



The
Wildlife
Trusts

Embracing Nature

*Climate change adaptation
at The Wildlife Trusts*

Progress report 2023 – 24



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Over the past 12 months, global climate record after record has been broken on both land and sea. The world has exceeded 1.5°C of warming above pre-industrial temperatures for a full year for the first time. From mass coral bleaching, to millions of hectares of land damaged by wildfire, to extreme heatwaves and flooding, we can see the effects of climate change all around us.

New weather extremes that we have not seen before could affect people and wildlife in the UK at any time; whether from flooding, extreme heat, drought or fire. The Wildlife Trusts are taking an approach to climate change adaptation that is not just based on long-term planning for an uncertain future, but doing everything we can to prepare our reserves, staff and assets for potentially catastrophic events now. Adaptation is no longer simply a long-term concern; it is immediate and potentially high impact, amongst the top threats listed on our risk register. In 2023 we conducted our first adaptation emergency planning exercise, using extensive and severe wildfires as a plausible scenario. An updated hazard assessment shows that even on a trajectory of only 2°C of warming by 2100, in the next 25 years almost half of our reserves will be in areas of extreme wildfire risk, three-quarters will see summer temperatures exceeding 1.5°C and more than half could see the lowest flow periods for rivers dropping by an additional 30%, while river flooding is also projected to increase significantly in our western regions.

In 2023 we saw abrupt swings in weather impacting wildlife all over the country. Over the 2023/24 winter, rainfall was 130% higher than average. The wet weather had both negative impacts, such as delaying the timing of restoration activities, and positive ones such as re-wetting peatlands that were damaged during the very dry weather in 2022. Flooding damaged many of our buildings, with some Trusts starting to report for the first time that they may not be able to access flood insurance against future events.

This year, we surveyed conservation practitioners across The Wildlife Trusts to better understand the threats our reserves are facing from climate change and other issues. Drought was identified as the leading current threat to nature across our reserves, with 90% of practitioners considering it to be having negative impacts on nature now - more so than other threats, such as pollution (80%), invasive species (73%), and habitat fragmentation (62%). When asked to consider future threats to reserves over the next 30 years, practitioners again identified drought as the leading threat (91%), with climate-driven threats including heatwaves (89%), and wildfire (70%) also drawing high levels of concern. Flooding,

and not drought, is often the top of the list of hazards that politicians and governments use to discuss UK climate impacts. These results show that the reality of impacts on the ground for nature are broader and drought planning needs more urgent attention alongside the other key hazards associated with climate change.

In 2023/24, The Wildlife Trusts have been active across the whole of the UK, making some of our most precious habitats more resilient. Peatlands, grasslands, woodlands, freshwater, marine and coastal reserves across the country are being restored, re-connected, and in some cases re-invented as climate change starts to bite. We have acquired critical new sites, restored thousands of hectares of habitat on land and sea, created new microclimates to help different species withstand severe weather, and changed how we work to bring in more flexibility and an adaptive approach. This report gives examples of the work we are doing across these major habitat types.

As well as working to minimise the negative impacts of climate change on nature, we are championing the role that nature plays in protecting people from the impacts of climate change, through our strategic work on nature-based solutions. Our new £40 million programme to restore temperate rainforest, funded through Aviva, represents the largest single corporate donation for UK nature-based solutions to date and is being planned with resilience built in from the start.

The Wildlife Trusts were very active in advocating for more ambitious adaptation policies from the UK Government in 2023, following a disappointing update to the Government's National Adaptation Programme which contained no new funding and lacked ambition. We need to see a significant change from the new Labour Government. In its first 100 days of the new Parliament we are calling for the UK Government to commit to:

- Reporting on, and increasing, total investment in adaptation for nature and nature-based solutions to at least £3 billion per year up to 2030. An important component of this should be a continuation of the Nature for Climate Fund and further strengthening of partnerships on delivery of nature-based solutions.
- Re-start bespoke adaptation support services for organisations, like charities, who need it - through committing at least £1 million to its arm's length bodies to provide this support.

- Move responsibility for the coordination of adaptation policy across UK Government from Defra to the Cabinet Office.
- Immediately unblock or enact delayed policies from the last Government that will improve the resilience of the natural environment and its ability to help people to adapt: ban the use of peat in horticulture, enable wild beaver release licences, include climate resilience as a core part of the forthcoming new land use framework, enhance regulation and enforcement related to pollution of our water bodies from agriculture and sewage discharges.
- In the marine environment, we welcomed the ban of sandeel fishing in the North Sea as a core component of resilience for marine wildlife and look forward to seeing this maintained.

We are ready to provide insights and support to the new Government. We have extensive experience in delivering adaptation on our nature reserves and partnership working, from implementing landscape recovery schemes and enabling community-led adaptation plans, to providing advice and support to farmers and other landowners.

There is still much we don't know, from the behaviour of different habitats and species to projected changes in climate, to understanding how different hazards could combine to impact our reserves, staff and activities. Ongoing and dedicated research in climate change adaptation remains a key priority for us, and we hope for the UK Government.

This report

The Wildlife Trusts' vision is of a thriving natural world, with our wildlife and natural habitats playing a valued role in addressing the twin crises of climate change and biodiversity loss, and everyone inspired to get involved in nature's recovery.

In order to meet this vision, we need to ensure we are preparing ourselves and the wildlife we support across the UK for the effects of climate change.

This is The Wildlife Trusts' third annual report on adapting to climate change, following from our first report in 2022, *Changing Nature*. In keeping with reporting requirements under the UK Climate Change Act (2008) we assess how climate change is directly affecting our own charities – the federation of Wildlife Trusts. We look at how climate change is already impacting and will impact our land holdings and the wildlife that depends on them into the future, as well as the risks to our core assets including our staff and buildings. We report on progress against the broad habitat areas where we do most of our work; peatlands, grasslands, woodlands, freshwater, marine and coastal habitats. A summary of latest progress against the action plan set out in *Changing Nature* is provided in Annex B.

For the first time, in this report we also set out our progress in wider work on climate change adaptation, including our policy-facing advocacy role, how we are working in partnership and enabling others to take action.

The geographic scope of the report covers The Wildlife Trusts across England, Wales and Northern Ireland, as well as the Isle of Man and Alderney. Scottish Wildlife Trust are in tandem pursuing their own climate change adaptation work programme.

Climate trends in 2023/24

The past 12 months have been unprecedented in terms of climate change trends globally. Scientists who monitor these trends, for example through the Copernicus Climate Change Service¹, reported that both land and sea surface temperatures broke records by large margins, particularly in the second half of 2023, which also became the hottest year on record². Work is still underway to determine the cause of these trends, which in turn led to catastrophic impacts in many countries, from extreme heatwaves on land and sea, to flooding, to wildfires. In Canada alone for example, a staggering 18 million hectares of land were burnt in 2023.

The UK was not subjected to extreme heat episodes in 2023 compared to 2022, but 2023 still came out as the second warmest year on record³ with many communities also hit by flooding; 130% more rain than average fell over the course of the winter⁴. Notable storms, including Babet and Ciaran also damaged buildings and infrastructure and sadly led to loss of life.

Our wildlife across the UK had to deal with these impacts through the year, including a severe marine heatwave in June 2023⁵, extremes of wet and dry weather, further wildfires after a record season in 2022, and widespread flooding over the winter of 2023 and into 2024.

Our role at The Wildlife Trusts is to do as much as we can to help nature to adapt to climate change impacts, as well as embrace the power of nature to help people to adapt through nature-based solutions and advocate for greater ambition on adaptation by government.



Leafcutter bee

© Jon Hawkins Surrey Hills Photography

2 Updated hazard assessment

Updated projections of climate impacts on our nature reserves

We first reported on how climate hazards are projected to affect our reserve network across the UK in *Changing Nature* in 2022. We focussed our first assessment on a single scenario of global warming consistent with a 3°C rise in global temperature above pre-industrial levels by 2100, and reported on the change in extreme temperatures, wildfire, and low river flows for the 2050s (with flooding impacts reported separately using different source data).

In line with the latest government guidance, for this report we have updated our hazard assessment to include a wider range of warming levels of 2°C and 4°C, and presented results for the 2080s as well as the 2050s.

The new projections suggest that in a world that warms by 2°C by the end of the century:

- 43% of reserves would have more than 30 days of extreme wildfire risk per year in the 2050s, rising to 48% in the 2080s.
- 75% of reserves would see an increase in extreme summer temperatures of more than 1.5°C in the 2050s, rising to 85% in the 2080s.
- 57% of reserves would experience drops in river flows of more than 30% at times of low flows.
- All reserves would sit within a +10% to -10% change in river flood magnitude.

In a world that warms by 4°C by the end of the century, the projections suggest that:

- 58% of reserves would have more than 30 days of extreme wildfire risk per year in the 2050s, rising to 73% in the 2080s.
- All reserves would experience an increase in extreme summer temperatures of more than 1.5°C by the 2050s, and 98% would see increases of more than 3°C by the 2080s.
- All reserves would experience drops in river flows of more than 30% at times of low flows.
- Changes in flood risk from river flooding become much more variable, with around 30% of reserves experiencing changes in flood magnitude of greater than + or -10%, and a clear west-east gradient with increases in river flood magnitude in the west and decreases in the east.

Figure 1 shows the spatial distribution of these trends across the UK.



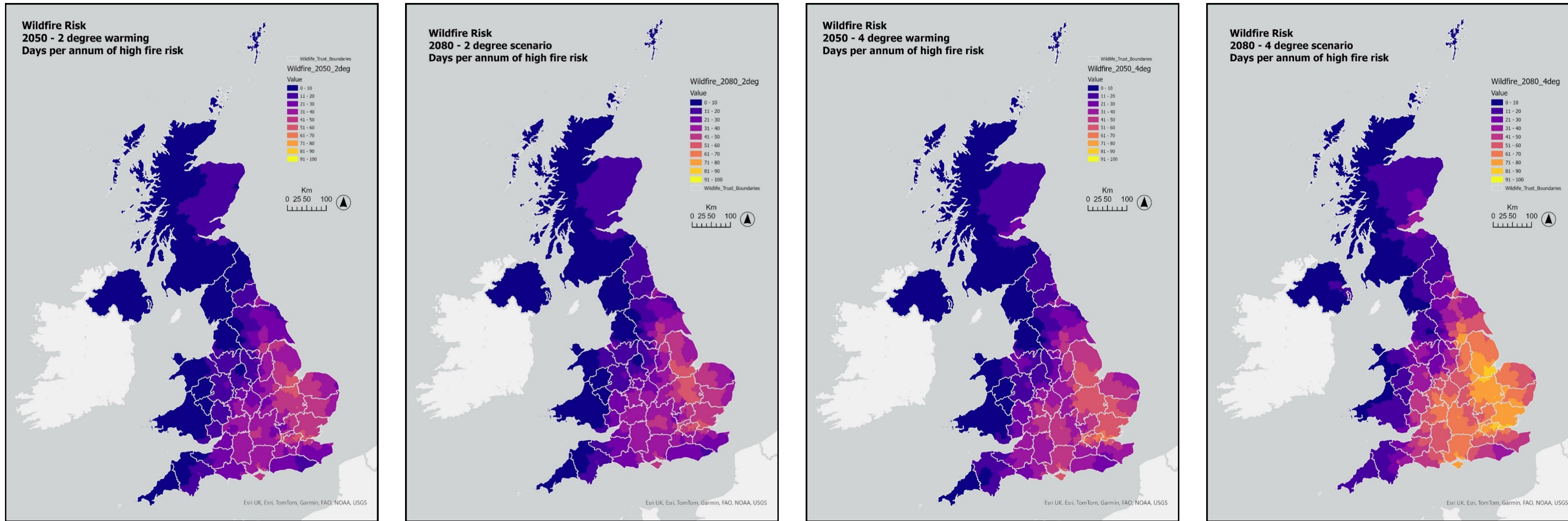
Fern emerging from
fire-damaged soil
© Joe Cornish/2020VISION

2 Updated hazard assessment

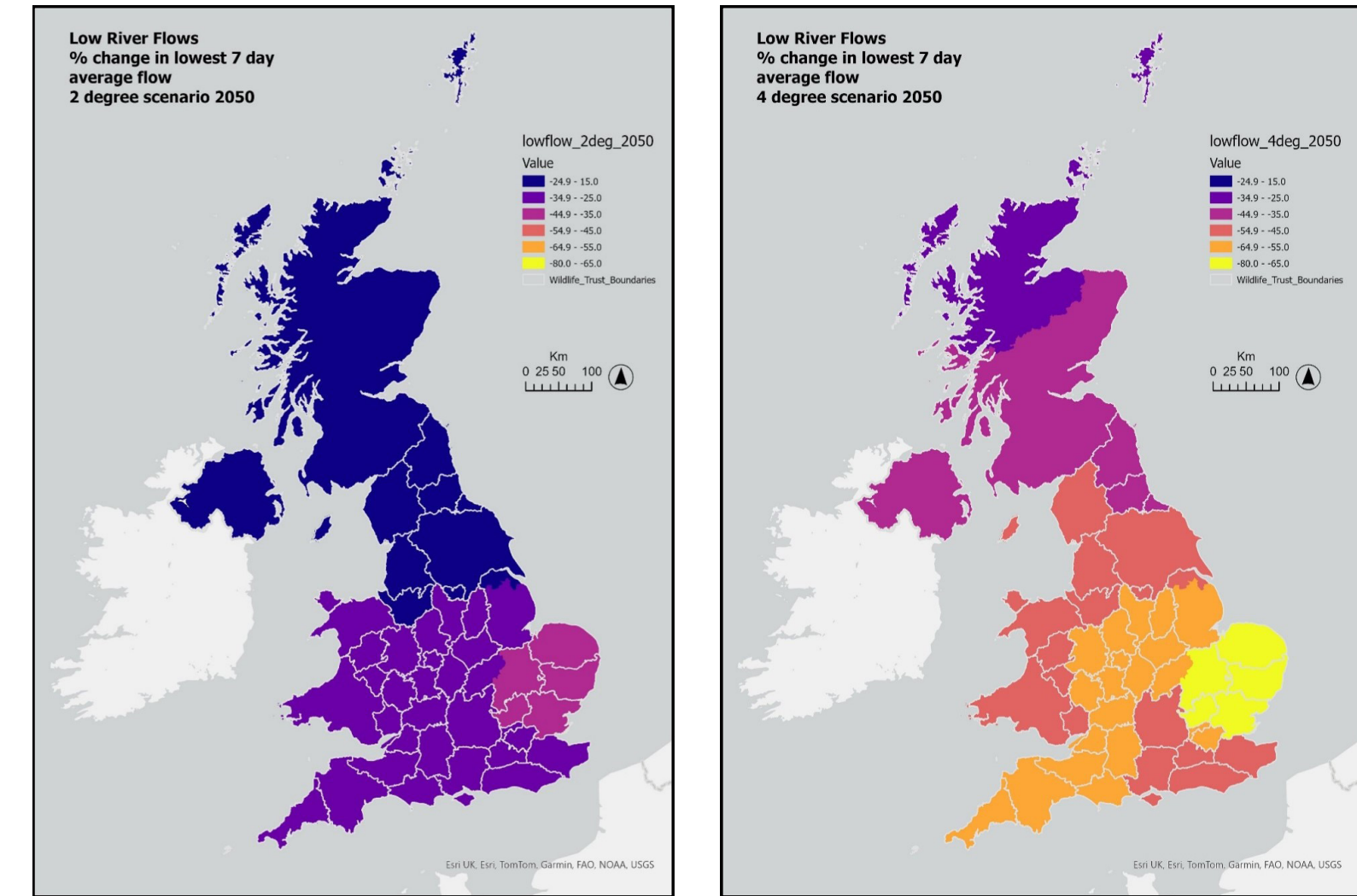
Notes: We overlaid projections of changes in different hazards taken from the UK climate risk indicators website⁶ with a GIS layer of our reserve network of over 2,500 sites. Annex A shows the scenarios used for this assessment.



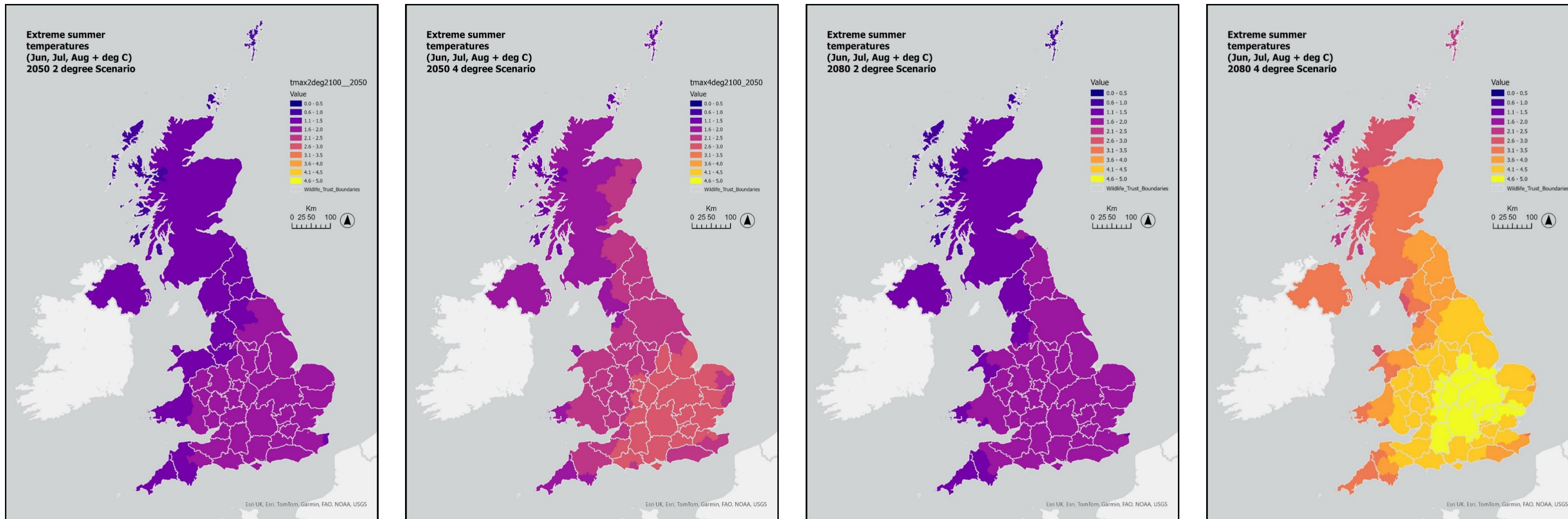
a. Changes in number of days of extreme wildfire risk



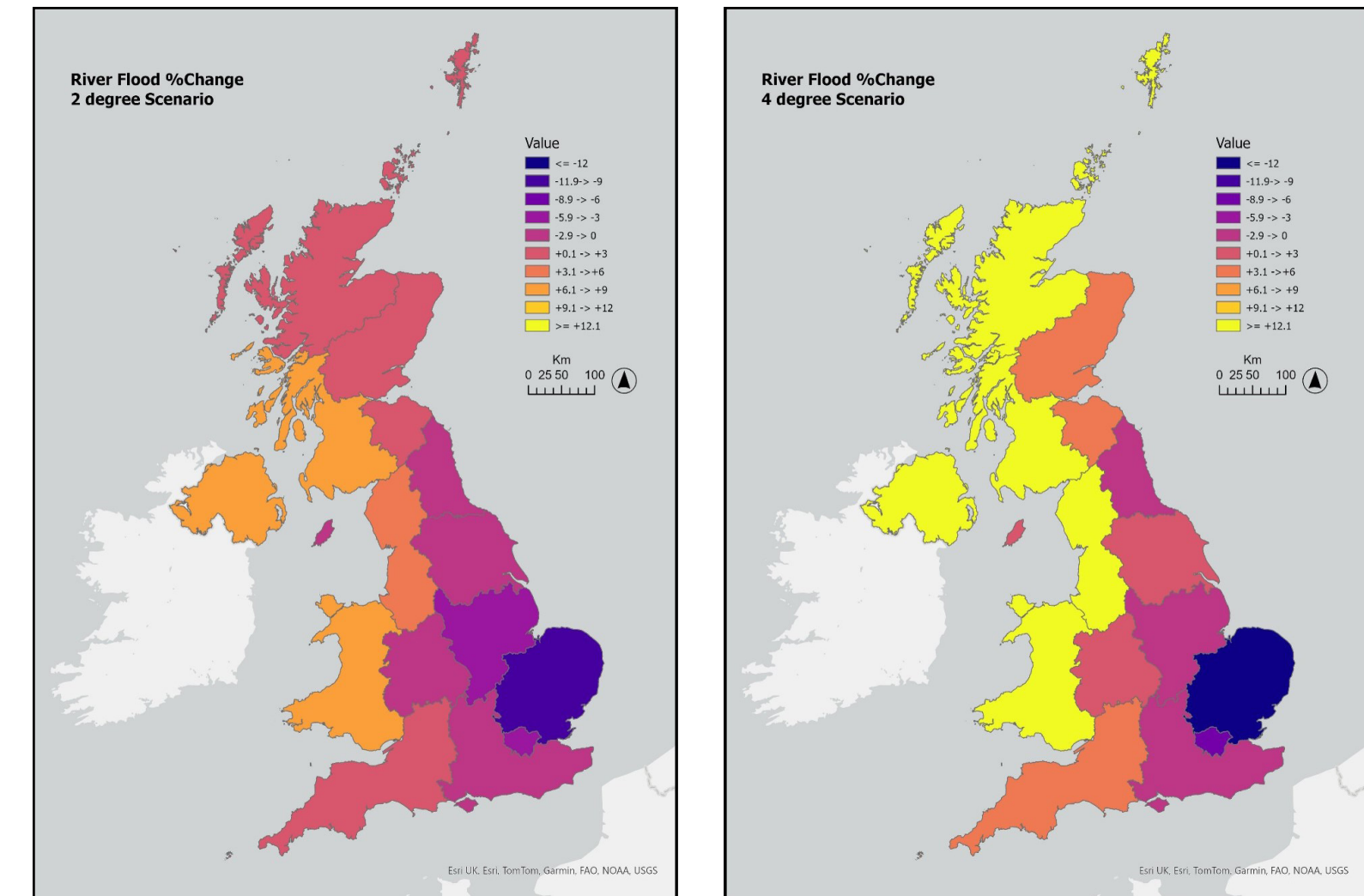
c. Percentage change in river flows on low flow days



b. Change in average summer maximum temperature



d. Percentage change in river flood



Short-term unprecedented extremes

In addition to looking at potential future changes in the climate, The Wildlife Trusts are focussing on short-term unprecedented extreme events and the impacts those could have for us and the wildlife we support now. These short-term effects are, confusingly, often more difficult to model than longer-term effects given that they happen due to a mix of the background climate warming signal combined with short-term natural variability. Of particular concern for us as large landholders are extreme and widespread wildfires due to their destructiveness, as well as prolonged drought, heatwaves, flooding, and sea level rise. Because we do not know the likelihood of different events hitting us in the next 1-3 years, we are taking an approach to adaptation in the short-term which focusses on two things; building as much background resilience as possible, and ensuring we have good emergency preparedness processes in place so that we can react quickly and in a coordinated way.

An issue that we concentrated on in 2023/24 as a federation was extreme wildfire planning. In October 2023, CEOs across The Wildlife Trusts came together to discuss the implications of a catastrophic wildfire scenario affecting large parts of the UK. From this exercise, we drew together lists of actions that we should be taking now to boost preparedness; from creating more firebreaks, to building relationships with local fire services, to making sure every nature reserve has an up to date management plan, including simple but critical resources like site maps, which the fire services can access quickly. We also reached out to UK Government departments and agencies (including Defra, Home Office, Cabinet Office and Natural England) and put out public calls to understand how best we can engage with other stakeholders to prepare for wildfire. Although the focus here has been on one specific risk, the background thinking on preparedness is useful for enabling us to be as ready as possible for any particular threat.

Managing interdependencies and cascading risks

The interdependencies between climate risks and approaches to adaptation is a new area of focus for The Wildlife Trusts, and we have few resources to undertake detailed modelling of these interactions at present. However, we know from experience that there are several types of geographical interdependency of particular importance to The Wildlife Trusts:

- Cascading impacts across sectors can amplify impacts on the natural environment; an example of this is increased water use by households and industry during hot, dry spells leading to even less water being left in the natural environment when it is needed most.
- As major landholders, the actions of neighbouring landowners can vastly increase or reduce risks from hazards that spread across boundaries, such as wildfire. Working in partnership and within local areas was one of the key actions highlighted by the Trusts in 2023 to reduce the risk of rapid wildfires from spreading.

Sections 10 and 11 of this report summarise our work through partnerships to enable broader action both with policy makers and wider sector groups such as farmers and local communities. These enabling actions are crucial for reducing impacts arising from interdependencies and cascading risks and form an important part of our overall response to these types of risks. Annex B of this report highlights the parts of our adaptation action plan where interdependencies and cascading risks feature most strongly and the action we are currently taking. For future reports, we will aim to update our core assessment of interdependencies and cascading risks, in particular to document where these impacts occur.



Urban flooding
© Scott Petrek

3 Our approach to adaptation

Supporting nature to adapt to climate change

Our principles for good adaptation are primarily based on the Lawton Principles, set out in *Making Space for Nature* from 2010. The principles, summarised as 'more, bigger, better, joined' are to:

1. Improve the quality of current sites by better habitat management.
2. Increase the size of current wildlife sites.
3. Enhance connections between, or join up, sites, either through physical corridors, or through 'stepping stones'.
4. Create new sites.
5. Reduce the pressures on wildlife by improving the wider environment, including through buffering wildlife sites.

These five principles form the basis of the 'bread and butter' work of The Wildlife Trusts. In addition to those founding principles, we are also starting to create a broader framework for adaptation that considers how conservationists can manage inevitable change while protecting the underlying health of our natural environment, both for nature itself and the basic underpinning services it provides to people.

Our main focus is ensuring that habitats, and ecosystems, continue to recover from decades of human degradation, and that they maintain their natural functioning. Within this, species composition may change as the climate changes but we manage sites to assist rare species wherever possible. For example, many Trusts are dealing with the challenges of ash dieback, with thousands of ash trees across our reserves dying and needing to be removed and replaced with different species. Rather than planting more ash trees, which will remain vulnerable to this brutal disease, Trusts are filling these gaps with a diverse mix of species, primarily through natural regeneration of woodland. We are also seeing some habitats starting to shift into different forms; coastal freshwater sites in some cases have suffered from tidal inundation due to the breakdown of sea walls, becoming saltwater sites which support different assemblages of wading birds, but still have a high nature value. Accepting and working with these changes is a necessary focus for our adaptation work, and something we are engaging more heavily on with Government to ensure that the policy framework can support us to maximise resilience, rather than acting as a barrier to the flexibility we need (see section 10).

Developing and championing nature-based solutions

As well as working to minimise the negative impacts of climate change on nature, we are championing the role that nature plays in protecting people from the impacts of climate change, through our strategic work on nature-based solutions. Natural spaces can lessen the effects of climate change through moderating water flows (helping to reduce both flooding and drought impacts), through their natural cooling function, particularly in urban areas, and through management choices that can reduce wildfire risk for local communities. In 2023, we continued to grow our programme of work on nature-based solutions, publishing our first showcase that demonstrated 30 out of hundreds of different projects taking place across Trusts, which alone channelled £75 million of investment. Securing an increased role for nature-based solutions is one of the three goals in our 2030 Strategy, and through a nature-based solutions steering group we are also planning events and enhanced communication and recognition of the work we do on nature-based solutions both within The Wildlife Trusts federation and more widely. We are keen to see other stakeholders embracing the role that nature can play in helping us to adapt.



Invertebrate survey on the banks of the River Wye
© Herefordshire Wildlife Trust

3 Our approach to adaptation



Views of conservationists on climate change adaptation

In 2024, we surveyed conservation practitioners working for Wildlife Trusts across the UK in combination with practitioners working for other landholding charities and organisations. We sought to understand:

1. perceptions of current and future threats facing nature on reserves;
2. the prevalence and range of adaptation actions being taken to protect nature on reserves; and
3. attitudes to adaptation among conservation practitioners and employees working in other roles.

We conducted the survey online during April and May 2024, collecting 301 responses, of which 214 were from Wildlife Trust employees. The survey⁷ will remain open for the duration of 2024, and we welcome further responses from conservation practitioners across the sector.

1 Perceptions of leading current and future threats to nature on Wildlife Trust reserves

In the UK and worldwide, currently more species tend to be threatened by land use change, pollution, and invasive species, with climate change acting as a threat multiplier across these drivers. However, nature reserves often constitute a best case for nature, where many of these leading threats are controlled or minimised. Consistent with this view, conservation practitioners working for The Wildlife Trusts identified climate-driven drought as the leading current threat to nature across 90% of our sampled reserves, ahead of land use change, invasive species, and pollution (Figure 2). This result suggests that the impacts of climate change are already being felt, and that climate change has emerged as the central challenge for nature on our reserves.

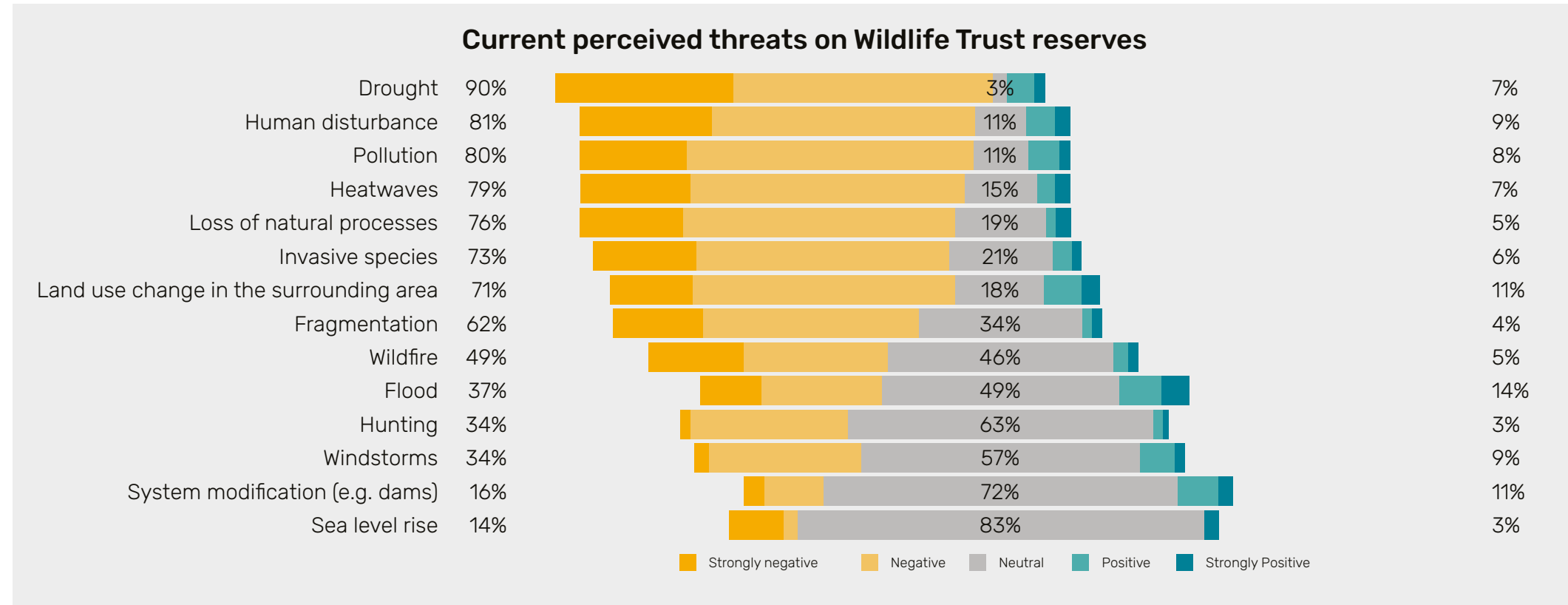


Figure 2 Perceptions of leading threats to nature on a sample of 96 Wildlife Trust reserves, from Wildlife Trust employees who directly work on or manage those reserves.

Notes: Based on 214 survey respondents. Percentages given for each bar show the proportion stating that the effect is strongly negative or negative (left hand side); neutral (middle); and positive or strongly positive (right hand side).

Moreover, when survey respondents were asked to consider threats to reserves over the next 30 years, drought remained the leading threat, with heatwaves climbing from 79% to 89% and wildfire climbing from 49% to 70% (Figure 3). Perceptions are that the severity of non-climate threats will also increase over time, underscoring the increasing challenges facing reserves going forward (Figure 2), and also therefore likely to be facing reserves managed by other organisations across the UK.

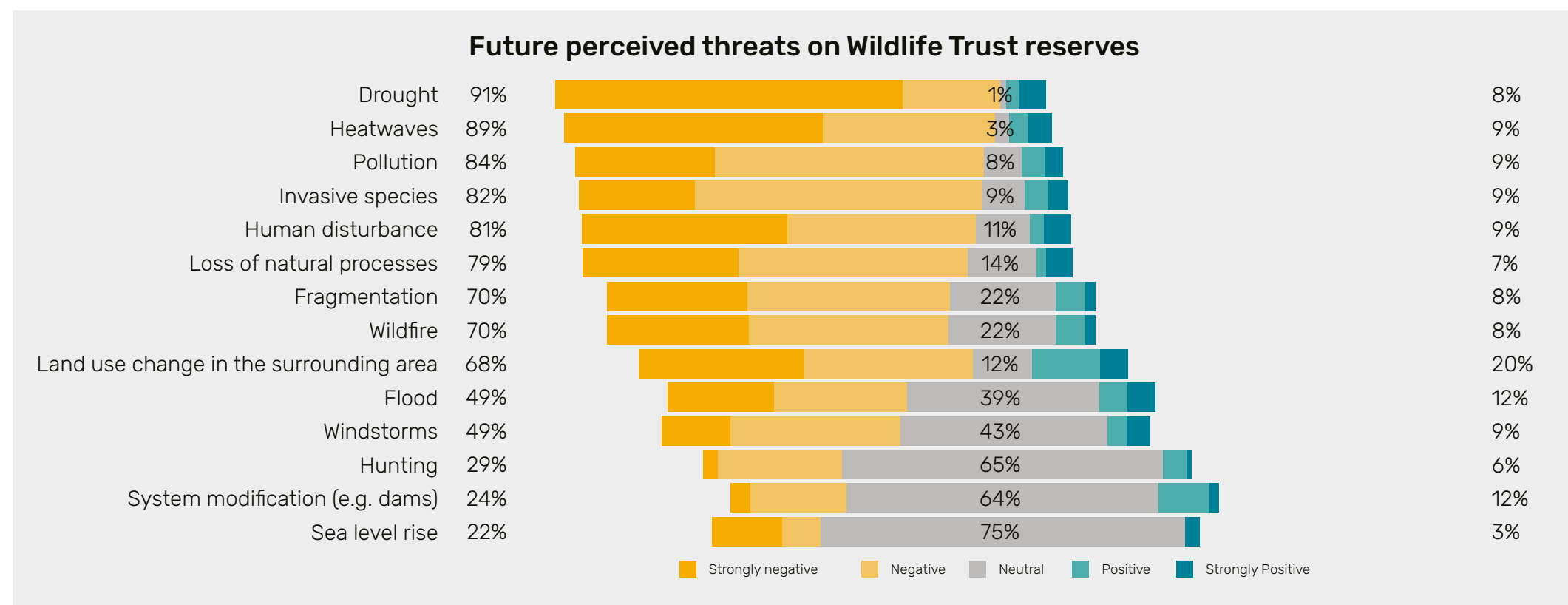


Figure 3 Perceptions of future leading threats to nature on a sample of 96 Wildlife Trust reserves, from Wildlife Trust employees who directly work on or manage those reserves.

Notes: Based on 214 survey respondents. Percentages given for each bar show the proportion stating that the effect is strongly negative or negative (left hand side); neutral (middle); and positive or strongly positive (right hand side).

3 Our approach to adaptation

2 Management actions by Wildlife Trust staff

Conservation practitioners in The Wildlife Trusts are already managing and preparing for change. On 58% of the reserves surveyed, practitioners are planning for the climate-driven establishment of new species and habitats. Depending on the species and habitats in question and whether they pose a threat or opportunity, preparation is either through prevention, facilitation, or both. Importantly, there are substantial differences in the most common approaches among reserve types. For example, on predominantly freshwater reserves – which are notably vulnerable to invasive species – the most common approach is preventative (38%), whereas on predominantly grassland reserves, prevention is the least common approach (7%). The particular vulnerability of aquatic habitats to both invasions and climate change is also reflected in the prioritisation of climate adaptation, which is a top priority on 80% of fen, 75% of freshwater and 71% of bog reserves in our sample.

In accordance with the Lawton Principles, conservation practitioners are already working to help nature adapt to climate change between and on Wildlife Trust reserves (Figure 4), with 77% of practitioners working on or planning to improve connectivity, 52% buying or planning to buy new sites, and many working on a wide range of on-site adaptation interventions, including rewetting, rewilding, the creation of refugia, and on-site assisted migration.

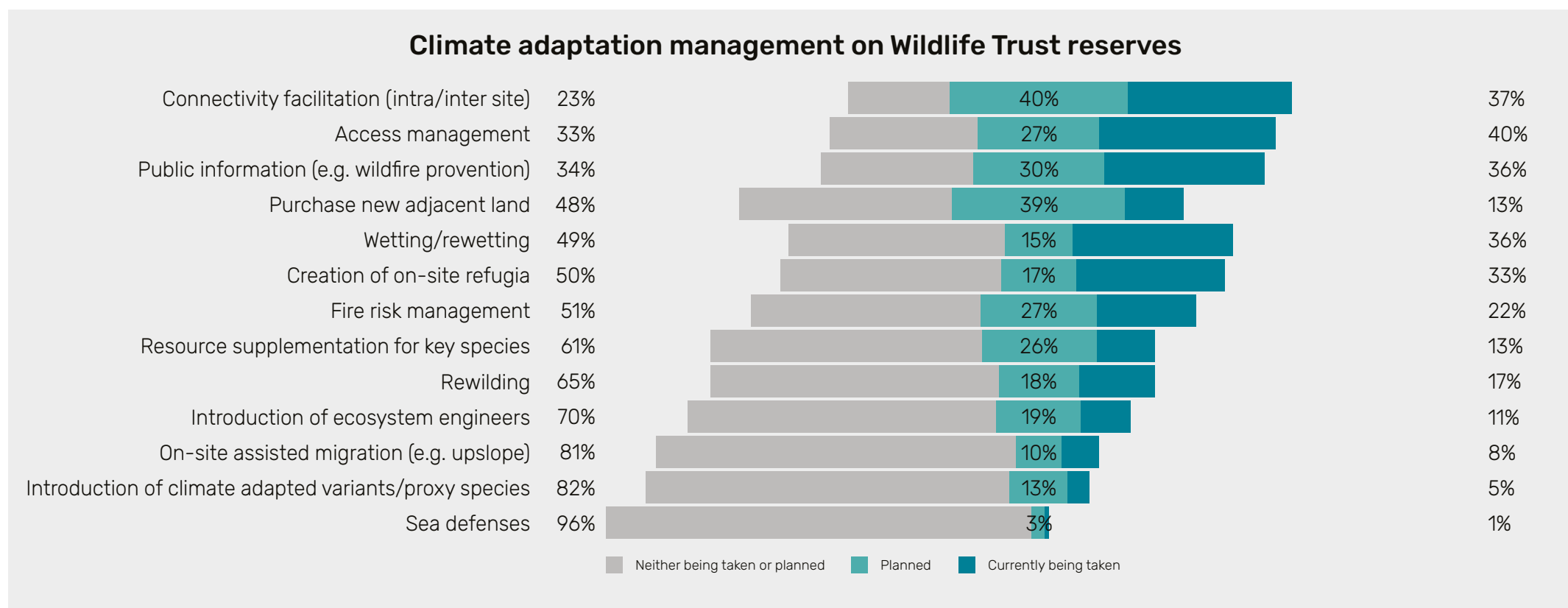


Figure 4 Climate adaptation management action being planned or taken.

Notes: Based on 214 responses covering 96 Wildlife Trust reserves. Percentages show the proportion of actions not being taken or planned (left hand side), planned (middle) or currently being taken (right hand side).



Tawny owl © Margaret Holland

3 Our approach to adaptation

3 Views on change and agreement between those in frontline roles and others

Helping nature adapt to climate change requires that we embrace changes to species and habitat mixes on reserves. At the timescales we live and work at, change can sometimes be difficult to accept, and can even be controversial. As a result, our collective attitudes to adaptation matter acutely.

We surveyed respondents for rates of agreement with eight statements relating to adaptation (Figure 5), split between 'frontline' staff working on nature reserves, and 'non-frontline' staff working in other roles. We identified generally concordant rates of agreement, though with some minor differences. Most employees believe we should be doing more to help nature adapt to climate change (91-96%) and there was a consistent

view that we need to overhaul management practices to help nature adapt to climate change (65-82%). Importantly, most employees agree that the idea that nature should be protected 'as-is' prevents adaptation work (61-63%) and most agree that it is ok for new species and habitats to establish in UK reserves (64-68%).

Wildlife Trust reserves are a small part of the overall approach to adaptation in the UK. It is critical to continue to develop our understanding of impacts on nature reserves across the sector, to document the breadth and depth of management actions being taken, and to understand prevailing attitudes to adaptation within and among all organisations involved in nature conservation across the country. We will do further work on the survey results to increase responses and assess the views across non-Wildlife Trust colleagues.

Attitudes to adaptation: non-frontline Wildlife Trust employees

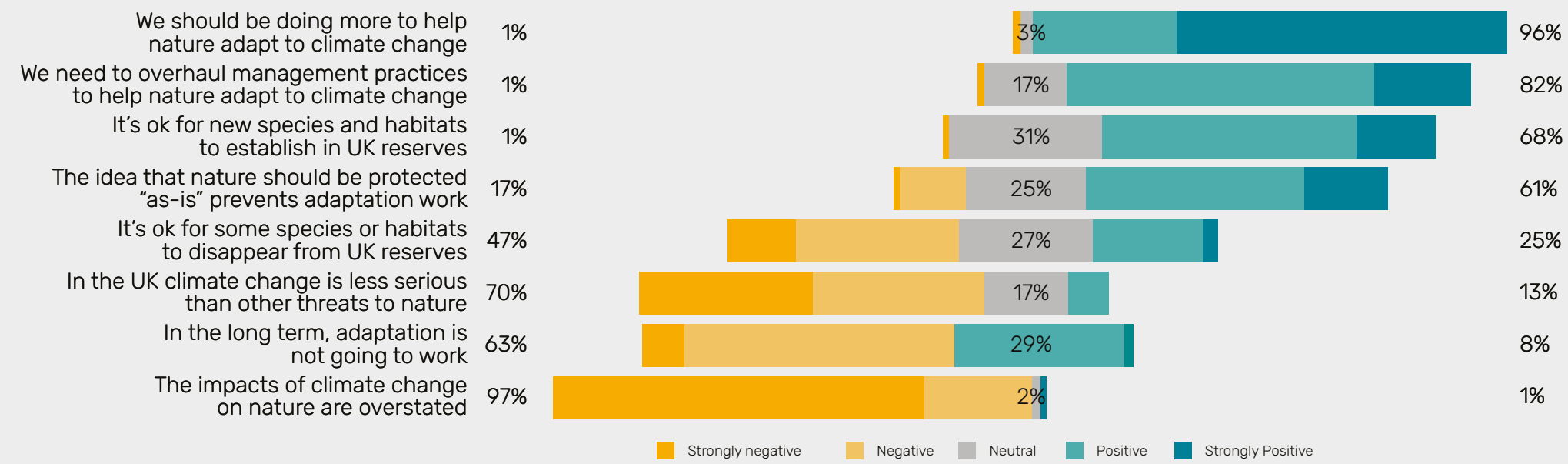
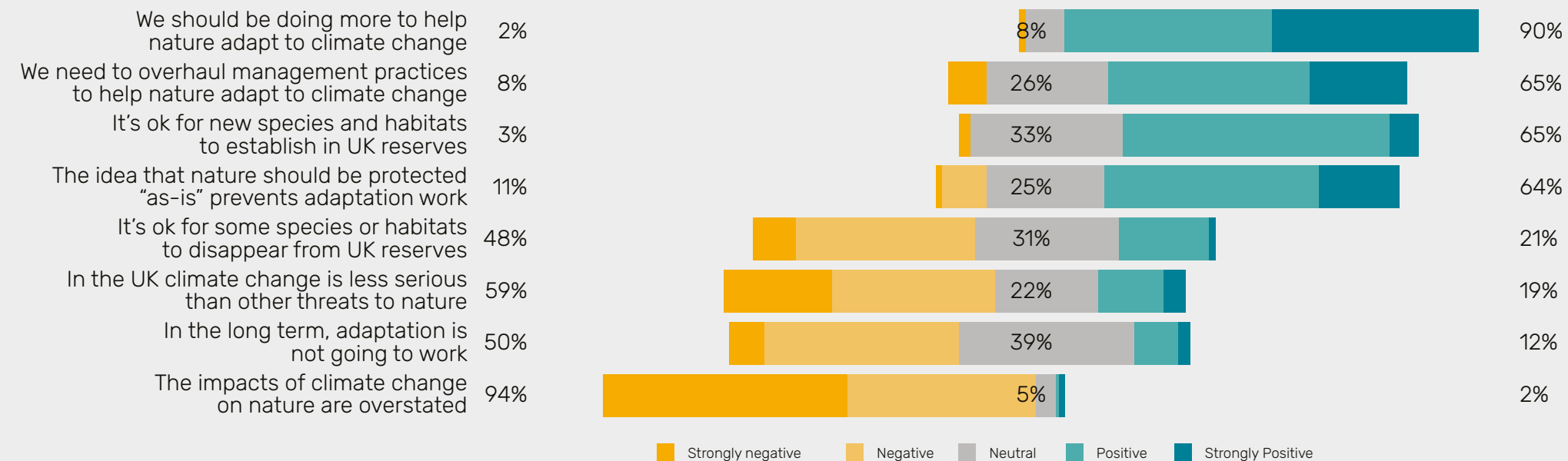


Figure 5 Attitudes to adaptation in the Wildlife Trusts between those working directly in conservation roles on reserves (frontline employees) and others (non-frontline employees).

Attitudes to adaptation: frontline Wildlife Trust employees



4 Adaptation theme – peatlands

Peatlands cover about 12% of the UK's land area, making up a significant part of the global peatland resource. They include blanket bogs and raised bogs occurring in acidic, low nutrient conditions often in upper catchments, and more productive fens, typically found in lower-lying areas, all of which are home to communities of plants and animals that are highly specialised. Occurring in places that are constantly waterlogged, they form where dead plant material cannot fully break down and so accumulates as peat. Undamaged peatlands represent vast stores of carbon, formed over thousands of years as carbon dioxide removed from the air by peatland plants is 'locked in' to the peatland soils as they form. Between them, peatlands are a major UK carbon store, containing upwards of 3.2 billion tonnes of carbon. They must remain wet to prevent this carbon from being released; damaged peatland represent a large source of UK greenhouse gas emissions with over 15 million tonnes of carbon dioxide equivalent emitted per year⁸.

In total, The Wildlife Trusts are actively restoring and monitoring over 50,000 hectares of peatland, both within our direct ownership and in partnership with others. These special places are home to multi-coloured soil-building Sphagnum mosses; dragonflies, butterflies and other invertebrates (such as the large heath butterfly); insect-eating carnivorous plants (sundews, butterworts and bladderworts); flat sedge, toads, adders and birds including hen harrier, reed bunting, lapwing, curlew, hobby and black-throated diver.



Risks and priority actions

Peatlands and the wildlife they support are at risk from water scarcity, increased wildfire, drought, extreme heat and changes in seasonality. When they are drained, they are particularly vulnerable to damaging fires, as dry peat will burn as well as the surface vegetation and can be extremely difficult to extinguish. The key actions we outlined in *Changing Nature* to help peatlands and their wildlife to adapt included:

- Preparing wildfire management plans for peatland sites, to reduce the likelihood, severity and impact of future wildfires.
- Raising the water table within and around peatland sites to prevent them drying out, to reduce fire risk and to slow the passage of fire – particularly at times of low precipitation.
- Restoring healthy peatland vegetation on damaged and degraded sites, to reduce fire-risk from the presence of dry grasses and woody plant matter and to reduce peat erosion from wind and rain.
- Restoring peatland habitat on peat soils that have been converted into arable farmland or productive grassland in the past, to increase the availability of suitable habitat for specialist peatland species and to increase the resilience of their populations by making peatland areas bigger and providing stepping stones between existing peatland sites.
- Slowing the flow of water out of upland peatland areas as a contribution to managing downstream flood risk in urban areas – particularly at times of high precipitation.

Impacts in 2023/24

Shropshire Wildlife Trust's engineering works to re-wet peatland at Charles Sinker Fields were significantly delayed due to unseasonably high rainfall, leading to high volumes of surface water and ground saturation. Lancashire Wildlife Trust have similarly delayed sowing of cotton grass in their paludiculture sites due to wet weather delaying ground preparation, as well as causing access issues to other sites. This is likely to reduce the number of crop rotations for the 2024 growing season. Trench bunding work on two areas of Somerset Wildlife Trust's Westhay Moor were also postponed until 2024/25 due to high volumes of surface water in the catchment and saturated ground conditions following a very wet autumn which continued into winter.

A predominantly wet year in Cambridgeshire from autumn 2022 (including very wet autumnal weather in March, April and July 2023), allowed the Great Fen, managed by the Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire, to recover from the summer drought of 2022, when local temperatures reached 39°C. This weather-induced recovery has continued through a predominantly wet autumn, winter and spring, from October 2023 through to March 2024.



4 Adaptation theme – peatlands

Progress in 2023/24

The Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire acquired Speechly's Farm, enabling a further 134 hectares of former arable degraded peatland to be re-wetted and added on to the Great Fen, finally linking Holme Fen and Woodwalton Fen National Nature Reserves. It allows the creation of additional areas of several different habitats including open water, reedbed, marsh, wet grassland and drier grassland, plus a 5.9 hectare area of paludiculture. This brings the total contiguous land area under conservation management at the Great Fen up to 1,900 hectares and makes it one of the largest restoration projects of its type in Europe.

A full and steadily expanding programme of monitoring and research at the Great Fen has included a programme of species and greenhouse gas monitoring (in partnership with the UK Centre for Ecology and Hydrology), to document the impacts of raised water tables on wildlife and the environment.

Research at the Great Fen has expanded the investigation of various aspects of paludiculture (as an economically productive alternative land use to traditional farming in landscapes surrounding high nature conservation value peatlands). It now includes several research partnerships looking at the production, processing and manufacture of construction board from *Typha* (one of the Great Fen's trial paludicultural crops), the use of drones for *Typha* seeding, improved methods of cultivating commercial crops of both *Sphagnum* moss and *Typha*, and the economics of scaling up paludiculture across the wider landscape.

In the 23/24 restoration season, the Yorkshire Peat Partnership (YPP) completed restoration work on 7,321 hectares and surveyed 3,560 hectares of upland blanket bog. Since its establishment in 2009, YPP, led by Yorkshire Wildlife Trust, has restored or is restoring 46,900 hectares of bog habitat which represents 50% of the total estimated upland blanket bog in Yorkshire.

Shropshire Wildlife Trust has started working with Harper Adams University and farmers in peatland areas within their county to develop ways to boost peatland habitats and ecosystems while maintaining food production⁹. Work to improve the management of water resources and carbon stocks, to re-wet peat soils and to explore the economics of sustainable food production will continue during 2024. It will include better mapping of Shropshire's peat soils.

Cheshire Wildlife Trust produced assessments of extent, condition, greenhouse gas emissions, and biodiversity value of all the peatlands in Cheshire West and Chester (covering more than 3,000 hectares), and of those owned by Cheshire East Council (covering 181 hectares). The reports highlighted the potential for peatland protection, restoration and enhanced management to contribute to the local authorities' strategic objectives for both biodiversity and climate change. The reports will now feed into Cheshire's Local Nature Recovery Strategy and into other environmental action plans, where it is hoped they will deliver benefits for both climate change adaptation and greenhouse gas emission reduction.

The Fens East Peat Partnership¹⁰ – a partnership of three Wildlife Trusts¹¹, National Trust, RSPB, Natural England, and farmers and landowners working across the fenlands of Lincolnshire, Cambridgeshire, Norfolk and Suffolk – started implementing peatland restoration plans at 20 fenland sites covering over 1,300 hectares. The work includes managing water levels within the sites to restore fen habitat, increase fenland biodiversity and reduce greenhouse gas emissions. The knowledge and expertise gained is being shared widely with other land managers in peatland landscapes.

Somerset Wildlife Trust began its first season of groundwork to re-wet the remaining lowland peat on Westhay Moor, the second site for this kind of hydrological intervention in Somerset behind Somerset Peatland Partnership project partner site Shapwick Heath, owned and managed by Natural England.

Evidence gaps

We still don't understand precisely how the fortunes of our peatlands will change. Typically drier summers, hotter and more intense periods of heatwave and drought, and more variable and intense precipitation are extremely likely to challenge the long-term viability of these habitats (as well as that of land uses that impede the recovery of peat landscapes, such as drainage-based agriculture). Specific evidence needs include better understanding the spatial risk profile for different peatland sites, whether and which new species may arrive on these sites, and how any changes could impact wider landscapes.

We also want to better understand what approaches to water management, habitat restoration and land management in areas with peat soils will provide the greatest chance of successfully sustaining peatland ecosystems and retaining their carbon stores. This includes economic assessments of paludiculture trials, which several Wildlife Trusts are undertaking.



Peat extraction
© Peter Cairns/2020VISION

5 Adaptation theme – grasslands

Grasslands across the UK include a variety of rare and internationally important habitats, from chalk downland, to species-rich wildflower meadows, to ancient hay meadows. The Wildlife Trusts own and care for some 22,000 hectares of grasslands across the UK, not including heath, arable, and tall herb habitats which, combined, account for an additional 18,000 hectares. Through the management of these reserves, Wildlife Trusts in turn support species such as lapwing, curlew, rare orchids and numerous butterfly species.

Risks and priority actions

Grasslands and the wildlife they support are at risk from increased wildfire, drought, extreme heat, and changes in seasonality. The key actions we outlined in *Changing Nature* to help wildlife to adapt to increasingly extreme weather conditions on grasslands included:

- Creating microclimate habitats for insects, such as using butterfly banks to increase the availability of shady areas in grasslands during periods of extreme heat.
- Improving habitat connectivity to help grassland species to move, connecting up rare grassland habitats through restoration on reserves and identifying 'stepping stone' habitat blocks to allow movement through the landscape.
- Changing grazing regimes for conservation grazing livestock on grasslands to match changes in grass growth through the year.
- Working in partnership with neighbouring landowners to reduce the risk of wildfire on grassland reserves.

Impacts in 2023/24

Many Trusts' grassland areas have been impacted by wetter than average conditions in 2023. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust faced severe delays to hay cutting due to wet conditions. Some areas that had been battered to the ground by heavy rain could not be cut at all and the hay was lost. Livestock have also been moved to drier areas in Oxfordshire and fewer areas were available for conservation grazing due to flooding. Similarly, Worcestershire Wildlife Trust missed some hay cuts leading to lower overall yields, and wet weather led to reduced grazing on areas that have been historically grazed through the summer.

The Wildlife Trusts also manage grassland sites that act as flood storage areas for periods of high rainfall. For example, Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust recorded beneficial flooded conditions for wading birds at their Upper Ray Meadows reserve, which supported much greater numbers of wetland wading birds through the winter of 2023/24. The opposite has been the case at Yorkshire Wildlife Trust's Wheldrake Ings nature reserve in East Yorkshire, which is part of the Lower Derwent National Reserve Site of Special Scientific Interest (SSSI). The series of recent wet winters have been beneficial to the floodplain plant communities of the site but the late flooding of spring 2024 has impacted on breeding waders and reduced the window of opportunity for conservation grazing, which is critical to maintain the botanical communities of the SSSI.

Some Wildlife Trusts reported declines in butterflies across their reserves in 2023, thought to be caused in part by the summer drought in 2022 killing caterpillars due to lack of food, and warmer winters leading to greater winter survival rates for butterfly egg parasites.



5 Adaptation theme – grasslands

Progress in 2023/24

Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust have spent decades restoring grassland habitats to support and improve the resilience of rare species. In 2023 they recorded the highest ever number of glow worms recorded at Whitecross Green Wood nature reserve near Bicester, where staff and volunteers have been working for years to optimise the grassland habitat. Volunteer surveyors counted 303 glowing females in the summer – the highest total since the census started in 1999. The Trust is also taking steps to protect species like Curlew. At the Chimney Meadows reserve on the banks of the Thames in West Oxfordshire, a pair of curlew again bred after the nest was protected with an electric fence, and two young successfully fledged.

The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire are starting to collect valuable data from their Banking on Butterflies programme. The project set out to test the relationship between butterfly distribution and behaviour at different temperatures around artificially created experimental mounds built at two of the Wildlife Trust's chalkland nature reserves, Pegsdon Hills and Totternhoe. Similar butterfly banks have also been constructed by Wiltshire and London Wildlife Trusts. The Trust has recently published results showing how butterfly activity was changing on the sites on the very hot days in July and August 2022. Researchers found that at temperatures between 30 and 35°C, butterflies flew more (feeding, mating and defending territories), but above that, flight activity fell rapidly as they sought shelter. At very high temperatures, there was a significant increase in the number of butterflies found in the shade provided by sheltering scrub and artificial butterfly banks. During surveys at lower temperatures, large patches of shade contained few, if any, butterflies, demonstrating that species only made use of the shade when experiencing very high temperatures. Results comparing butterfly body and air temperature support the idea that butterflies were using the banks specifically to cool down.

The Met Office has undertaken a series of pro bono research projects for The Wildlife Trusts in 2023/24, two of which are related to grasslands.

The first project is looking at the relationship between weather data, such as rainfall and days of sunshine and water levels in a fen site owned by Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust, and specifically at when drought conditions are reached for specialist plant communities such as the mire community 'M13' (*Schoenus nigricans* – *Juncus subnodulosus*). This data will hopefully indicate where/when the fen is fed by rainwater and where/when it is fed by the aquifer. This will provide the first steps in being able to manage on-site water levels to try to ensure that the fen remains sufficiently wet throughout the year, to prevent drought impacts regularly occurring. The second project is looking at the relationship between chalk grassland butterfly abundance (using species such as chalkhill blue and small heath) and a range of weather variables such as mean air temperature, precipitation, and sunshine duration. Understanding the weather drivers behind butterfly abundance at a site level will help inform management activities, for example by providing more scrub or tall vegetation and thus greater levels of shade refuges during hot summer days.

The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire have also experimented with reprofiling of grassed rides in their Waresley and Gransden Woods reserve, in an effort to reduce the effects of footfall on path structure and drainage during wet winters. The reprofiling done so far is leading to good results, with improved drainage and reduced path erosion and vegetation loss.

Norfolk Wildlife Trust are adapting annually cultivated turf strips in the Brecks. A tractor mounted rotovator turns over the turf to provide conditions for specialist annual flora, ground nesting birds and invertebrates. These also double-up as firebreaks as the combustible material is buried under the surface, which helps the Trust to manage the threat of wildfires on their heathlands. The Trust's Grimston Wetscapes project is embarking on further restoration of parts of NWT Roydon Common and Tony Hallatt Memorial Reserve. The land forms part of a large area of globally important wildlife habitats, including predominantly wetlands (wet heath and mire) as well as woodlands.

Evidence gaps

A key priority for grassland research is to better understand how the ecosystem services that grasslands provide, including carbon storage, may alter in different locations as a result of climate change impacts. We also need to understand wider risks to grassland soils from more prolonged and extreme periods of flood and drought, and how grassland species such as butterflies may move through the landscape as average conditions change over time, including through Wildlife Trust reserves. More real-time data to monitor changes in distribution and behaviour of different species in response to changing conditions would be very valuable.



Brown argus
© Amy Lewis

6 Adaptation theme – woodlands

Across The Wildlife Trusts we manage over 24,000 hectares of primarily broadleaf woodland. Our woodlands are materially important for sequestering carbon, with at least 30,000 tonnes and possibly up to 80,000 tonnes of carbon dioxide equivalent being locked up each year. We care for a diverse range of woodland habitats from ancient beech woodlands in the east to temperate rainforest in the west.

Risks and priority actions

Our woodlands and their associated wildlife are at risk from all climate hazards – wildfire, wind throw, extreme heat, drought and flooding. The priority adaptation actions we identified in *Changing Nature* to increase woodland resilience included:

- Mixed planting and firebreaks to reduce the risks from wildfire, as well as public awareness campaigns on how to reduce wildfire risk.
- Changing water table management to try to adapt to increasing extremes of dry and wet weather.
- Active management of invasive pests and diseases, and using natural regeneration to reduce future risk from systemic diseases like ash dieback.
- Considering our planting mix for future as well as current resilience, using Forestry Commission guidance.
- Maximising the role of our woodlands as nature-based solutions, including for enhancing water quality, urban cooling and flood mitigation.

Impacts in 2023/24

In 2023, Trusts have reported numerous impacts on woodlands and woodland species which are thought to have some link to climate change. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust reported through its annual count of hazel dormice a drop in numbers from over 100 in 2004 to just two individuals. Warmer winters could be part of the decline which disrupt hibernation behaviour. At the same time, the Trust have had to spend hundreds of thousands of pounds in one year alone in managing the effects of ash dieback across their woodlands. This is a very significant cost for any organisation, but particularly for charities.

The extreme conditions in 2023 also led to management practices altering around the weather. Worcestershire Wildlife Trust were prevented from doing any willow pollarding on their wetland reserves due to prolonged rainfall, as well as being delayed in managing woodland ride cutting.



Progress in 2023/24

The Aviva Temperate Rainforest Programme is one of the largest woodland creation projects currently underway across The Wildlife Trusts. Its aim is to create approximately 1,800 hectares of new temperate rainforest over the next century; in 2023/24 the first 145 hectares were secured across parts of Devon, Wales and the Isle of Man. As a UK-wide programme, with a 100 year timeline it is directly impacted by climate change. As the name implies, these woodlands require humid, temperate conditions all year round to survive. The UK's remaining fragments of this globally rare habitat are found along the damp Atlantic fringes of the west and north of the British Isles. Temperate rainforest needs relatively high annual rainfall, which is well spaced throughout the year, cool average temperatures and high humidity to thrive. The risks posed by a warming, drying climate to this habitat are evident, so a number of measures are embedded within the programme to mitigate these future threats.

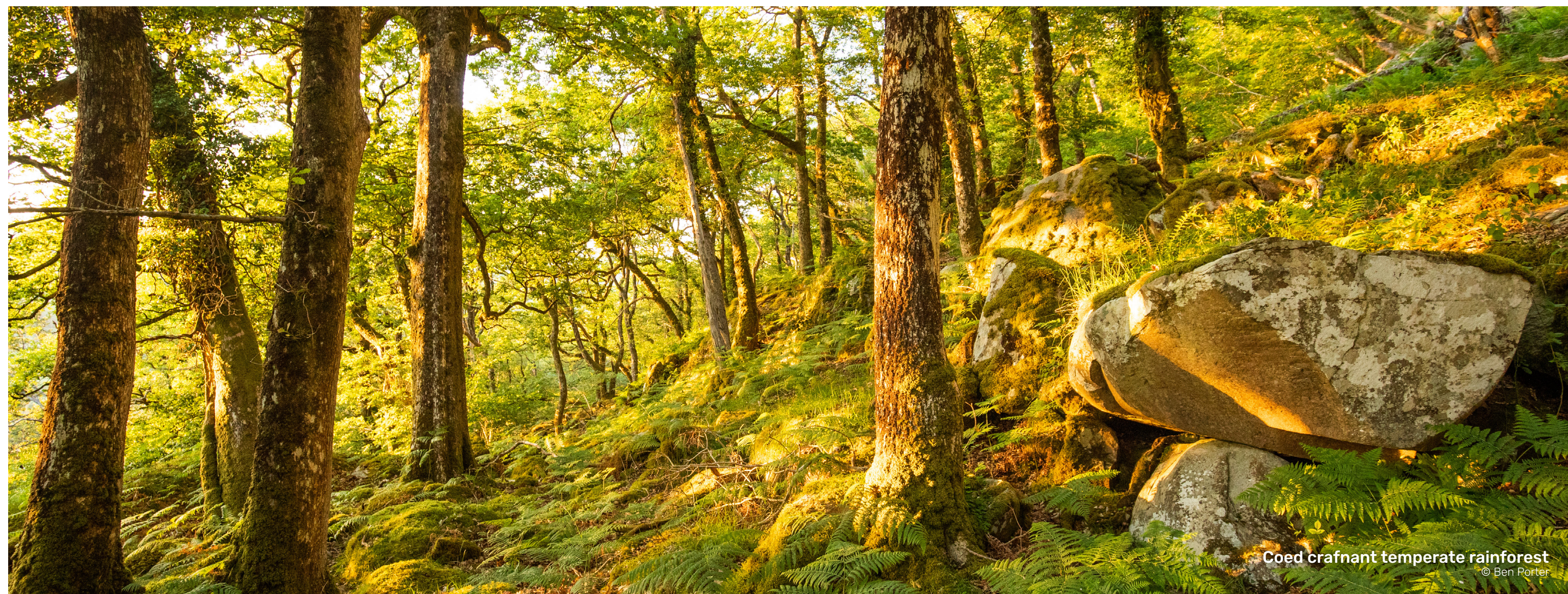
Firstly, site location is considered carefully. We are prioritising sloping sites with sufficient elevation gain to offer opportunities for 'topographical shift'. It is suggested that plants and animals will migrate up the elevational gradient in search of cooler conditions. In addition, northerly aspects are favoured as these always provide cooler, shadier conditions with higher soil moisture values to maintain humidity. Sites with existing running water are also targeted as streams and rivers create humid microclimates which can provide refugia for species such as bryophytes and lichens needing damper conditions. Secondly, a mix of tree species are being planted, all tailored to local growing conditions. We use a mid-range 2050 climate warming model embedded in the Forest Research Ecological Site Classification (ESC) tool to predict the environmental suitability of chosen

tree species at our Aviva sites. The seedlings used are locally sourced wherever possible to maximise suitability alongside utilisation of natural colonisation where seed sources are available on site. Finally, adaptive management is being considered in all plans. All Aviva sites are being registered through the UK Woodland Carbon Code (WCC) which provides a mechanism to model carbon sequestration over 100 years. This requires regular site surveys to ensure trees are growing as expected, giving the iterative opportunity to replace and substitute species where needed as conditions alter on site. As humidity is key to the successful establishment of rainforest conditions, consideration is being given to the creation of more water storage on the sites through physical interventions such as pond creation, stream re-routing and drainage management. Maintaining water all year round underneath the maturing canopy will further buffer the impact of drier summers.

More widely, adaptive woodland management is increasing across the UK, including in The Wildlife Trusts. Cheshire Wildlife Trust for example have planted 11,000 trees on a 35 hectare upland farm in the Pennine fringe as part of a resilient agro-forestry scheme.

Evidence gaps

There are many examples internationally of improving the resilience of woodlands to warming climates, including through increasing water retention, combatting wildfire risk and diversifying stands, much of which can be applied or trialled in a UK context. What is less understood is how to establish new woodlands which are resilient to future climate change. Further research is needed into the best methods of establishment that are scalable and minimise carbon leakage. The Temperate Rainforest Restoration Programme is developing a research programme to delve into these types of questions. By working collaboratively with academic partners and other non-governmental organisations we hope to gain deeper understanding around successful woodland establishment. Some Trusts have also experimented with different options to see what works. For example, Yorkshire Wildlife Trust have stopped using tree guards for their planting at Wild Ingleborough, as they found that the guards were leading to rapid growth but then trees failing at 5 to 10 years due to high wind damage. Learning from these kinds of tests and trials is being shared across the federation.



Coed crafnant temperate rainforest
© Ben Porter

Across The Wildlife Trusts we manage nearly 800 km of water courses (rivers and streams) as well as numerous lakes, ponds and freshwater wetland habitats. The vast majority of rivers in the UK have been modified over time; deepened, straightened, and embanked to increase water flow and improve navigability, or impounded to create a head of water for milling, power generation and irrigation. These actions create artificial water level regimes and barriers to species movement, have often resulted in rivers being cut off from their floodplains and have degraded or removed the freshwater habitats that many species rely on. In the UK, we also care for internationally important and globally rare chalk streams, 85% of which are found in the UK. As shallow, slow-flowing rivers, these habitats are especially vulnerable to the impacts of climate change; experiencing low flows and high temperature in dry summers which can be fatal for the plants, fish and insects the streams support.



Brown trout swimming through a freshwater lake

© Alex Mustard/2020VISION

Risks and priority actions

Freshwater habitats are clearly at risk from drought and low flows, as well as heatwaves increasing water temperature, and even wildfire for ponds. We want our floodplain habitats to act as a natural defence during times of flood, while also protecting our other habitats from excessive flooding. The priority actions identified in *Changing Nature* included:

- Natural flood management schemes to increase habitat condition and reduce the risks of flooding for people.
- Beaver re-introductions to assist in managing water levels.
- Reducing water temperatures through tree planting, in order to prevent de-oxygenation and harmful algal blooms.
- Advocating for reductions in pollution loads to rivers and freshwater bodies, which exacerbate low water quality during times of low flows.
- Recording and controlling freshwater invasive non-native species.
- Creating new freshwater habitats to improve habitat condition and connectivity.
- Re-wetting of marshes and other wetland habitats to support rare plants and animals.

Impacts in 2023/24

Shropshire Wildlife Trust reported high volumes of surface water, ground saturation and raised river volumes over the winter of 2023/24, impacting all practical delivery projects with delays to pond, wetland and river restoration projects on the River Worfe and the Strine. Norfolk Wildlife Trust reported similar impacts from extremely high water levels and flooding on the River Thurne and across the Norfolk Broads following the wettest February on record and prolonged heavy rainfall over a number of months. At Thompson Common in Norfolk the extremely wet winter of 2023/24 has threatened the fragile wetland habitats. Pingo ponds, glacial relics that are groundwater fed, can become inundated with run-off from neighbouring farmland. The Trust is working in partnership with The Woodland Trust, who have recently purchased land adjoining the site, to ensure sustainable water management in the future.

In West Cornwall, where water quality monitoring is conducted as part of the Upstream Thinking Project, all monitoring sites deteriorated slightly for colour, dissolvable carbon (DOC), turbidity and phosphorus compared with 2022. This was likely due to more frequent and heavy rainfall experienced over the year.

In Cheshire and Lancashire, Wildlife Trusts have observed the spread of invasive non-native plant species including Japanese Knotweed, Himalayan Balsam and Water Fern (*Azolla*) to new areas, due to flooding events.

Some benefits have also been observed. Yorkshire Wildlife Trust are monitoring a mass germination of a rare sedge at their Askham Bog SSSI nature reserve in York. Two thousand of the rare Slender Sedge (*Carex lasiocarpa*) plants were observed in spring 2024 after only a single flowering plant in 2023, thought to be due to the wet winter and inundation of the site into spring.

7 Adaptation theme – freshwater

Progress in 2023/24

The Wildlife Trusts' beaver population continues to increase with new kits born at Hatchmere in Cheshire, and at Dorset Wildlife Trust's enclosed beaver site in West Dorset. Cornwall Wildlife Trust is preparing a licence application for a wild release of Eurasian beavers to Helman Tor Nature Reserve south of Bodmin. The reserve is over 300 hectares in size including significant areas of wet grassland, fen and wet woodland. In the Cornwall Climate Change Risk Assessment, these wetland habitats are classified as being at a high risk due to the likelihood of increasing drought periods. One of the drivers for bringing beavers back to Helman Tor is that dam building will hold more water back on the site during drought, therefore increasing the site's resilience. An added benefit is that the community of Par and St Blazey downstream is increasingly suffering from fluvial flooding, and the beavers could help to reduce this too.

Numerous Trusts are involved in large-scale catchment partnership programmes which aim to improve the health and resilience of the freshwater environment. Some updates in 2023 included:

- Herefordshire and Radnorshire Wildlife Trusts' Wye Adapt to Climate Change programme aims to build resilience across the wider Wye catchment. The programme works with landowners to identify nature-based solutions covering everything from natural flood management to improved soil health to carbon sequestration. The Trusts' officers are working with landowners to identify the opportunities best



Leaky dams in operation in Herefordshire – Wye Adapt Programme

represented on their land that will have the greatest impact and supporting the landowners to identify funding opportunities.

- Herefordshire Wildlife Trust have also targeted landowner advice on natural flood management through their Restoring our Rivers project. Funded by the Environment Agency and local donors, they have supported seven farms to introduce natural flood management, including implementing leaky dams, fencing off water courses and adding in cross-slope hedgerows. A dedicated group of local volunteers will continue to monitor the impact of these interventions over the next year through data loggers, camera traps and regular surveys.
- Shropshire Wildlife Trust have continued river restoration work along the River Worfe. This is funded by Severn Trent Water who are working with partners across the region to remove or offset the environmental impacts of abstraction and to help the associated rivers and water bodies achieve Water Framework Directive (WFD) objectives. Shropshire Wildlife Trust have been able to leverage additional funding from the Environment Agency and work with landowners to deliver extensive floodplain reconnection, meander reconnections, wet woodland management, invasive non-native species treatments, leaky dams, fencing off water courses and planting reedbeds.
- Shropshire Wildlife Trust have built a portfolio of flood-related projects over the past year, including the Shropshire Slow the Flow 2 programme and Severn Valley Water Management Scheme Demonstrators, delivering projects on both farmed and urban sites.
- Radnorshire Wildlife Trust launched the Wilder Lugg project at the beginning of 2024 - working with the rural community to implement Natural Flood Management interventions and habitat creation along the upper reaches of the Welsh River Lugg. The Wilder Lugg project also supports increased citizen science efforts along the river, providing training and opportunities to involve the local community in the river's restoration.

Evidence gaps

The Wildlife Trusts have a particular interest in the role of wetlands and freshwater systems as nature-based solutions, and more research on the effectiveness of measures like natural flood management is still needed; specifically what is happening on the ground across individual sites. In 2024, RSA Insurance are funding research through a number of Trusts to help us assess the wider benefits of our own natural flood management schemes. This work, undertaken by Stantec, will be published in early 2025. We also need a better understanding of how and where water companies are targeting pollution and over-abstraction so that Trusts can align their river and other freshwater restoration activities.

Another area where more research is required is on the efficacy and potential trade-offs of using wetlands to reduce river pollution from wastewater treatment works, to give regulators greater confidence in allowing funding for these solutions which also deliver carbon and biodiversity benefits.



Restoration location for the River Lugg - Radnorshire Wildlife Trust

8 Adaptation theme – marine and coastal

The UK has approximately 17,800 km of coastline cliffs, rocky shores, sand and shingle beaches, sand dunes, mudflats, saltmarshes and machair. Reserves owned and managed by the Wildlife Trusts cover approximately 7,050 hectares of coastal habitat. These areas are critically important for invertebrates, breeding and overwintering birds, seals and a variety of coastal plants. Beyond the coastline, UK waters are also home to a range of marine habitats, including rocky and living reefs, deep-water corals, kelp forests, seagrass beds, and both shallow and deep-sea sediments. These habitats provide food and shelter for a variety of species such as marine mammals, seabirds, fish, crustaceans and other invertebrates like worms, starfish and anemones.

Whilst the Wildlife Trusts do not own or manage marine reserves, many Trusts collaborate with other organisations on projects to protect and restore marine habitats. We are also actively involved in campaigning for marine protection, engaging in fisheries policy, surveying coastal and marine areas, advising on development at sea and running events to educate and inspire people about the sea.

Risks and priority actions

Coastal habitats and species are at risk due to coastal flooding, erosion, and other hazards typical of terrestrial habitats such as drought and extreme heat. Marine species and habitats (including fisheries) are at risk from pests, pathogens and invasive species as well as changing climatic conditions, including ocean acidification and higher water temperatures. The *Changing Nature* report highlighted key actions for the Wildlife Trusts to help marine and coastal habitats adapt, including:

- Scope out available evidence and undertake research to inform us of priority coastal realignment sites and risks to our coastal assets from sea level rise.
- Review how we can monitor new species that are arriving on our reserves and in marine protected areas around the UK.
- Working in partnership with relevant stakeholders, assess what additional adaptation actions can be taken to help marine wildlife to adapt to climate change.
- Report on new species arriving and species being lost across our reserve network and marine protected areas around the UK.

Impacts in 2023/24

The UK experienced a severe marine heatwave in June 2023 lasting 16 days, in which temperatures reached a peak of 16°C instead of a typical 13.5°C⁵. Wildlife Trusts have observed impacts on marine species distributions and breeding times thought to be caused by warming sea temperatures. For example, Manx Wildlife Trust reported that seal pups are being born a few weeks earlier on the Calf of Man, thought to be due to sea temperatures being warmer. In 2023, the Arctic walrus 'Thor' was sighted in Hampshire, Yorkshire and Northumberland before making the journey to Iceland³. Walrus sightings are thought to have increased in UK waters in recent years because of increasing sea temperatures due to climate change. Warming sea temperatures leads to a reduction in sea ice which reduces habitat for walrus to rest and breed, meaning they may travel further in search of areas with good food supplies and resting spots.



Lion's mane jellyfish
© Alex Mustard/2020VISION

Progress in 2023/24

Many Trusts have been working to restore a range of marine and coastal habitats, either on Wildlife Trust reserves or through collaborative projects. These projects are helping to restore and create habitats which are important for climate adaptation, for example, through protecting coasts from storms and erosion, adapting to sea level rise, sequestering carbon and providing habitat. Some Trusts have collaborated in 'seascape' projects, looking to restore multiple habitat types. For example, Hampshire and Isle of Wight Wildlife Trust joined the Solent Seascape Project which is working to restore seagrass, oyster reefs, saltmarsh and seabird nesting habitat across the Solent. Lincolnshire and Yorkshire Wildlife Trusts are working with Ørsted on 'Wilder Humber', which aims to restore sand dune, seagrass, saltmarsh and native oysters. The North Sea Wildlife Trusts are part of the Stronger Shores project working on oyster, seaweed and seagrass restoration to help protect against flood and coastal erosion. Essex Wildlife Trust are continuing to manage multiple managed realignment sites such as at Abbott's Hall and Fingringhoe Wick Nature Reserve.

With Norfolk Wildlife Trust's Cley and Salthouse Marshes nature reserve at increasing risk of severe storm events, the decision was made to allow natural functioning form to return to the shingle bank sea defences. Interventions are aimed at aiding the rapid evacuation of salt floodwater allowing the reserve with its precious freshwater habitats to adapt to the ever-changing shape of this dynamic stretch of coastline. In September 2023, work started to move a vulnerable section of the New Cut flood drain to the south, so it can continue its vital role in maintaining freshwater habitats while allowing natural functioning coastal shingle roll back to occur. The project also reprofiled the North Scrape and rejuvenated an area of reedbed with the addition of innovative pseudo-creeks to assist the natural adaptation to changing habitats.

Norfolk Wildlife Trust's Wissey Wetlands in the Fens also continues to provide an important breeding site for reedbed birds. This site was created in collaboration with the Environment Agency from farmland to compensate low-lying coastal wetland under threat due to sea level rise. Cheshire Wildlife Trust experienced an early summer heatwave in 2023 and worked hard to maintain coastal ponds to support local species. Their efforts resulted in an exceptional year for rare natterjack toadlets at Red Rocks Marsh.

Alderney Wildlife Trust has undertaken the first ever baseline survey of invasives in Alderney, identifying two new invasive species on the island,

pacific oyster and devil's tongue weed, which has spread to the whole bay. The Trust is currently at the monitoring stage to establish a baseline before identifying appropriate measures to reduce their spread. Cornwall Wildlife Trust is in its 20th year of intertidal monitoring surveys on Looe Island Marine Nature Reserve, monitoring changes in the zonation of species and distributions of non-native species as a result of climate change.

The Wildlife Trusts have continued campaigning for and contributing to consultations for further marine protection. In July 2023, three highly protected marine areas (HPMAs) were designated by Defra which will benefit the recovery of marine habitats and species. In March 2024, the Marine Management Organisation also introduced a byelaw prohibiting bottom towed fishing gear in 13 marine protected areas (MPAs), benefiting habitats such as subtidal biogenic reefs which are important natural carbon stores.



Evidence gaps

Less than 30% of Marine Protected Areas (MPAs) are reported to have all features in either a recovered or recovering status, with 48.4% thought to have at least one feature in a degraded or degrading condition. The condition of the remaining sites is unknown. This evidence is needed because damaging activities still occurring in MPAs limit the ability of marine habitats to sequester and store carbon and protect the coast from erosion and flooding. In the North Sea region, stocks of carbon within the existing MPA network are estimated to hold 19.4 million tonnes of organic carbon, accounting for 51.9% of the total organic carbon stores in the region¹².

Industries such as fishing, oil extraction, offshore wind and aggregate extraction taking place in the marine environment limit the space available for habitats to recover. There is a lack of spatial planning for these industries in a way that supports nature protection and restoration. At the coast, we are seeing increasing sea defences as sea levels rise due to climate change. Man-made defences stop coastal habitats moving further inland meaning many soft shorelines are disappearing rather than building up naturally and adapting over time. There is a lack of data and mapping of areas which are suitable for coastal realignment, and for other nature-based solutions to sea level rise.

There is also uncertainty around carbon sequestration rates from marine and coastal habitats, as well as methane and nitrous oxide emissions from habitats such as seagrass. This demonstrates the need for long term funding for research and practical restoration work. Work to map existing and suitable areas for marine and coastal habitat restoration is ongoing and hopefully will support future restoration efforts.

Restoration examples

Kelp – Sussex Wildlife Trust have supported kelp restoration efforts as part of the Sussex Kelp Recovery Project.

Native oysters – Ulster Wildlife and Belfast Harbour have created an oyster nursery with around 700 native oysters suspended in cages to help restore oyster reefs in Belfast Lough.

Seagrass – Essex and Hampshire & Isle of Wight Wildlife Trusts have both been part of the LIFE Recreation ReMEDIES project. Essex Wildlife Trust are working with Project Seagrass to carry out surveys and trial methods for seagrass transplants, and Hampshire & Isle of Wight Wildlife Trust are leading similar trials through the Solent Seascape Partnership. Both projects include conducting extensive surveys of existing seagrass, as well as trialling transplants with a view to expanding this at various sites. North Wales Wildlife Trust also joined Project Seagrass to plant and monitor seagrass at Pen Llŷn. Through the Wilder Humber Project, Yorkshire and Lincolnshire Wildlife Trusts supported by Ørsted have continued restoration of seagrass habitats in the Humber Estuary. In the last two years, around 8 hectares of new and enriched seagrass areas have been planted at Spurn Point on the north bank of the estuary. This is complemented by the ongoing native oysters restoration pilot and new field station providing nursery facilities. Cornwall Wildlife Trust are trialling low-cost methods for intertidal seagrass restoration in the Fal Estuary. The three-year project aims to develop techniques to restore Cornwall's rare dwarf seagrass beds which can then be used by local coastal communities to roll out intertidal seagrass restoration to sites where this habitat has been lost.

Saltmarsh – Essex Wildlife Trust supported the installation of a flux tower on the saltmarsh at Abbotts Hall Nature Reserve to collect data on how saltmarsh captures and stores carbon (in collaboration with the Environment Agency and the UK Centre for Ecology and Hydrology, funded by Defra's marine Natural Capital and Ecosystem Assessment programme). The Trust's use of coir rolls or 'sausages' for saltmarsh restoration continues to attract interest from other land managers around the Blackwater and Colne Estuaries, as one of the key management tools for inclusion in a proposed landscape recovery scheme.

Coastal grazing marsh – Working in partnership with the RSPB, Essex Wildlife Trust has secured over £200,000 of funding from Natural England's Species Recovery Programme to enhance its Tollesbury Wick and Howlands Marsh Nature Reserves. Through a series of interventions, including the installation of solar pumps and the creation of new foot-drains, ditches, scrapes, and water control features over 100 hectares, a significant percentage of Essex's remaining coastal grazing marshes will be re-wetted. They also secured funding from Mace to work on further coastal grazing marsh restoration at Fobbing Marsh Nature Reserve to create a new network of shallow ditches.

Sand dunes – The Wildlife Trust for Lancashire, Manchester and North Merseyside collected and planted unwanted Christmas trees in front of the Fylde sand dunes, resulting in a 90 m increase in dune width in 2023 (in collaboration with Fylde Council and Blackpool Council, funded by the Environment Agency).



9 Adaptation theme – our staff and built assets

Risks to our people and our built assets from climate impacts also forms part of our climate change risk assessment and adaptation plan.

In *Changing Nature*, risks to people and assets from flooding and extreme heat came out as urgent priorities. The types of actions we identified to help to reduce these risks included:

- Ensuring our severe weather management plans, both for flooding and extreme heat, are easily available and up to date.
- Reviewing climate impacts in our organisational risk registers and business continuity plans.
- Including passive cooling measures in new buildings.
- Adapting our buildings with property-level flood protection and utilising flood insurance as far as possible.
- Assessing risks to our buildings from non-flood hazards such as high winds.

2023 was a severe flood year for many Trusts. Lincolnshire Wildlife Trust's main office was flooded for the first time since 2007 and due to measures already built in, they were able to get the building back up and running in a matter of days. Areas of focus have been on temporary resilience measures such as removable flood barriers and absorbent flood bags. The Trust however believes it will now struggle to access flood insurance in the future due to excessively high premiums; charities, like small businesses, are not eligible under the Flood Re scheme for flood insurance subsidies. Similarly, the riverside Royal Society of Wildlife Trusts (RSWT) office in Newark had to be closed in January 2024 as the River Trent in Newark was centimetres away from overtopping its banks. The RSWT senior management team deployed the flood emergency plan for the first time in 20 years.

In terms of upskilling staff, over the past year, RSWT has been developing an in-house climate change training course which includes a session on adaptation as well as mitigation; this is now being deployed through a 'train-the-trainer' programme approach across the federation.



10 Working with others – policy

The Wildlife Trusts were active in numerous adaptation policy discussions in 2023. We provided detailed input to the preparation of the UK Government's third National Adaptation Programme, both through its biodiversity working group chaired by Natural England, and directly to the Defra climate change team. The programme, published in June 2023, continued to fall short of what is required to ensure Government is putting in place the mechanisms to enable a well-adapted UK, and we are working across a number of forums to make the case for increased attention for adaptation in general, as well as adaptation related to the natural environment:

- We are actively engaging with Natural England, including as a member of their climate change programme board, to provide input to their SSSI programme which is considering how to increase flexibility within the designations system as the climate changes. A number of Wildlife Trusts are also involved in Natural England-led case studies testing the climate change vulnerability assessment and the Resist-Adapt-Direct Framework across a range of habitats. Future Nature's Land and Farm Advice Service, the consultancy wholly owned by Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust, conducted a landscape-scale climate adaptation assessment for Natural England. This project focused on the climate impact and adaptation needs of priority habitats, particularly heathlands, deciduous woodlands, coastal floodplain grazing marshes, and rivers and streams. They aim to guide Natural England's local area team in safeguarding, managing, and prioritising sites to respond to evolving climate conditions.
- Two Wildlife Trusts, Cheshire and Nottinghamshire, were successful in being awarded funding through the Environment Agency's £25 million Natural Flood Management Fund at the end of 2023.
- We have been closely engaging with Defra on their new £750,000 temperate rainforest programme, sharing notes on our own work on monitoring and building resilience from our Aviva-funded programme.
- We highlighted the role of adaptation in our video coverage of the UN climate change negotiations, COP28, held in December 2023 in Dubai.
- We participated in Defra's adaptation public dialogue, chairing its oversight group and helping to communicate the findings of the study, including a public-led vision for a well-adapted UK, and a series of adaptation priorities that summarised the attitudes of four cross-UK groups on the role of Government. Through this engagement, the protection of nature and nature-based solutions emerged as a key priority.

- We are working with the UK Health Alliance on Climate Change, Green Alliance, The National Academy of Social Prescribing and Natural England to draw together the nature, health and climate agenda and to promote policy solutions.

The Labour Party's manifesto recognised climate change and nature loss as the greatest long-term threat the UK faces, and we strongly welcomed the inclusion of climate resilience as a priority area. The manifesto itself contained no detail on how it will protect landscapes and wildlife in the face of climate change in the short-term, but in its first 100 days we want to see the new Government do five things:

- Commit to reporting on and increase investment in climate change adaptation to protect and harness the role of nature in addressing climate change risks. At least £3 billion per year up to 2030 in nature recovery and nature-based solutions is likely to be required to match the level of increasing risk, which needs to come from a mix of Government and private sector funding. We would strongly welcome a continuation and expansion of the Nature for Climate Fund and will work to further strengthen our partnerships with Government and others to deliver nature-based solutions and nature recovery at scale.
- Commit to provide further financial support, of at least £1 million per year, to its arm's length bodies across the UK to provide bespoke adaptation advice to organisations who need it, including charities.

- Ensure that adaptation is coordinated effectively across the whole of Government; we recommend moving the coordinating role from Defra and placing it in Cabinet Office under a dedicated resilience Minister.
- Follow through immediately with key policy decisions which have been delayed or blocked, which will significantly improve the resilience of the natural environment and provision of nature-based solutions:
 - Ban the sale of peat for use in the amateur gardening sector.
 - Grant the first wild beaver release licences.
 - Make resilience a core component of the long-awaited Government land use framework.
 - Enhance regulation and enforcement to improve water quality in freshwater bodies, cracking down on agricultural pollution as well as sewage discharges, and facilitating the use of nature-based solutions.
- In addition, we strongly welcomed the ban imposed in 2024 on sandeel fisheries in the North Sea and look forward to seeing this continued.



Landscape-scale partnerships

Working in partnership is core to the ethos of The Wildlife Trusts, and is especially important for working on landscape-scale resilience programmes. Every Wildlife Trust has partnership programmes on adaptation underway in some form or other.

Many of these partnership approaches operate across catchment scales or target broad habitat types such as peatlands. Some of the notable developments in 2023 included:

- Yorkshire Wildlife Trust were awarded c£750k for the UreDales Landscape Recovery Scheme pilot in the western Yorkshire Dales. The project development phase will work with 15 landowners in the next two years to find a sustainable land management model for this uplands area including peat restoration, woodland and scrub establishment.
- Shropshire Wildlife Trust are active in the River Severn Partnership and in particular Severn Valley Water Management Scheme where they have worked to develop two major 'demonstrator' projects to be delivered between 2024 and 2027, one urban 'ed-pave' project and another in the River Perry catchment. Shropshire Wildlife Trust also co-host the Shropshire Middle Severn Catchment Partnership (CaBA) that enables cooperation and networking between the stakeholders of the wider catchment.
- Gloucestershire Wildlife Trust are a key partner in Natural England's Nature Returns scheme.
- Herefordshire Wildlife Trust, Radnorshire Wildlife Trust and the Wye Valley National Landscape Partnership are delivering the 'Wye Adapt to Climate Change' programme which aims to build a dynamic climate action network of 'Landscape Leaders' (farmers, landowners, community leaders) to transform the catchment and inspire others to take climate action.

Communities and businesses

Somerset Wildlife Trust is piloting its "Act to Adapt"¹³ process, which supports communities to co-create Climate Adaptation Plans. Building on their Climate Adaptation Toolkit¹⁴, Somerset Wildlife Trust are now collaborating with Glastonbury, Burnham-on-Sea and Highbridge, and the Polden Hills to support these communities to identify potential solutions to their climate challenges.

Community workshops raised awareness of local climate projections and adaptation actions, with a focus on how nature-based solutions can address risks posed by threats like increased rainfall and extreme heat. Residents then identified their priority themes and preferred adaptation actions, which included:

- Planting more trees
- Adapting to flooding risks
- Recognising nature and adaptation in planning rules
- Securing funding for adaptation projects

Somerset Wildlife Trust compiled this information into draft Climate Adaptation Plans for each location and are running consultations to ensure more residents can shape their community's plan.

After the consultations, Somerset Wildlife Trust will refine the plans and hold events to share them with residents and stakeholders in each community. This will include implementing some key actions, to show tangible progress on adaptation. Each community will then take ownership of their plan, leading continued implementation to make their towns better adapted, prepared and resilient to the impacts of climate change.



Adaptation community consultation event, Glastonbury
© Somerset Wildlife Trust

Farmers and landowners

Numerous Trusts have developed partnerships with farmers in their regions that aim to boost resilience, particularly this year in relation to flooding.

Herefordshire and Radnorshire Wildlife Trusts' Wye Adapt programme is focussing on working with farmers. Over three years, the programme aims to introduce practical interventions across more than five target areas in the Wye catchment. The programme has already delivered advice on over 400 hectares of farmland with proposed opportunities ranging from woodland regeneration to wetland creation. It aims to increase farmers' resilience to both flood and drought impacts.

The Somerset Levels and Moors is a region facing a high level of threat from climate change, with low lying land at increasing risk from flooding due to wetter winters and sea level rise, and the wetland ecology at risk from increased summer droughts. To counter these effects, the Adapting the Levels Landscape Recovery Project (led by Somerset Wildlife Trust) is working with 15 landowners across parts of the Levels and Moors' Brue Valley floodplain to enhance, connect and protect over 1,100 hectares of land, including over 800 hectares of peatlands. The project is focused on land management changes, such as raising the water table to reduce carbon emissions, protect the rich historic environment and to help buffer the worst effects of drought and flood. This has included investigating a RAD (Resist-Accept-Direct) approach to managing the landscape, to better understand how habitats could shift and be best managed in a changing climate. By working towards these goals, the project aims to create a connected, healthy and climate resilient wetland and coastal grazing marsh mosaic, allowing critical species, such as breeding waders and the European eel, to flourish. Adapting the Levels is also working with communities across the project area, to support them in staying resilient and adaptable to climate change.

Within Cornwall, the Upstream Thinking project farm advisers helped secure over £1.7 million for farmers through government Countryside Stewardship agreements and Sustainable Farming Incentive. These grants enable farmers to improve yard infrastructure, implement sustainable land management practice and improve wildlife habitat. Interventions include separating clean and dirty water in farmyards, fencing cattle from water courses, establishing deep-rooted herbal leys which increase soil health and reduce fertilizer use, planting winter cover crops to reduce soil erosion, installing buffer strips to protect watercourses, planting

hedgerows and trees and managing wildlife habitats and areas of scrub. By working alongside the farming community, the project has been able to monitor an increase in water quality and ecological status in areas of West Cornwall, and buffer against long-term impacts on climate change.

In the Mimram Valley in Hertfordshire, Herts and Middlesex Wildlife Trust are working closely with other partners and farmers to develop a landscape nature recovery project. The valley is a priority area for conservation with high potential for habitat restoration and creation, improved landscape connectivity, and to support the recovery of Species of Conservation Concern. The Valley includes three nature reserves and links rural areas to major settlements including Welwyn Garden City and Hertford. The Trust wants to develop a valley-long nature recovery project with landowners with a holistic approach to conserving the chalk river and associated habitats. In 2024, the Trust is starting a new project in partnership with the Environment Agency, Affinity Water and the Rivers Trust to work with farmers on a landscape scale. The Trust is looking to initiate and facilitate a farmer cluster, taking in land managed from the river's source at Whitwell to its confluence with the Lea at Hertford.



| Hazard | Wildfire Risk | | | | Extreme Summer Temps | | | | Low River Flows | | River Flood | |
|---------------------|------------------------|------------------------|------------------------|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------------------|----------------------|---|----------------------|
| | Days at Risk per annum | | | | Plus (+) °C | | | | % Change in lowest 7 day av flow | | % Change in magnitude of the T-year flood | |
| Representative Year | 2050 | | 2080 | | 2050 | | 2080 | | | | | |
| Degree of Warming | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 |
| Indicator Category | Wildfire | Wildfire | Wildfire | Wildfire | Climate | Climate | Climate | Climate | Water | Water | Water | Water |
| Indicator | Met Office Fire Danger | Met Office Fire Danger | Met Office Fire Danger | Met Office Fire Danger | Max. temp | Max. temp | Max. temp | Max. temp | Low River Flows | Low River Flows | River Flood | River Flood |
| Variant | Very High | Very High | Very High | Very High | Summer | Summer | Summer | Summer | 2-year variant | 2-year variant | 2-year variant | 2-year variant |
| Metric | Days / Yr | Days / Yr | Days / Yr | Days / Yr | °C change | °C change | °C change | °C change | % Change | % Change | % Change | % Change |
| Scenario | 2°C in 2100 | 4°C in 2100 | 2°C in 2100 | 4°C in 2100 | 2°C in 2100 | 4°C in 2100 | 2°C in 2100 | 4°C in 2100 | Warming Level 2°C | Warming Level 4°C | Warming Level 2°C | Warming Level 4°C |
| Strand | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM | UKCP18 Global HadGEM |
| Member | Median | Median | Median | Median | Median | Median | Median | Median | Median | Median | Median | Median |
| Spatial Resolution | Local Authorities | Local Authorities | Local Authorities | Local Authorities | Local Authorities | Local Authorities | Local Authorities | Local Authorities | Region | Region | Region | Region |
| Spatial Unit | All | All | All | All | All | All | All | All | All | All | All | All |
| Time Period | 2041-2070 | 2041-2070 | 2071-2100 | 2071-2100 | 2041-2070 | 2041-2070 | 2071-2100 | 2071-2100 | N/A | N/A | N/A | N/A |

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The Wildlife Trusts are a federation of 47 charities, 46 individual Wildlife Trusts and a central charity, the Royal Society of Wildlife Trusts. Together we have more than 900,000 members, 39,000 volunteers and 3,600 staff across the UK. We share a vision of nature in recovery, with abundant, diverse wildlife and natural processes creating wilder landscapes where people and nature thrive.

Wildlife Trusts care for – and have restored – some of the most special places for wildlife in the UK. Collectively we manage more than 2,600 nature reserves, operate 123 visitor and education centres and own 29 working farms. We undertake research, we stand up for wildlife and wild places under threat, and we help people access nature.

We work with businesses who are committed to being nature positive and take action to help restore 30% of land and seas for nature by 2030.



The Wildlife Trusts

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