species are outcompeted by the vigorous growth.

In 2018, the European Court of Justice ruled that no further nutrient loading would be allowed on sites designated for nature conservation if they were already in an unfavourable condition.¹¹ This means that developers in areas with nutrient-rich water must mitigate the risk of eutrophication and maintain a nutrient-neutral environment.

Achieving nutrient neutrality has become an ever-growing problem for housing developers across the country. In August 2020, Natural England advised district authorities that the high levels of phosphorus were degrading the Somerset Levels and Moors, which resulted in the approval of over 11,000 new houses being halted.¹² Now, developments for new homes, by law, must demonstrate that they will be nutrient neutral, or that sufficient mitigation could be put in place to make them nutrient neutral.



The solution

In order for housing development to be considered nutrient neutral, anything that could result in nitrates and phosphates entering the soil or watercourses is only permissible if the equivalent levels of nutrients are removed from the system elsewhere. This could either be done by, for example, taking a pollution source out of use, such as closing a pig or dairy farm, or by intercepting nutrients before they can enter the watercourses through habitat creation such as woodland or constructed wetland.

On the Somerset Levels, a variety of green solutions have been developed.

Nutrient neutrality woodland

- Eight hectares of woodland would offset the nutrients from approximately 24 new homes.¹³
- The woodland can also be used for other purposes, such as for timber or for biodiversity offsets.

Nutrient neutrality constructed wetland

- For newly built homes on agricultural land, it will be possible to balance some of the nitrates and phosphates originating from the development with the reduction created by taking agricultural land out of production. The residual nitrates and phosphates will have to be removed by passing outfalls through a specifically designed reed bed system or constructed wetland.
- Constructed wetlands are designed for the treatment of wastewater, as habitat creation or both, and have proven highly effective in both phosphate (95%) and nitrate (85%) removal.
- Just 0.5 hectares of constructed wetland would offset the nutrients from approximately 24 new homes.¹⁴
- Wetlands offer one of the best nitrogen, phosphorus and potassium (NPK) fertiliser removal rates, by area.

The benefits

Not only does the 'green' solution to eutrophication improve the status of our watercourses while allowing essential housing development to progress with minimal environmental damage, but it also has numerous additional natural capital benefits:

- creating wetland habitat to remove nutrients is extremely beneficial for biodiversity (especially if a variety of habitats are created)
- it provides invaluable flood storage, often in low-lying areas where flood risk is a key concern
- wetlands are often very attractive places to visit as they provide excellent opportunities for birdwatching and other recreational activities
- on top of that, wetland habitat is very good at sequestering carbon.

In many cases, it should be possible to consider the economic value of these additional natural capital benefits and to secure funding for their delivery. For example, the wetland habitat creation could be part of a biodiversity and/or carbon offsetting scheme, or the improvement in water quality could be part-funded by the local water company in lieu of costly water treatment.

While resolving the impasse over housing in the vicinity of sensitive designated sites is clearly important, the bigger picture here is the wider status of our watercourses and water bodies. We cannot continue to pump nutrients into our aquatic habitats, whether through agricultural fertilisers or sewage water, without dramatically affecting the delicate balance and losing the more sensitive, pollution-intolerant species. Cleaning up watercourses after the event is all very well, but what we really need to do is to avoid such high levels of nutrients entering the system in the first place.

3. RESTORING OUR DAMAGED PEATLANDS

Peatlands are one of nature's most effective carbon sinks. Schemes that focus on restoring peat may not be typically considered to be rewilding, as significant intervention can be necessary to re-wet damaged peat, but they can deliver a range of carbon and biodiversity benefits.

GARRON PLATEAU BOG RESTORATION PROJECT

The challenge

One of the most significant emitters of carbon dioxide is degraded peat. Huge areas of peatland have been damaged in recent decades, either by extraction, by burning or by draining. This has had knock-on effects on biodiversity, water quality and flooding.

In Northern Ireland, approximately 1% of peatlands have been restored in the past 30 years but there is clearly a huge amount still to be done.

The solution

In Northern Ireland, the Department of Agriculture, Environment and Rural Affairs (DAERA) has committed to a number of initiatives to support the restoration of peatland habitats and ecosystems across the country.

The Garron Plateau peatland is the most extensive area of intact blanket bog in NI. The area is a European designated special area of conservation, as it is the only site in NI to contain the priority species marsh saxifrage and bog orchid. The Garron Plateau is also the catchment area for the Dungonnell Reservoir, owned by NI Water, that supplies drinking water to the Ballymena and Moyle areas (about 37,000 homes).¹⁵

Overgrazing and artificial drainage have caused the degradation of the peatland. So far, 15 km of drains have been blocked, restoring 72 hectares of blanket

bog. The project is aiming to restore an additional 444 hectares of peatland by blocking 41 km of artificial drainage channels by the end of 2021.¹⁶

A new Nature for Climate Peatland Grant Scheme will launch this year across England, providing much-needed funding for peatland restoration projects.¹⁷

The benefits

As with most habitat restoration projects, in addition to the obvious benefits for biodiversity, there are numerous other ecosystem services provided by peatland that are reinstated in the process.

First among these is the carbon storage capacity of peat. Restoring these habitats is doubly important as it not only stops the land from emitting carbon, but it also sequesters it. Peat holds a prodigious amount of water and releases it very slowly. This not only reduces flooding but also cleans the water before discharge.



[15] IUCN, "Dungonnell Blanket Bog Catchment Management Plan" [16] *ibid* [17] "Nature for Climate Peatland Grant Scheme: Discovery Grants open to fund the development of restoration projects", 2021

4. MAXIMISING THE ENVIRONMENTAL AND ECONOMIC BENEFITS OF OUR NATIONAL PARKS

Britain's National Parks are not the nature-rich wildernesses we see in other countries. Rewilding could help us hit our '30 by 30' target: the conservation of 30% of the Earth by 2030.

REWILDING THE CAIRNGORMS

The challenge

While our National Parks attract many visitors and thus provide a much-needed boost to the rural economy in these areas, restoring nature in these farmed landscapes would make them even more attractive, with knock-on effects on both biodiversity and the local economy.

Unlike almost any other developed country, Britain has no large areas of land in which wildlife, specifically large herbivores and their predators, can roam freely. British National Parks are dominated by privately owned sheep farms and grouse or deer estates, leaving our hills bare. In the US, in contrast, the federal government owns vast swathes of protected public land that is dominated by natural habitat, including National Parks such as Yosemite and Yellowstone.

Although National Park Authorities in the UK can use their planning powers to restrict building and development within park boundaries, they have very few powers to encourage nature recovery over the wider landscape. Therefore, despite conservation initiatives, UK National Parks are nature-depleted and in desperate need of rewilding. There is less woodland cover in the Yorkshire Dales than in London.

The UK has been ranked 189th out of 218 countries for its quality of nature,¹⁸ and this is in part because our National Parks are not the wilderness areas that they are in other countries across the world.

The solution

In the UK's largest National Park – the Cairngorms in the Highlands of Scotland – conservationists and landowners have taken on the biggest habitat restoration project in Britain, known as Cairngorms Connect. The driving motivation behind the project is to fulfil a 200-year vision to restore habitats and increase biodiversity in the park.

The group is focusing on restoring waterways, woodlands and marshes like the Insh, a 1000-metre floodplain stretching between Kingussie and Kincaira along the River Spey.¹⁹ It is also working to bring native predators back to the National Park after years of human interference. So far, the Cairngorms Connect Predator Project has seen 11 breeding raptor species, from golden eagles to hen harriers, return to the National Park, as well as mammals such as foxes and badgers.²⁰



The benefits

Rewilding Britain has recently launched a “Wilder National Parks” campaign and has produced an animated video²¹ to illustrate how an ecologically degraded upland valley can be transformed into a flourishing nature-rich landscape through rewilding. Among the benefits of this restored landscape are increased biodiversity, reduced flooding, improved water quality, greater carbon sequestration and new opportunities for communities and local economies, for example, nature-friendly farming, forestry, eco-tourism and recreation.

Furthermore, studies show that rewilding can bring new opportunities, including jobs and volunteering opportunities, and that nature recovery on marginal land can work well alongside generating income from food production and livestock. Far from compromising their ability to provide an income for rural communities, rewilding our National Parks would enable diversification that would provide a more sustainable future for residents and wildlife alike.

All our National Parks would benefit from this sort of rewilding or habitat restoration. These could be our largest wild spaces, areas where biodiversity could thrive and where people could experience true wilderness. It's time for our National Parks to be more like those around the world: areas where pristine habitats are preserved and at a scale in which species populations can be viable in the long term.

[18] Friends of the Earth policy, “How well are the UK and the EU protecting nature?”, 2019 [19] Cairngorms Connect, “Insh Marshes – a shared vision for a natural floodplain” [20] Cairngorms Connect, “Cairngorms Connect Predator Project” [21] Rewilding Britain, “Wilder National Parks”.

5. CLEANING UP OUR RIVERS AND WETLANDS

Just like terrestrial habitats, our rivers, streams and lakes are suffering from the damage to their native biodiversity. Rewilding can be applied at a catchment scale.



REWILDING THE UPPER BURE, NORFOLK

The challenge

Healthy rivers, lakes and wetlands are critical for life on Earth. Now, as we see stark biodiversity loss due to human intervention and the climate crisis, there is an urgent need to restore the health of the waterways in our landscapes.

Intensive farming, pressures from development and worsening climate impacts have left just 14% of England's rivers in good health. Both the recent BBC Panorama programme "The River Pollution Scandal"²² and George Monbiot's "Riverside" documentary²³ have highlighted how badly we are treating our rivers. As a result, 13% of British freshwater and wetland species are now threatened with extinction,²⁴ and our rivers are choking with pollution and algal blooms.

True wetlands, such as bogs, marshes, floodplains and salt marshes, have been treated as an inconvenience by humans over millennia and have, as a result, been drained for agriculture and dammed or diverted to make way for development. Wetlands and rivers are now some of Britain's most damaged natural habitats, with fens, bogs and reed beds only clinging on in isolated pockets in most parts of the UK.²⁵ It is estimated that we have lost 90% of Britain's natural wetlands.

Water landscapes are essential for human well-being, for buffering climate change and for biodiversity, so why are we treating them like open sewers? As climate change brings new water challenges, we urgently need to fix our relationship with this vital resource by bringing it into our landscapes again, cleaning and rewilding waterways and reintegrating

wetland habitats into our lives.

The solution

The National Trust has recently embarked on a waterways project in the Upper Bure in Norfolk, specifically with the aim of improving the environmental status of the river.²⁶

The Bure is a chalk stream, a rare habitat across Europe and a haven for biodiversity, from southern damselflies and water-crowfoot to otters and kingfishers. In fact, the 200 chalk streams across the globe are mostly found in southern England and France. The clear water from underground chalk springs makes them the perfect source of clean water, providing ideal habitats in which wildlife can thrive.

Historically, the Upper Bure Valley has supported life by providing fertile land for farming, water meadows for grazing, power for milling and fisheries for commercial and recreational use. However, over time, this level of activity has impacted the health of the river and the landscape it supports.

Through various local restoration projects, the National Trust is bringing the river back to life by reprofiling the banks, creating more 'edge' habitat for wildlife, adding gravel into the river to benefit fish and invertebrate populations and creating floodplain wetlands, scrapes and ponds. The organisation is also creating 9 km of new footpaths so the river can be easily accessed by local communities.

The benefits

By cleaning up the Upper Bure, the National Trust is reinstating a rare and sensitive habitat and is restoring the stunning biodiversity that goes with it. The organisation is also helping local communities to once again be proud of their wonderful asset, and is encouraging visitors to enjoy its charms, bringing valuable income to the local area.

But the benefits from cleaning up rivers are often felt far downstream, and the Bure feeds into the internationally designated Norfolk Broads, Britain's largest protected wetland area. Cleaning up the Bure and other watercourses that flow into the broads will help increase the ecological status of this critical site.

[22] BBC Panorama, "The River Pollution Scandal", 2021 [23] Spanner Films, "Riverside" live documentary, 2021 [24] Rewilding Britain, "Rewilding water" [25] Ibid [26] National Trust, "Restoring the River Bure in Norfolk".

6. CARBON SINKS AND TREE PLANTING

Perhaps the most well-known nature-based solution is the planting of trees to sequester carbon. But by planting the right trees in the right place, we can provide a host of co-benefits.

SENCE VALLEY

The challenge

A carbon sink is a forest, ocean or other natural environment that absorbs (or sequesters) more carbon than it releases. In contrast, a carbon source is anything that releases more carbon into the atmosphere than it absorbs, for example, the burning of fossil fuels or the degradation or burning of peat.

While carbon is essential to all life on earth, increased human activity is producing too much, to the point that emissions are trapped in the atmosphere, resulting in the extreme weather and rising sea levels we see today: all symptoms of the climate crisis. We are releasing more carbon into the atmosphere than the Earth's natural carbon sinks can absorb, and this is why protecting them (and indeed, creating more) is vital.

Humanity's continued reliance on fossil fuels for energy means billions of tonnes of carbon are released into the atmosphere every year. Forests are some of the world's largest carbon sinks, yet despite their importance, an area the size of a football pitch is destroyed every second.

In the UK, the net annual rate of carbon dioxide accumulation by our forests is projected to fall from around 21 million tonnes of CO₂ in 2020 to around 19 million tonnes by 2030.²⁷ As climate impacts worsen and calls to fix our relationship with nature grow louder, it is time to turn the tide and increase woodland cover, both in the UK and across the globe.



The solution

Throughout the winter of 2019–2020, Forestry England, with significant help from numerous local community groups, from the scouts to the Women's Institute, planted 100,000 trees on the 100 acres of land adjacent to Sence Valley in north-western Leicestershire, as part of the centenary woodland creation project.²⁸

The new woodland, with 17 different tree species included in the planting regime, has been designed to be sustainable and resilient, while performing an essential carbon sequestration function. Additional wild flower meadow and wetland habitats have been created within the woodland to add to the biodiversity value of the restoration while still sequestering carbon.

Forestry England will be recording and surveying the land to ensure that the woodland is healthy and is providing the best possible habitats for local flora and fauna.

The benefits

Planting trees is fundamental to reversing climate change. In 2000, the Edinburgh Centre for Carbon Management (ECCM) concluded that the only way to fight climate change was to combine vigorous fossil fuel emission reductions with a voluntary programme for improving forestry management, forest conservation and reforestation.²⁹

New woodland is invaluable for biodiversity; it reduces the air temperature and humidity, holds back water to reduce flood risk and improves water and air quality.

The Sence Valley project is just one of many such schemes across the country, where tree-planting is being used not just to create a carbon store but also to provide these numerous other benefits. But one of the most important mantras has to be "the right tree in the right place". Too often in the past, carbon-offsetting schemes have planted trees in the wrong location, often removing other important habitats, such as peatland, in the process and introducing tree species, and indeed woodland habitats, where they do not belong.

To be most effective, tree planting schemes need to be ecologically appropriate, well planned and sensitive to the local environment. Where this is ensured, the biodiversity gains, as well as the other benefits such as carbon sequestration, flood protection and recreational enjoyment of the countryside, can be enormous.

[27] Forest Research, "Carbon sequestration" [28] Forestry England, "Sence Valley centenary woodland creation project."
[29] FAO, "Forests and climate change, Carbon and the greenhouse effect "

7. NATURAL FLOOD MANAGEMENT

A significant challenge in the UK as a result of a changing climate is an increase in the incidence of flooding. Replacing carbon-intensive, man-made solutions with natural flood management is cost-effective and provides a range of further benefits to people.



THE SUSSEX FLOW INITIATIVE AND BEAVERS IN THE KNAPDALE FOREST, SCOTLAND

The challenge

Flooding is a natural part of a river's annual cycle, but human disruption to natural hydrological systems, specifically through the canalisation of watercourses, increased run-off from overgrazed sheep pasture and urban hardstanding and too much development in floodplains, has reduced the capacity of the landscape to absorb excess water.

Flooding costs the UK economy between one and five billion pounds annually. Currently, natural flood management makes up less than 1% of the flood defence budget, despite it being both cheaper and more sustainable.^[30] In terms of the human impact, more than five million people live and work in 2.4 million properties that are at risk of flooding from rivers or the sea, one million of which are also at risk of surface water flooding.^[31]

The solutions

Two initiatives at opposite ends of the country illustrate how flood risk can be effectively reduced while at the same time having significant knock-on benefits for the environment.

Launched in 2012, the Sussex Flow Initiative is a natural flood management project working with and restoring natural processes to reduce flood risk within the county's River Ouse catchment.^[32] The initiative

works with landowners and locals to create natural features designed to slow and store water in the landscape to help reduce flood peaks.

These features include:^[33]

- re-wooding landscapes to reduce flooding and run-off
- planting hedgerows across slopes to capture rain
- restoring natural washlands
- reversing drainage of woodland and heathland
- replicating nature by placing 'leaky dams' made of tree branches and trunks upriver along the River Ouse
- introducing flood storage ponds.

Natural flood management is arguably best delivered by the Eurasian beaver, as illustrated by the Knapdale River beaver reintroduction project in Scotland. The beaver is native to Britain but has been missing from our landscape for over 400 years. It is one of nature's most prolific engineers and could be fundamental to the cost-effective reduction of flood risk in our most vulnerable catchments. Through the building of dams, the digging of canals and the creation of dead wood on which many species depend, beavers not only perform an extremely valuable flood storage function but also create and maintain habitats where an abundance and diversity of life can flourish.

Significant work to rehabilitate this once-abundant species is being taken on by government and the conservation sector. After becoming extinct in the 16th century, the species is being reintroduced to sites across England, Scotland and Wales.^[34] In May 2009, the Scottish Government gave permission for the reintroduction of the beaver to Knapdale Forest. In partnership with the Royal Zoological Society of Scotland and Forestry and Land Scotland, the Scottish Beaver Trial was one of the largest reintroduction projects in Europe.^[35]

The project lasted five years and has been an overall success. In 2010, the first beaver pup was born and today the Scottish beaver population remains relatively stable. In 2016, two years after the conclusion of the trial, the beavers were granted native species status by the Scottish Government, thus ensuring their continued protection.^[36] After the success of this trial, there have been beaver reintroduction projects across Scotland, Wales, Devon, Cheshire and Dorset.

[30] Rewilding Britain, "Rewilding to enable natural flood management". [31] Environment Agency, "National flood and Coastal Erosion Risk Management Strategy for England", 2020 [32] Sussex Wildlife Trust, "Sussex flow initiative, Helping to reduce flooding and increase wildlife habitat naturally" [33] Ibid [34] RSPB, "Beaver reintroduction in the UK" [35] Scottish Wildlife Trust, "Scottish Beavers" [36] Environment and Society Portal, "Resistance and rewilding: The return of Beavers to Knapdale forest", 2019

The benefits

The creation of floodplain woodlands as part of the Sussex Flow Initiative has enabled better flood management by increasing the landscape's natural ability to absorb excess water and reduce flooding. Rainwater is absorbed into tree-covered soil at 67 times the rate at which it is absorbed into grass-covered soil, thus preventing water from running over land and flooding rivers and other watercourses.³⁷

In addition, the creation of natural flood-storage ponds has enabled the storage of huge amounts of floodwater (as well as having benefits for wildlife and carbon sequestration), while 'leaky dams' not only help to prevent flooding, but also benefit the surrounding area by reducing soil erosion, stabilising riverbanks and ensuring a slow release of water into the area.

The beaver dams in Knapdale perform very similar functions: holding back water, releasing it slowly and creating a variety of aquatic habitats, but with the added benefit of providing a wildlife experience that can bring additional revenue into rural economies.

Whether using beavers or not, letting our rivers and floodplains behave more naturally and restoring natural habitats in these areas will have a wide variety of environmental and socio-economic benefits. As climate change leads to ever more extreme flood events, the ability of the environment to absorb excess water and release it much more slowly, thus avoiding the damage caused by flash flooding, will become increasingly important.

8. REGENERATIVE AGRICULTURE

We shouldn't have to choose between nature and food. Regenerative agriculture enables us to balance the different benefits we receive from nature by bringing the principles of rewilding into the management of the soil that grows our crops.

GROUNDSWELL, A PRACTICAL AND SUSTAINABLE AGRICULTURAL SHOW

The challenge

For many decades, our agricultural systems have become ever more intensified. Huge quantities of pesticides and fertilisers have been administered across the landscape with devastating consequences for our soil and aquatic systems. Furthermore, in addition to this damage, the simple practice of ploughing releases enormous quantities of carbon into the atmosphere every year.

While a recent article suggesting that we only have 100 harvests left in our UK soil has since been called into question,³⁸ it is certainly the case that our soil is in very poor health. If we are to continue to be able to farm the land for generations to come, it's clear we need a more sustainable approach to farming; one that respects the importance of the soil biota, increases biodiversity and reduces carbon emissions.

The solution

Regenerative agriculture is an approach to farming that focuses on the gradual regeneration of the topsoil, increasing biodiversity, improving the water cycle, enhancing ecosystem services, increasing resilience to climate change and generally strengthening the health and vitality of soil. A recent video made by Carbon Neutral Cambridge, "From the Ground Up",³⁹ explains the principles and interviews farmers implementing the system.

Groundswell, which originated in Hertfordshire, is a practical agricultural show that provides a forum for anyone interested in food production or the environment to learn about the theory and practical application of regenerative farming. This includes the introduction of no-till systems, the planting of cover crops and the reintroduction of livestock into the arable rotation, with a view to improving soil health.

The show is a two-day event, featuring talks, forums and discussions from leading international soil health experts, experienced arable and livestock farmers and agricultural policy experts, along with direct-drill demonstrations and agriculture technology (AgTech) innovators. The aim is to encourage those farmers who are perhaps unsure about changing their practices to make the switch to a more sustainable approach.

The benefits

By not ploughing, but instead, directly drilling into the soil, the soil structure is protected and carbon emissions are very significantly reduced, which are key for the health and ecology of the soil and its water retention capacity. Healthy root systems are maintained along with complex interactions with fungi and other crucial soil organisms.

Planting nitrogen-fixing cover crops further increases biodiversity while simultaneously returning nutrients to the soil. It also provides forage for livestock, which can be used to 'mob graze' the cover crop: high density grazing over a short duration to ensure a longer than usual crop recovery period. The cows fertilise the soil naturally as they graze.

[37] Mossy Earth, "5 Reasons Rewilding is so Important" [38] New Scientist, "The idea that there are only 100 harvests left is just a fantasy", 2019

[39] Carbon Neutral Cambridge, "From the Ground Up", 2021

9. GREEN ENERGY

There is great scope to combine nature-based solutions and rewilding schemes with other societal needs, like the generation of clean energy.

SWANSEA BAY TIDAL LAGOON

The challenge

The mounting threat of the climate crisis means that the need to generate renewable energy is becoming ever pressing. Renewable energy is a clean solution to the problem of providing for human demand without depleting the world's natural resources and emitting the carbon that contributes to the impacts we see today.

The solution

The UK has some of the world's largest tidal ranges, with the bays and estuaries on the western side of the country lending themselves particularly to potential tidal energy schemes.

Swansea Bay Tidal Lagoon in South Wales is set to be the world's first tidal lagoon power plant and will contribute significantly to meeting the UK's need for affordable low-carbon energy. A tidal lagoon is essentially a U-shaped breakwater built out from the coast with a band of hydro-turbines within it. Seawater fills and empties the man-made lagoon as the tides rise and fall. Renewable electricity is thus generated on both the incoming and outgoing tides, four times a day, every day.

Owing to the significant tides on the west coast of Wales, keeping the turbine gates shut for just three hours means that there will be a 4-m height difference between the water inside and outside the lagoon. Power is generated as the water rushes through the 60-m-long draft tubes, causing the 7.2-m diameter hydro-turbines to rotate.⁴⁰

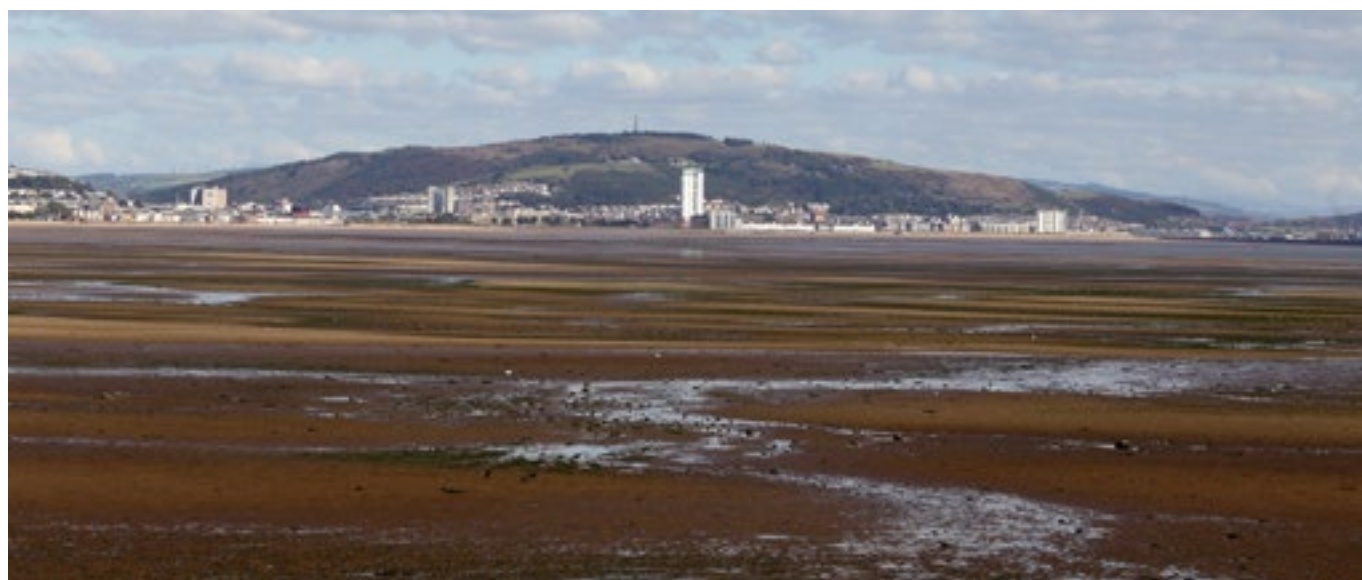
The benefits

The Swansea Bay Tidal Lagoon is predicted to power around 155,000 Welsh homes each year: approximately 90% of the homes in Swansea Bay. This will reduce the need for fossil fuels, the main driver of the climate crisis.⁴¹

The lagoon has an estimated life of at least 120 years, meaning it will last twice as long as a nuclear facility and five times longer than an offshore wind farm. The timing and volume of daily tidal movements is predictable, making it the most reliable form of renewable energy. Unlike nuclear power plants, no complex and expensive decommissioning is required.

The lagoon will also provide other environmental and socio-economic benefits:

- A lobster and oyster hatchery will be built and plans for an integrated multi-trophic aquaculture (IMTA) facility (a means to enable a number of different species to live together for environmental and economic benefit) are being discussed.
- The lagoon will offer the prospect of restoring the native Swansea oyster population, thus restoring a former key industry for the city that provided 500 local jobs and landed 16 million oysters per year at its peak in the late 1800s.⁴²
 - Oyster reefs clean the water, recycling nutrients and helping to protect against coastal erosion.
 - Over the years, oysters have been vulnerable to over-harvesting, habitat loss, pollution and disease, with populations suffering declines of over 95% in Wales.



- The structural complexity of the building materials for the scheme will play an important role for the diversity of animals and plants inhabiting the lagoon wall. Rocks of different sizes, roughness and porosity will be used to create an artificial reef system, offering opportunities for new habitats to be developed and used by a large variety of marine species.

The Swansea Bay Tidal Lagoon project has been developed as a 'pathfinder' project for the renewable energy industry, and it forms part of a potentially wider programme of six tidal lagoon projects in UK waters. If built, these would be capable of generating

sufficient energy to supply approximately 8% of the UK's total energy.

It is important to note that tidal energy schemes can also have adverse environmental effects, as alterations in sediment flows often lead to the loss of sandbank and mudflat habitats that are important for wading birds associated with Special Protection Areas. Such impacts clearly need to be addressed (e.g., by habitat creation schemes elsewhere, such as managed retreat) to ensure that the value of the renewable energy is not compromised by a net decrease in the habitat available to these important species.

10. REWILDING TO PROTECT RARE OR ENDANGERED SPECIES

Rewilding is often thought of as a means of reintroducing long-lost species, but it can be used to protect the last strongholds of species struggling against habitat loss or degradation.

MOUNTAIN HARES IN ENGLAND

The challenge

The iconic mountain hare, which turns white in the winter, was once found across the UK's uplands, but hunting has curbed its populations to areas of Scotland. A subspecies, the Irish hare, remains on the Emerald Isle. In the 1870s, English landowners attempted to reintroduce mountain hares to England, but most efforts failed. However, a small group in the Peak District survived and spread, eventually establishing itself across the National Park.

In recent decades, that population has been put at risk by a combination of hunting, habitat loss and degradation and road traffic accidents. The population is now so small that it is not known whether it is genetically diverse enough to survive. Climate change also threatens this, our only native hare species. Hot dry summers can result in moorland fires, killing the hares and destroying their habitat, while milder winters with less snow mean that the white mountain hares stand out more, so suffer more predation.

The solution

Several organisations are working together to try to protect the mountain hare across the UK, including NatureScot, the British Trust for Ornithology and The Mammal Society, that are working with other conservation organisations to run surveys across Scotland. The People's Trust for Endangered Species is investigating the genetic viability of the remaining mountain hares in England. It is monitoring populations and exploring how various threats are affecting them through thermal imaging, genetic sampling, camera trap monitoring and geographic information system (GIS) modelling. All of this research is building up to a review of the legal status

of mountain hares, and thus identification of further possible protection measures. By rewilding areas in the Peak District, possibly including further reintroductions, this relic English population could be saved. As the climate continues to change, we may need to consider further reintroductions to rewilded moorland in the north of England if the species is to gain the foothold it needs.

The benefits

The mountain hare is an important flagship species. Its survival in England is about more than one species: it acts as an indicator of the health of our uplands and the impacts of land management, hunting, and climate change. Ensuring the mountain hare survives in England will protect a range of upland habitats, supporting birds, invertebrates and rare plants. It will help us to sequester carbon and will deliver enormous well-being benefits to people engaging with the great outdoors.





WHAT CAN WE DO TO REWILD BRITAIN?

At RSK, we specialise in all the above solutions. We work in river restoration, carbon and biodiversity offsetting, renewable energy, rewilding, peatland restoration, regenerative farming, flood management, nutrient neutrality, green infrastructure and the greening of our cities.

Through the establishment of Nature Positive and RSK Wilding and working with our sister RSK group companies ADAS, cbec, Salix and Binnies, we are helping bring together the expertise across the wider group to provide solutions to many of our clients' problems.

Human progress and the protection of the environment need not be mutually exclusive; this is what sustainable development means. It will need a significant mind-shift away from the old ways of unsustainable exploitation and will require us all to do things differently, but new approaches, as shown above, bring greater social, economic and environmental benefits.



The climate crisis and catastrophic biodiversity loss are not just things that scientists talk about, they are critical existential threats to humanity that all of us will start to experience. But all is not lost. We are now within the UN Decade on Ecosystem Restoration, a time when the massive, landscape-scale restoration of habitats, not just in the UK but around the world, needs to start happening at pace.

Tree planting, peat restoration, wetland protection and habitat creation will sequester carbon at an enormous rate, will restore biodiversity and will provide a far healthier and more interesting environment in which to live. Combining this work with a complete shift away from fossil fuels into renewable energy will ensure a sustainable future while bringing a huge boost to the economy.



TACKLING CLIMATE CHANGE TOGETHER	
	#GREENDIALOGUES

For further information, visit us at www.rskgroup.com or contact:
RSK Group Ltd · 172 Chester Road · Helsby · WA6 0AR · UK
Stephanie Wray, Managing Director of Nature Positive, RSK · Email: stephanie.wray@naturepositive.com