



The  
**Wildlife**  
Trusts

# ***Changing Nature***

A climate adaptation report  
by The Wildlife Trusts

Version 1 – June 2022

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## Summary

We are experiencing a global climate and nature crisis. The two are inter-linked. Climate change is driving nature's decline, and the loss of wild spaces is leaving us ill-equipped to reduce carbon emissions and adapt to climate change. Meanwhile, degraded habitats are actively emitting carbon instead of storing it. The UK is one of the most nature-depleted countries on the planet, with damage to habitats and species by people having led to the loss of half its biodiversity.

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, 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 for the effects of climate change.

This is The Wildlife Trusts' first report to set out an assessment of climate risk and actions on adapting to climate change. In keeping with reporting requirements under the 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 assets like our buildings and our staff. This report also sets out the adaptation actions we are taking now to improve our federation's collective resilience to the changing climate, and the action we are taking to support wildlife as the climate changes across the UK.

This report does not cover our policy and advocacy work on climate change adaptation, which can be found in other publications. The geographic scope of the report covers The Wildlife Trusts across England, Wales and Northern Ireland, while Scottish Wildlife Trust is exploring opportunities to produce its own assessment in due course.

Species and habitats across the UK are at increasing risk from a range of climate hazards that are expected to worsen as the climate changes. The main hazards affecting land are hotter average and extreme temperatures, changing rainfall patterns, flooding and coastal change, water scarcity, and wildfire. The main hazards affecting the sea are warming sea temperatures, acidification, and de-oxygenation.

We have undertaken a high level assessment of changing hazards for our nature reserves. By the 2050s, under a future warming trajectory that reaches 3°C warming by 2100:

- 94% of our 2,700 sites are projected to see increases in maximum summer temperature of more than 1°C compared to 1981-2010; with 7% of those exceeding +1.5°C (all in the south of England);
- 55% will see nearby river flows drop by more than 30% during times of low flow compared to 1981-2010;
- 50% will experience 30 or more days of very high wildfire risk per year compared to only 9% between 1981-2010.

We also expect a general trend towards greater flood risk, with the latest UK Climate Change Risk Assessment projecting around a 50% increase in the number of

protected areas at significant risk of flooding by 2050. The risk of heat-related deaths nationally is projected to triple by 2050, so we can also expect worsening exposure to extreme heat for our staff in our offices, outdoors and working from home. These changes will be very challenging for both wildlife and people to adapt to.

We have assessed the need to undertake additional adaptation action in the next five years for 26 key risks (and some opportunities) drawn from the latest UK Climate Change Risk Assessment. All of these risks will affect our ability to achieve our three strategic goals by 2030, summarised as: nature in recovery, people taking meaningful action, and nature playing a central and valued role in addressing local and global problems.

We set out a prioritised list of adaptation actions for the next five years, based on an assessment of the urgency of addressing the relevant risks. Immediate priorities for the coming year include:

- collating and assessing our collective action to manage increased risk from fire, extreme heat, flooding, drought and coastal change;
- facilitating the movement of different species;
- collating our monitoring and management of pests, diseases and invasive species;
- assessing the risk to our buildings and providing guidance for home workers on managing flooding, extreme heat and extreme weather risk.

By the end of 2027, we hope to have:

- gathered much more evidence on the work already underway across The Wildlife Trusts on adaptation on our nature reserves;
- developed new principles and priorities for nature conservation in a changing climate;
- and significantly grown our delivery of nature-based solutions with a climate resilience focus.

Our adaptive capacity is relatively low, scoring 1 out of a possible 3 on an adaptive capacity scale. We have started to consider climate risk and collate the large amount of adaptation action already underway, and some Wildlife Trusts have integrated adaptation into their strategies and work plans. However, most individual Wildlife Trusts do not have dedicated staff working on climate change adaptation, and struggle to find resource and time to consider the long-term issues that climate change presents. We will try to find ways to boost this capacity over the coming years and in our next report, will update our assessment of adaptive capacity.

The final part of the report focusses on the importance of working in partnership. We have set out our current activity and what we want to achieve over the next five years. In particular, partnership working with other charities, government, agencies, and the public will be critical in determining how conservation planning and management needs to facilitate change over the next decade and beyond in response to the changing climate. Answering this question will be a priority for us in the years ahead.

## Glossary

**Adaptation** – In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects. Source: IPCC AR6 Glossary.

**Adaptation pathway** – A generic term that involves the analysis of adaptation options over time to changing risk levels. This term has been applied in a number of different ways, which include:

- i. Adaptation roadmaps or pathway frameworks, which consider portfolios of adaptation that change over time, to allow analysis of the timing and sequencing of adaptation and identify priorities;
- ii. Adaptive management, which is an iterative cycle of monitoring, research, evaluation and learning, i.e. a process that is used to improve future management strategies (also called iterative risk management);
- iii. Dynamic adaptation route-maps, which focus on decision-making under uncertainty and identify adaptation tipping points (or turning points); the point at which a particular action is no longer adequate for meeting the plan's objectives and act as triggers for a change in adaptation. Source: CCRA3

**Exposure** – The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected. Source: IPCC AR6 Glossary.

**Hazard** – The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. Source: IPCC AR6 Glossary.

**Impacts** – The consequences of realised risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather and climate events), exposure, and vulnerability. Impacts generally refer to effects on lives, livelihoods, health and wellbeing, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial. Source: IPCC AR6 Glossary.

**Invasive non-native species (INNS)** – Non-native species are those that have reached the UK by accidental human transport, deliberate human introduction, or which arrived by natural dispersal. Most non-native species are considered benign or positive, but some have a negative impact on native species through the spread of disease, competition for resources, or by direct consumption, parasitism or hybridisation. Such species are termed invasive non-native species or INNS. Source: JNCC.

**Mitigation** – A human intervention to reduce emissions or enhance the sinks of greenhouse gases. Source: IPCC AR6 Glossary.

**Nature-based solutions** – Actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges, effectively and adaptively, to provide both human wellbeing and biodiversity benefits. Source: IUCN, 2016

**Opportunity** – The potential for a beneficial consequence, as a result of a changing climate (the propensity to be beneficially affected). Source: CCRA3

**Resilience** – The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation. However, the term resilience is now used very widely, in different ways, and in this report we largely use the word resilience interchangeably with adaptation. Source: CCRA3

**Risk** – The potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. In the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard on lives, livelihoods, health and wellbeing, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), as well as the (climate-related) hazard and the likelihood of its occurrence. Note that in this report, the term risk is used for negative consequences (i.e. threats). Source: CCRA3.

**The Wildlife Trusts** – The term used to refer to all 46 individual Wildlife Trusts and the Royal Society of Wildlife Trusts. In this report we also use the word 'federation' when talking about the legal entity of The Wildlife Trusts, and 'movement' when we refer to our organisations collectively but not in a legal sense.

**Vulnerability** – The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. Source: IPCC AR6 Glossary.

## 1. About The Wildlife Trusts

The Wildlife Trusts are a federation of 46 individual Wildlife Trust charities, covering all parts of the UK, the Isle of Man, and Alderney. Each Trust is an independent registered charity. Every Wildlife Trust is a member of the Royal Society of Wildlife Trusts (RSWT), a registered charity in its own right. RSWT's role is to ensure a strong voice for wildlife and, internally, to lead the development of the movement and coordinate shared action. Taken together this movement is known as The Wildlife Trusts<sup>1</sup>.

The Wildlife Trusts is collectively one of the top 10 largest land-holding charities in the UK: directly we manage over 2,700 sites (of which 2,300 are publicly accessible nature reserves) covering 104,000 hectares of land. In 2020/21, we gave advice to land managers on another 240,000 hectares and helped to improve 4,600 km of rivers and streams for wildlife. Staff across the Wildlife Trusts also spent more than 1,000 days on marine monitoring and surveying<sup>2</sup>. We have an important role in delivering adaptation to support nature on the ground, in addition to implementing actions that will make our federation more resilient to the changing climate.

The Wildlife Trusts have a long history, starting in 1912 when Nathaniel Charles Rothschild proposed a new organisation to save the best places for wildlife across the British Isles<sup>3</sup>. The Society for the Promotion of Nature Reserves was formed, and by 1915, 284 sites across the UK 'worthy of preservation' had been identified and were thereafter known as the Rothschild Reserves. At the same time, local conservation organisations were forming in different regions, which would ultimately become Wildlife Trusts. The first Wildlife Trust was Norfolk in 1926, followed by Yorkshire in 1946 and Lincolnshire in 1948. The 1950s saw further groups beginning to form and by the end of the decade, the Society that Rothschild had formed took on the role of a national association to represent them, now known as the Royal Society of Wildlife Trusts.

The formation of the Rothschild's Reserves marked the beginning of modern-day conservation in the UK. However, climate change and other human pressures have shifted conservation practice away from a historic model that focussed on maintaining protected areas or sites as they were. A newer, emerging theme of recovery that brings nature back to depleted areas, maximises biodiversity in heavily populated areas as well as on nature reserves, and allows for greater flexibility and change is now being practiced

alongside more traditional conservation approaches. Because the climate is changing, it will not be possible in the future for nature in the UK to stay as it is. In response to climate change, species are moving where they can, and different areas of the UK are becoming more or less suitable for different habitat types. In 2006, The Wildlife Trusts acknowledged the need to link landscape recovery to climate change adaptation through its Living Landscapes programme<sup>4</sup>. The future of conservation in the UK will need to include greater flexibility and prioritise actions that support nature as a whole in the face of inevitable change, and potentially much greater climate change after 2050, if global efforts to substantially reduce greenhouse gas emissions before 2030 fail.

The Wildlife Trusts' vision reflects this. It aims to recover and bring nature back, to empower people to take action for nature, and to create a society where nature matters. Our collective Strategy 2030<sup>5</sup> embeds climate action across all three of its goals:

1. Nature is in recovery with abundant, diverse wildlife and natural processes creating wilder land and seascapes where people and nature thrive.
2. People are taking meaningful action for nature and the climate, resulting in better decision making for the environment at both the local level and across the four nations of the UK.
3. Nature is playing a central and valued role in addressing local and global problems.

Sitting under these goals are 10 impact measures [Figure 1], providing us targets to judge both The Wildlife Trusts and the UK's progress in recovering nature and addressing climate change. Our work on climate change adaptation sits across all of these goals and impact measures.

Ultimately, the world's response to the climate crisis, both on mitigation and adaptation, will define our ability to restore nature, which is the core objective of The Wildlife Trusts. Collectively, we are taking transformative action to address climate change in reducing our own emissions, maximising and increasing our carbon sequestration and adapting to the impacts of climate change, in a way that supports nature's recovery. This report assesses the risks that we face from climate change as The Wildlife Trusts, and sets out an adaptation plan for the next five years.



## Nature in recovery

We will put nature firmly in recovery by making more space for it and connecting habitats at a landscape scale, restoring the abundance of nature and getting it working again; for example, making sure our wetlands are wet and reintroducing missing 'keystone' species.

Working with partners and influencing others, from farmers and fishers to businesses and politicians, we will restore natural processes and reconnect wilder land and seascapes to bring our wildlife back at scale, and create places where people and nature can thrive together.

### OUR IMPACT MEASURES

#### Nature will be in recovery

At least 30% of land and seas will be actively managed for nature's recovery in every part of the UK.

#### Wildlife will be abundant and diverse

The abundance and diversity of wildlife will be increasing significantly in every part of the UK.

#### Natural processes will be operating effectively

The UK's natural processes and ecological systems will be more intact and functioning significantly better on land, in freshwaters and at sea.

## Meaningful action

The Wildlife Trusts will work to engage and empower people of all ages, identities, cultures, backgrounds and abilities, supporting them to value, enjoy, speak up and take action for wildlife.

We will engage underrepresented groups, listen to our supporters, connect people together, and enable and empower them to effect real change, so that we can drive better decision making for nature across the political and corporate sphere, at the local, regional and national level.

### OUR IMPACT MEASURES

#### People taking action

We will create a ripple effect of people and communities led by The Wildlife Trusts, to achieve 1 in 4 people taking action for nature and climate.

#### Action is meaningful

We will inspire individuals and communities to take meaningful actions to drive nature's recovery, locally and nationally.

#### Organising and empowering

We will become the leading movement in organising and empowering people and communities to take meaningful action for the nature they love.

## Nature-based solutions

The Wildlife Trusts, working in partnership with others, will restore our natural ecosystems at scale and demonstrate what is possible, so that natural habitats can store and sequester carbon, help prevent flooding, reduce soil erosion, improve soil fertility, provide pollination services, allow nature's recovery at sea, and support improvements to people's physical and mental wellbeing.

We will use our collective voice to advocate for how – as a society – we could and should be using nature-based solutions and working with natural assets to help address multiple challenges and drive positive global change.

### OUR IMPACT MEASURES

#### Nature is central to people's health and wellbeing

Nature will be playing a more significant role in keeping people healthy and reducing health inequality; at least 30% more people will be participating regularly in outdoor activity in high quality and accessible natural green and blue spaces near where they live.

#### Nature is central in stabilising climate

Nature will be playing a much more significant role in stabilising the global climate; net UK greenhouse gas emissions from land use will have halved and offshore development will be causing no further harm to carbon-capturing marine habitats.

#### Nature is central to water management

Nature will be playing a more significant role in reducing the risks of flood, drought and extreme weather; at least 30% of UK flood defence expenditure will be on natural flood solutions and the role of nature in providing clean water will be reflected in all water company investment decisions.

#### Nature helps to improve food security

Nature will be playing a more significant role in increasing food security; the abundance of pollinating insects will have increased by at least 10%, soils will be recovering and all fish stocks will be growing.

Figure 1: The Wildlife Trusts' Goals and Impact Measures for 2030. Source: [Bringing Nature Back: The Wildlife Trusts' Strategy 2030](#)

## 2. Climate change impacts and risk assessment

### LATEST ASSESSMENTS OF GLOBAL AND UK CLIMATE CHANGE

The latest global assessment from the Intergovernmental Panel on Climate Change (IPCC) highlights that the planet is warming quickly, with a rise in global temperature of 1.1°C for the most recent decade compared to 1850–1900. There are consequences everywhere, driven by increased extreme heat, heavy rainfall and flooding, sea level rise, drought, and fire weather (conditions that make wildfire more likely). Current CO<sub>2</sub> concentrations in the atmosphere are the highest they have been for 2 million years. Observed sea level rise is the fastest in 3,000 years, sea ice lowest for 1,000 years, and glacier retreat unprecedented for the past 2,000 years. Since 1950, heat extremes on land and sea have become more frequent and intense, and globally, heavy rainfall and drought have both become more extreme. The oceans are warming and becoming more acidic. Further warming is inevitable and average annual global temperature rise is expected to hit 1.5°C by around 2040<sup>6</sup>.

These changes in our climate are happening at the same time as global biodiversity loss. Nature is undergoing a dangerous and unprecedented decline globally. This decline is caused by human activities, with climate change becoming an increasingly important component<sup>7</sup>. Research undertaken to develop a Biodiversity Intactness Index<sup>8</sup> by the Natural History Museum suggests that the UK is among the top 10 most nature-depleted countries in the world, with less than half of the biodiversity it would have without human damage (a score of around 42% out of a possible 100%). The analysis suggests that scores of less than 30% mean ecosystems are at risk of collapse, and that a score of 90% is needed for the world to have adequate biodiversity for resilient and functioning ecosystems.

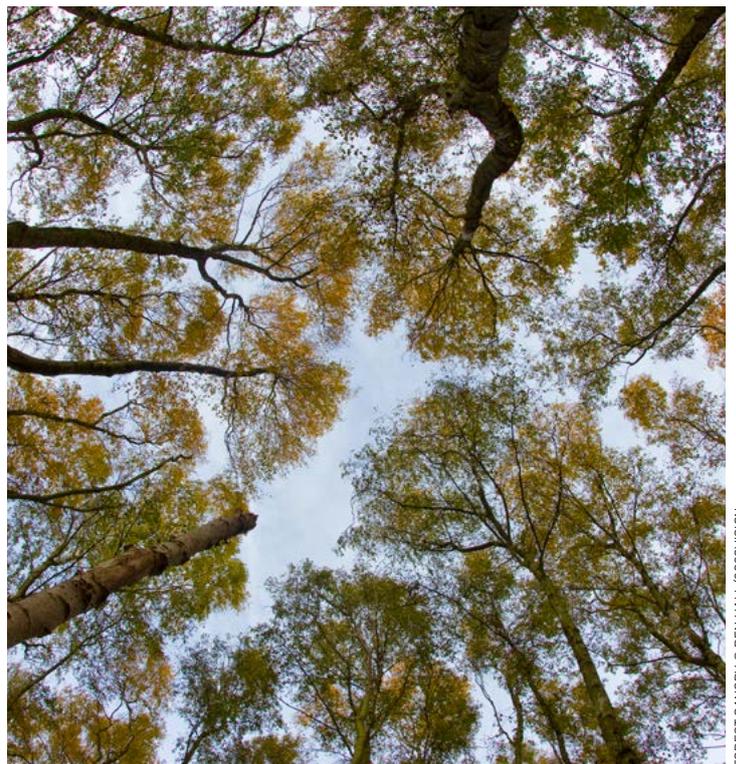
Despite actions to try to reduce emissions of greenhouse gases over the past 40 years, global emissions in 2019 were the highest in human history. On the basis of current global implementation of emissions reduction policies, the world will likely warm by over 3°C by 2100. To avoid warming of more than 1.5°C (the goal of the Paris Agreement), global greenhouse emissions need to peak by 2025 at the latest and drop by 43% by 2030, including a drop in methane emissions of 34%<sup>9</sup>. To have any chance of achieving this, much stronger global action on climate change mitigation will be needed in 2022, culminating in negotiations at the 27<sup>th</sup> UN Climate Change Conference (COP27) in Egypt in November 2022.

The impact of climate change on nature is both dangerous and widespread resulting in global losses, including in the UK. While there is evidence of adaptation happening across the world (both in natural systems and through actions being taken by people), it is not keeping pace with the increasing risks from climate change. Observed impacts on nature are worse than predicted in the IPCC's previous assessment report in 2014. Even if the world temporarily exceeds 1.5°C of warming for several decades, it is expected that entire ecosystems will be lost including many tropical corals, montane habitats and coastal

wetlands. The risk of species extinction is estimated to increase ten-fold for a warming level of 3°C compared to 1.5°C. Every additional fraction of a degree of warming will lead to increased impacts and losses to the natural environment as well as people and society. This also means that every bit of avoided warming matters in reducing those impacts<sup>10</sup>.

The UK Government produces a national climate change risk assessment (CCRA) every five years. The most recent assessment, based on an independent report by the Climate Change Committee<sup>11</sup>, listed risks to the natural environment as among the most urgent adaptation priorities for the UK. The majority of the 18 risks (and some opportunities) considered for the natural environment were scored as needing additional adaptation action ('more action needed') in the next five years, over and above what is already planned<sup>12</sup>. This means that current adaptation action across the UK is inadequate to match the scale of increase in risk. The report also highlighted that 'integrated ecosystem-based approaches or nature-based solutions can contribute to adaptation in the natural environment and in other sectors', but that the implementation of these approaches and integration with adaptation goals was also very limited.

Climate risk in the UK is worsening over time. Over half of the risks across all sectors assessed in the latest CCRA were given the highest urgency score [Figure 2], compared to only one-third in the previous assessment in 2017. The estimated magnitude of future impact also increased for 20% of the risks compared to the previous assessment, and none had decreased in magnitude. We have used this CCRA urgency scoring approach as the basis for our own risk assessment in this report.



<b>N1</b> Risks to terrestrial species	<b>N2</b> Risks to terrestrial species and habitats from pests, pathogens and INNS	<b>N4</b> Risks to soils from changing conditions, including seasonal aridity and wetness	<b>N5</b> Risks to natural carbon stores and sequestration from changing conditions	<b>N6</b> Risks to and opportunities for agricultural and forestry productivity
<b>N7</b> Risks to agriculture from pests, pathogens and INNS	<b>N8</b> Risks to forestry from pests, pathogens and INNS	<b>N11</b> Risks to freshwater species and habitats	<b>N12</b> Risks to freshwater species and habitats from pests, pathogens and INNS	<b>N14</b> Risks to marine species, habitats and fisheries
<b>N16</b> Risks to marine species and habitats from pests, pathogens and INNS	<b>N17</b> Risks and opportunities to coastal species and habitats	<b>I1</b> Risks to infrastructure networks from cascading failures	<b>I2</b> Risks to infrastructure services from river and surface water flooding	<b>I5</b> Risks to transport networks from slope and embankment failure
<b>I8</b> Risks to public water supplies from reduced water availability	<b>I12</b> Risks to transport from high and low temperatures, high winds and lightning	<b>H1</b> Risks to health and wellbeing from high temperature	<b>H3</b> Risks to people, communities and buildings from flooding	<b>H4</b> Risks to people, communities and buildings from sea level rise
<b>H6</b> Risks and opportunities from summer and winter household energy demand	<b>H8</b> Risks to health from vector-borne diseases	<b>H11</b> Risks to cultural heritage	<b>H12</b> Risks to health and social care delivery	<b>H13</b> Risks to education and prison services
<b>B1</b> Risks to business sites from flooding	<b>B2</b> Risks to business locations and infrastructure from coastal change	<b>B6</b> Risks to business, from disruption to supply chains and distribution networks	<b>ID1</b> Risks to UK food availability, safety, and quality from climate change overseas	<b>ID4</b> Risks to the UK from international violent conflict resulting from climate change
<b>ID5</b> Risks to international law and governance from climate change overseas that will impact the UK	<b>ID7</b> Risks from climate change on international trade routes	<b>ID9</b> Risks to UK public health from climate change overseas	<b>ID10</b> Systemic risk arising from the amplification of multiple risks cascading across sectors and borders	<b>N3</b> Opportunities for new species colonisations in terrestrial habitats
<b>N9</b> Opportunities for agricultural and forestry productivity from new species	<b>N10</b> Risks to aquifers and agricultural land from sea level rise, saltwater intrusion	<b>N15</b> Opportunities for marine species, habitats and fisheries	<b>N18</b> Risks and opportunities from climate change to landscape character	<b>I3</b> Risks to infrastructure services from coastal flooding and erosion
<b>I4</b> Risks to bridges and pipelines from flooding and erosion	<b>I6</b> Risks to hydroelectric generation from low or high river flows	<b>I7</b> Risks to subterranean and surface infrastructure from subsidence	<b>I9</b> Risks to energy generation from reduced water availability	<b>I10</b> Risks to energy from high and low temperatures, high winds and lightning
<b>I13</b> Risks to digital infrastructure from high and low temperatures, high winds and lightning	<b>H2</b> Opportunities for health and wellbeing from higher temperatures	<b>H5</b> Risks to building fabric	<b>H7</b> Risks to health and wellbeing from changes in air quality	<b>H9</b> Risks to food safety and food security
<b>H10</b> Risks to health from poor water quality and household water supply interruptions	<b>B3</b> Risks to businesses from water scarcity	<b>B5</b> Risks to business from reduced employee productivity – infrastructure disruption and higher temperatures	<b>B7</b> Opportunities for business – changing demand for goods and services	<b>N13</b> Opportunities for marine species, habitats and fisheries
<b>I11</b> Risks to offshore infrastructure from storms and high waves	<b>B4</b> Risks to finance, investment, insurance, access to capital	<b>ID2</b> Opportunities for UK food availability and exports	<b>ID3</b> Risks to the UK from climate-related international human mobility	<b>ID6</b> Opportunities (including Arctic ice melt) on international trade routes
<b>ID8</b> Risks to the UK finance sector from climate change overseas	<p><b>Key</b></p> <p> <span style="color: orange;">■</span> More Action Needed                      <span style="color: yellow;">■</span> Further Investigation                      <span style="color: green;">■</span> Sustain Current Action, Watching Brief             </p>			

**Figure 2: CCRA risks and opportunities by urgency score.**

**Source:** Climate Change Committee (2021) Independent Assessment of UK Climate Risk

**Notes:** Letter codes represent chapters in the CCRA3 Technical Report; **N** (natural environment), **I** (infrastructure), **H** (health, communities and built environment), **B** (business), **ID** (international dimensions). Colours denote urgency scores, with more action needed (orange) and further investigation (yellow) given greater urgency than sustain current action and watching brief (green).

## IMPACT ASSESSMENT

To provide further context for our own risk assessment, we have, where possible, created estimates for some future climate change impacts for our reserve network for the 2050s, which reflects the risks that wildlife faces in the areas we manage directly.

We have assessed changing risk from high temperatures, wildfire and low river flows by mapping our reserve network against future estimates of changes in impacts created through the Climate Risk Indicators Project led by the University of Reading, which in turn is based on the 2018 UK Climate Projections<sup>13</sup>. This project, funded through the UKRI Climate Resilience Programme<sup>14</sup>, provides easy-to-use spatial estimates of a number of different climate hazards (such as temperature) for a range of different time periods and climate scenarios. It allows users to map their own spatial data on top of this impact information to create location-specific estimates of change.

Figure 3 shows a map of the locations of our reserves, along with three sets of future climate risk indicators obtained from the CRI website. We calculated the percentage and number of reserves at different levels of risk for three different climate hazard variables (change in maximum summer temperature, change in low river flows, and absolute number of days with high wildfire risk) for the 2050s under a scenario consistent with warming of 3°C by the end of the century above pre-industrial levels (see Annex B for more details on the choice of scenarios).

We have chosen this scenario as it reflects broadly the pathway the world is currently following on the basis of current global climate change mitigation policies, and focussed on the 2050s because most adaptation actions that we will implement will take no more than 20 years to deliver, so 2050 provides a useful reference point for this first assessment. Ideally, we would want to look further into the future and use a wider range of scenarios from 2°C to 4°C of warming to reflect uncertainty properly, but resource constraints mean that this has not been possible for this first report.

The results show that for the 2050s, compared to a baseline climate from 1981-2010:

- **Extreme temperature** – 94% (2,569) of our reserves are projected to experience an increase in maximum summer temperature of more than 1°C. Of those, 7% (191) are projected to see increases of more than 1.5°C, all of which are in the south of England. A further 6% (159) are projected to experience an increase of between 0.5-1°C, and none have a change of less than 0.5°C.
- **Water scarcity** – 55% (1,516) of our reserves are projected to see nearby river flows drop by more than 30% from the 1981-2010 baseline during times of low flows, with 45% (1,223) seeing a decline of between 10 and 30%, and none seeing a decline of less than 10%.

- **Wildfire** – 50% (1,373) of our reserves are projected to have 30 or more days per year with very high wildfire risk, compared to only 9% in the 1981-2010 baseline period<sup>i</sup>. A further 47% (1,269) have between 5 and 15 days of high risk per year, and only 3% (86) have fewer than 5 days.

The Climate Risk Indicators Project provides future projections for river flooding, but not for all types of flooding combined. Because of this, we have instead used results from the flood projections developed to inform the third UK Climate Change Risk Assessment, to give a sense of risk to habitats from rising flood risk<sup>15</sup>:

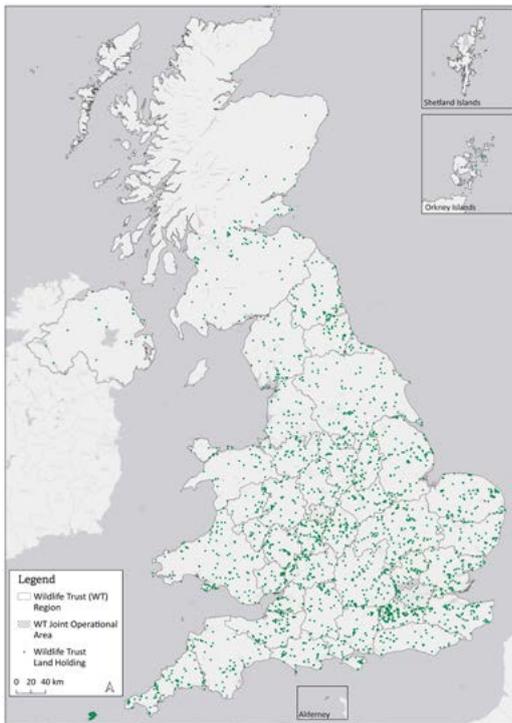
- **Flooding** – Sayers et al. (2020) estimate that under a scenario of warming of 4°C by 2100 (3°C is not available) and assuming continued levels of adaptation, by 2050 the area of 'most important habitats' (Ramsar, SPA and SAC sites) exposed to frequent flooding will increase over baseline (2018) levels by 51% in England, 33% in Scotland, 44% in Northern Ireland and 57% in Wales. In the absence of spatial flood data for our reserves, we assume that this order of magnitude of change can be taken as a reasonable proxy for change in flood risk to our nature reserves.

The third UK Climate Change Risk Assessment also gives further information on the **risks to people from extreme heat and flooding**, highlighting that the risk of heat-related deaths is projected to triple by 2050 (from a baseline of around 2,000 per year now to 7,000 per year by 2050, including the effects of population growth), and the number of people living in areas of significant flood risk will double<sup>16</sup>.

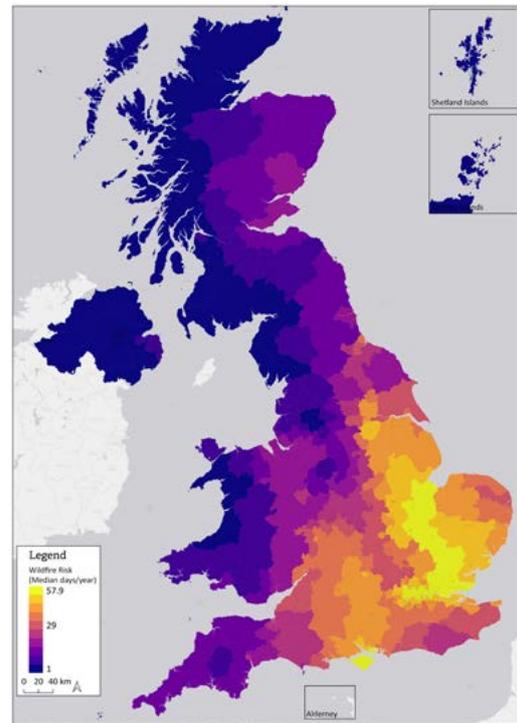
The impacts from changes in **wind speed and direction** are also an important hazard for The Wildlife Trusts, particularly through the effects of windthrow on tree losses or the spread of wildfire, for example. Projections are future wind speed and direction are still very uncertain and current projections produced by the Met Office do not show significant changes in extreme wind speeds or direction, and as such they are not included here, but are included in the assessment of urgency below.

These examples consider single hazards in single places, but **compound or cascading risks** (multiple impacts happening at once, or one impact setting off a chain of further impacts) are also important for The Wildlife Trusts to understand, as such events can create fast-growing impacts in multiple places, or lead to a much greater threat than would be predicted from looking at a single hazard or single place alone. For this first report, we have been unable to undertake a quantitative assessment of these kinds of impacts, but have noted the need to assess these risks in our forward work plan.

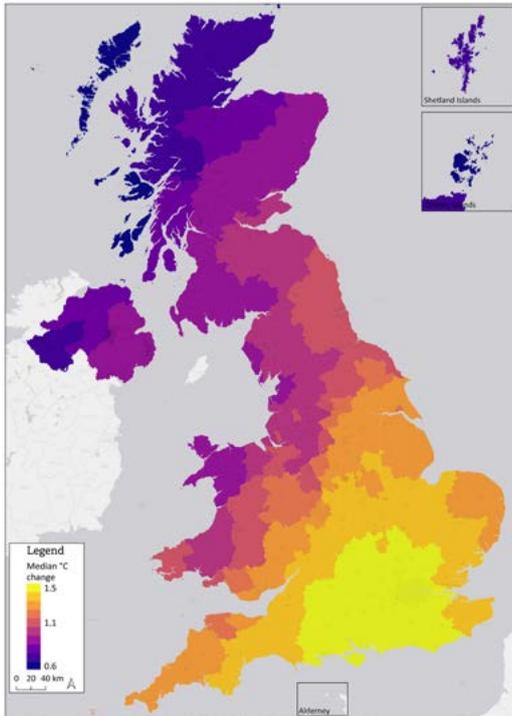
<sup>i</sup> Defined as the number of days with risk in the 'very high' or 'exceptional' category according to the Met Office Fire Severity Index. See [Fsi - Met Office](#) for more details.



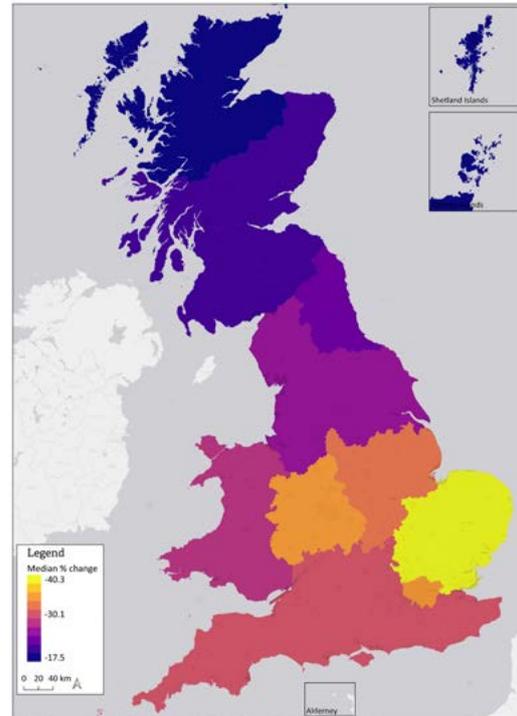
Wildlife Trusts' Land Holding



Fire danger weather



Maximum summer temperature



Low river flows

**Figure 3: Land holdings and climate impact indicators for The Wildlife Trusts**

**Source:** UK climate risk indicators website at [Climate Risk Indicators](https://www.climate-risk-indicators.org/); Wildlife Trusts spatial mapping of reserve network

**Notes:** We have run future projections for maximum summer temperature, high fire danger weather and low river flows for the 2050s; for scenarios that are closest to matching a 3°C rise in global temperature by 2100 (see Annex B for more details). Note that for summer temperature and wildfire, yellow colours denote a worsening situation, whereas for low river flows, purple colours denote a worsening situation.

## OBSERVED IMPACTS

We are seeing increased reporting from Wildlife Trusts on climate-related impacts occurring on our sites. Some of the impacts from extreme weather reported in the last five years include:

### Extreme heat and wildfire:

- During the 2018 heatwave, soil drying and compaction, plant losses and wildfire led to species such as badgers and birds of prey struggling to find food and having to travel over much greater distances<sup>17</sup>. The Trusts have also seen numerous impacts on freshwater and wetland species from algal blooms to de-oxygenated rivers and streams<sup>18</sup>.
- Cornwall Wildlife Trust is having to manage regular heathland wildfires across multiple sites such as its Rosenannon, Tregonetha and Bartinney reserves. Most are thought to be caused by arson, but spread is being exacerbated by hot, dry periods.
- In 2018, Staffordshire Wildlife Trust had to contend with a 60 hectare fire at the Roaches. The Trust is now working to restore the damaged peatland and implement new preventive measures to minimise future fire risk.
- Until 2018, Herefordshire Wildlife Trust had some staff located in a portacabin on their Lower House Farm site and had to send them home early due to excessive overheating in summer.

### Flooding:

- Worcestershire Wildlife Trust has observed more frequent periods of water being held on Hill Court Farm, partly due to the frequency of high flow surges of the river Severn which means the water is unable to slowly drain away via the main brook into the river.
- Herefordshire Wildlife Trust has seen prolonged flooding of the Lugg Meadows nature reserve, leading to a decline in the conservation value of the site and loss of income from hay cutting.
- Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust has reported that the Ouse Washes Nature Reserve is now frequently flooded late in spring, destroying nests and eggs of black-tailed godwits and other wader species.
- The Woods Mill headquarters of Sussex Wildlife Trust were flooded in December 2019, closing the reserve and destroying its plug-in hybrid vehicle and charging point.
- Flooding at Shropshire Wildlife Trust's Shrewsbury office damaged the premises, vehicles, and made the office-base unusable for several working days.
- In the Wye catchment, heavy rainfall events in the autumn are leading to increased soil run off from recently harvested fields, exacerbating river pollution levels in the River Wye and Lugg.

### Reduced water availability and drought:

- Shropshire Wildlife Trust is observing changes to the lowland raised bog at Wem Moss Nature Reserve, due to a lowered water table. Purple moor grass is beginning to encroach on the bog and requires annual mechanical

cutting to control. While atmospheric nitrogen deposition is likely to be at least partly responsible, the hotter, drier conditions are thought to be exacerbating the drying out of the bog.

- Herefordshire Wildlife Trust has observed worsening nutrient loads on the River Wye, which is already heavily polluted, during times of low flows. Increases in the concentration of nutrients and decreases in the availability of oxygen in the water is causing development of algal blooms and loss of key species. Algal blooms are developing earlier every year and extending further up the catchment.
- Several Trusts have reported an increase in severity of chalk rivers running dry in recent years, including Hertfordshire and Middlesex and others in the south of England.
- Suffolk Wildlife Trust has observed that Knettishall Heath (a 169 hectare SSSI) has been impacted by a regional lowering of the water table linked to groundwater abstraction, which has resulted in the loss of botanically-rich fen plant communities that were once found in low-lying parts of the reserve. A 6.5 hectare wet woodland has also been severely impacted by the lowered water table and low flows in the adjacent river. The heathland now faces increasing risk from wildfire.

### Greater unpredictability:

- Worcestershire and Herefordshire Wildlife Trusts report that blossom time in orchards is becoming less predictable due to general weather trend changes. Early warmth is causing the trees to blossom early and for insects to emerge, only to be hit by frost a few days later.
- Multiple Wildlife Trusts are reporting having to bring in fodder and water for their conservation livestock in seasons when this should not be necessary, including spring (water) and summer (fodder).



Sussex Wildlife Trust headquarters flooded in 2019

- Tree losses have been exacerbated during storms by other stress factors such as ash dieback weakening and killing trees.
- Changing weather patterns are resulting in longer plant growing seasons. Wildlife Trusts are responding to these changes through longer grazing periods and/or additional management to maintain floral diversity in grassland habitats, and to prevent over-dominance of grasses. However, conditions have varied by year, making forward planning difficult. At Catcott Lows in Somerset, in dry autumns, livestock are being kept on the reserve for longer, but in wetter years they are taken off earlier – resulting in less control of the vegetation.

### URGENCY ASSESSMENT

In this section, we consider how urgent additional adaptation action in the next five years is for:

- Our land holdings, including our nature reserves
- Conservation activities that fall outside our own reserves such as marine conservation and farmland advice
- Our staff and assets such as buildings and vehicles
- Our corporate activities, including investments, supply chains and adaptation services.

The approach we have used for this assessment was to select 26 of the 61 risks and opportunities set out in the latest national UK Climate Change Risk Assessment

(CCRA3), reflecting those that are most relevant to The Wildlife Trusts (see Annex A). For each of these risks or opportunities, we considered the national risk urgency score given in CCRA3, and then conducted our own assessment of the urgency for further adaptation in the next five years specifically for The Wildlife Trusts. These scores were then reviewed by individual Wildlife Trusts.

This urgency assessment has been conducted for The Wildlife Trusts as a whole and results for individual Wildlife Trusts might differ if done on a Trust-by-Trust basis. For example, unlike the Wildlife Trusts themselves, the Royal Society of Wildlife Trusts (RSWT) does not own any land holdings, so it will focus its own direct adaptation actions in the next five years on the risks related to staff, assets and corporate activities, as well as coordinating broader actions across the Wildlife Trusts.

Figure 4 below shows the summary risk assessment scores and definitions for the different urgency categories, followed by a description for each risk and opportunity. Some risks have been grouped together where the adaptation actions being taken are the same. We have also given examples of relevant action being taken by Wildlife Trusts under each risk and opportunity. It should be noted that while some of these risks only relate to one of our three strategic goals for 2030 [Figure 1], most cut across all three goals as they affect the ability of nature to recover, to provide nature-based solutions, and for people to take meaningful action.



More Action Needed	Further Investigation
<p><b>N1</b> Risks to terrestrial species and habitats from changing climatic conditions</p> <p><b>N10</b> Risks to aquifers and agricultural land from sea level rise and saline intrusion</p> <p><b>N11</b> Risks to freshwater species and habitats from changing climatic conditions</p> <p><b>N17</b> Risks and opportunities to coastal species and habitats</p> <p><b>N18</b> Risks and opportunities to landscape character</p> <p><b>H1</b> Risks to human health and wellbeing from high temperatures</p> <p><b>B5</b> Risks to businesses from reduced employee productivity due to high temperatures</p> <p><b>H3</b> Risks to people, communities and buildings from flooding</p> <p><b>B1</b> Risks to business sites from flooding</p> <p><b>H4</b> Risks to people, communities and buildings from sea level rise</p> <p><b>B2</b> Risks to business locations from coastal change</p> <p><b>B3</b> Risks to businesses from water scarcity</p> <p><b>B7</b> Opportunities for businesses from changes in demand for goods and services</p>	<p><b>N3</b> Opportunities for new species colonisations in terrestrial habitats</p> <p><b>N4</b> Risks to soils from changing climate conditions</p> <p><b>N6</b> Risks and opportunities for agricultural and forestry productivity</p> <p><b>N13</b> Opportunities for new species colonisations in freshwater habitats</p> <p><b>N14</b> Risks to marine species and habitats from changing climatic conditions</p> <p><b>N15</b> Opportunities for marine species and habitats from changing climatic conditions</p> <p><b>H5</b> Risks to building fabric</p> <p><b>B4</b> Risks to finance, investment and insurance including access to capital for businesses</p> <p><b>B6</b> Risks to businesses from supply chain interruptions</p>
Sustain Current Action	Watching Brief
<p><b>N2</b> Risks to terrestrial species and habitats from pests, pathogens and invasive species</p> <p><b>N12</b> Risks to freshwater species and habitats from pests, pathogens and invasive species</p> <p><b>N16</b> Risks to marine species and habitats from pests, pathogens and invasive species</p> <p><b>N5</b> Risks and opportunities for natural carbon stores (peatlands, woodlands, saltmarsh)</p>	<p>None</p>

**Figure 4: Climate change urgency scores for The Wildlife Trusts, 2022-2027**

**Notes:** Definitions of urgency categories from the third UK Climate Change Risk Assessment (CCRA3):

*More action needed:* New, stronger or different adaptation action, whether policies, implementation activities, capacity building or enabling environment for adaptation – over and above those already planned – are needed in the next five years to reduce climate risks or take advantage of opportunities. This will include different responses according to the nature of the risks and the type of adaptation:

- Addressing current and near-term risks or opportunities with low and no regret options (implementing activities or building capacity).
- Integrating climate change in near-term decisions with a long life-time or lock-in.
- Early adaptation for decisions with long lead-times or where early planning is needed as part of adaptive management.

*Further investigation:* On the basis of available information, it is not known if more adaptation action is needed or not. More evidence is urgently needed to fill significant gaps or reduce the uncertainty in the current level of understanding in order to assess the need for additional adaptation action.

\*Note that all risks and opportunities require further research and evidence – not just those listed under further investigation – and all the risks and opportunities require ongoing monitoring on risk / opportunity levels and adaptation activity.

*Sustain current action:* Current or planned levels of activity are appropriate, but continued implementation of these policies or plans is needed to ensure that the risk or opportunity continues to be managed in the future.

*Watching brief:* The evidence in these areas should be kept under review, with continuous monitoring of risk levels and adaptation activity (or the potential for opportunities and adaptation) so that further action can be taken if necessary.

## RISK BY RISK ASSESSMENT

**N1 Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)**
**National Score**

More Action Needed

**The Wildlife Trusts' Score**

More Action Needed

CCRA3 scored this risk as 'More Action Needed' at the national level because although plans are in place to manage the risks to terrestrial species and habitats, implementation is lagging behind the increase in risk.

The Wildlife Trusts are managing 104,000 hectares of land, with over 2,000 nature reserves, for wildlife. In 2020/21, we also gave advice on improving more than 240,000 hectares on land for wildlife. Restoring and maintaining our nature reserves in good condition and expanding our reserves network (as part of a country-wide Nature Recovery Network) as well as ongoing management of specific hazards such as wildfire, is core to our day-to-day activities and will help to reduce the impact on terrestrial species and habitats from changing climatic conditions and extreme events. However, given the threats identified above, it is highly likely that we will need to do more to address this risk – especially in considering some of the offsite issues affecting our land. We also need to assess the level of additional action required to meet our strategic goal of a net increase in abundance and diversity of wildlife on our sites by 2030 in the context of climate change. As such we have marked this risk as 'More Action Needed' needed for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Somerset Wildlife Trust is investigating a '[RAD' framework \(Resist, Accept, Direct\)](#) as part of their work to assess climate change impacts to priority habitats and how to manage habitats to maintain levels of biodiversity and provision of ecosystem services.
  - In Bedfordshire, BCN Wildlife Trust in collaboration with Cambridge University are undertaking a project called [Banking on Butterflies](#). The project team are building banks on chalk grasslands to provide north, south, east and west facing slopes, and assessing the impact of this on the ability of butterfly species to thermoregulate and persist in that location.
  - [London Wildlife Trust's Our Brilliant Butterflies](#) has restored 45 hectares of chalk grassland habitat on six reserves on the southern edge of London, and created 40 new chalk scrapes in the landscape in and around these areas to act as stepping stones for small blue, dingy skipper, grizzled skipper and dark green fritillary. The dingy skipper has already been recorded at one of these satellite areas this year.
  - With the help of People's Postcode Lottery funding, Devon Wildlife Trust is changing the way it manages
- its whole 170 acre Woodah Farm estate with climate change adaptation in mind. Changes are being made to grazing regimes, woodland is being replanted and the team are diversifying the habitats on site to make the site as a whole more resilient. The Trust is looking at water sourcing/storage to help cope with less reliable water supplies and different rainfall patterns. In collaboration with the University of Exeter, there is also research underway looking at changes to vegetation, insect life, soil carbon and biota and how those changes should be factored into future planning.
- Ulster Wildlife are involved in an EU INTERREG programme called *Collaborative Action for Natura Network (CANN)* which involves improving the condition of peatland and wetland sites. Wildfire management plans have been developed for two large cross-border sites (Cuilcagh and Anierin Uplands SACs and Sliabh Beagh SACs), which provide recommendations for reducing the impact and severity of wildfires in the future.
    - The Wildlife Trust of South and West Wales is a partner in the ENRAW funded [Healthy Hillside Project](#). This partnership aims to minimise the risk and impact of wildfires through preventive measures. This combines proactive land management techniques to reduce the fuel load on hillsides, such as controlled burns, conservation grazing, and bracken bashing, with a programme of awareness-raising and education aimed at reducing wildfires caused by arson.
    - Following a 60 hectare wildfire at the Roaches in 2018, Staffordshire Wildlife Trust is trialling interventions to prevent and minimise the impacts of wildfire in the future, as well as restoring peatland damaged in the fire. Traditional fire breaks (such as those employed on Cornwall Wildlife Trust's heathland sites) were not suitable for this site. Instead, the Trust's solution came about from observations during the 2018 fire that rewetted peatland areas slowed, stopped, and changed the course of the fire, and these areas have also shown quick recovery post-fire. As such, the Trust is now employing tried and tested peatland rewetting techniques, including grip blocking, stone dams and sphagnum planting, at key locations across the Roaches. These interventions will act as wet firebreaks to prevent the spread and slow the speed of any future fires, and have numerous benefits, including reducing wildfire risk and impact, restoring key blanket bog habitat, supporting bog wildlife, storing water and protecting critical carbon stores. Staffordshire Wildlife Trust has also employed two part-time staff to patrol the site, raise awareness amongst visitors, and engage the public at key out of hours times, to help prevent wildfires.
    - Sheffield and Rotherham Wildlife Trust is creating fire ponds and water storage areas across Greno Woods that can act as water sources for dousing fires, as well as upgrading key routes for fire engine access. It is coupling this with habitat management to act as fire breaks and a public awareness campaign about wildfire risk and woodlands.

**N2** Risks to terrestrial species and habitats from pests, pathogens and invasive species  
**N12** Risks to freshwater species and habitats from pests, pathogens and invasive species  
**N16** Risks to marine species and habitats from pests, pathogens and invasive species

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
Sustain Current Action

CCRA3 scored these risks as 'More Action Needed' at the national level because evidence was lacking that action was being taken to manage invasive non-native species alongside pests and diseases.

Numerous Wildlife Trusts are helping to record, map and control invasive non-native species (INNS) in their areas. There are multiple examples of projects which the Trusts are involved with relating to terrestrial, freshwater and marine invasive non-native species. Plans and actions are in place to monitor and manage INNS across all of our sites, hence we have scored this risk 'Sustain Current Action' for The Wildlife Trusts.

However, as species spread or new species become established in response to climatic conditions, current control efforts may no longer be sufficient or acceptable; for example, where the control of non-native plants relies on the use of herbicides, to upscale use for their control would be counter to aspirations to see pesticide use reducing. There are also a range of new innovations that need to be developed and tested including any biological control measures. As such, involvement in research regarding alternative control measures will be beneficial alongside sustaining the actions currently underway.

Examples of action from The Wildlife Trusts:

- Herefordshire Wildlife Trust led a rust fungus release trial in the Wye catchment as a biological control of Himalayan Balsam. Two sites were initially selected for release but susceptibility tests showed plants at one site would be resistant to the rust. Balsam at the second site showed susceptibility and continued in the trial. The rust fungus was released at the site over the summer of 2020 and the levels of infection monitored. Plants became successfully infected, however the fungus did not successfully overwinter, possibly a result of the extreme winter floods. A further release was undertaken in 2021 and infection was again successful. Monitoring will take place again in 2022 to see if the infection has persisted.
- Essex Wildlife Trust and partners in the Waterlife Recovery East project are using traps equipped with an electronic Remote Monitoring Device ('smart traps') to more efficiently and humanely control non-native American mink. DNA samples are then collected for a Cambridge University study into mink dispersal, breeding patterns and inter-relatedness of offspring. This evidence-based approach is enabling the team to ascertain the effectiveness of the trapping effort, understand the numbers of actively breeding mink, where they come from, and how to target effort to reduce the likelihood of future incursions.
- Hampshire & Isle of Wight Wildlife Trust is working to establish 'ark' sites for native white-clawed crayfish. Crayfish plague, carried by the invasive signal crayfish, is the single biggest cause of the native species' decline, so headwater, lake and pond sites remote from rivers where the non-native is established provide a critical refuge for this endangered species.
- Sussex Wildlife Trust is trialling the use of a beetle to control the spread of Australian swampweed (*Crassula helmsii*) at Rye Harbour.

**N3** Opportunities from new species colonisations in terrestrial habitats

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this opportunity as 'Further Investigation' at the national level because although actions to improve habitat condition and connectivity will also benefit new species colonising terrestrial habitats, there is no programme of work to specifically support new colonisations (as a result of climate change), or to assess the need for active translocations.

This is an area of research The Wildlife Trusts would be interested in supporting and we also have very little evidence available on how our reserves network and how wider activities can support new species colonisations, where these are beneficial. There is likely to be a major role here for local Biological Record Centres, which will usually be the first to hear about a new species arriving

in their county. More research is also needed on how to identify and promote colonisation of 'beneficial' species over species that may become invasive; often this is not clear until the species in question has already arrived. We have therefore also scored this opportunity as 'Further Investigation' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Somerset Wildlife Trust is observing new wetland bird species arriving on its wetland reserves such as great white egret, cattle egret, glossy ibis and black-crowned night heron. A recent State of UK Birds report has noted that many of the bird species that have recently colonised the UK or are looking like they may do so are wetland species, and that they are establishing first in protected areas<sup>19</sup>.
- The Devon carpet moth, *Lampropteryx otregiata*, as its name suggests used to be confined to southwest England. Over the past decade its range has extended north as far as Scotland and it was discovered in Northern Ireland in 2020, recorded at the Ulster Wildlife Glenarm Nature Reserve. It was then found

again at the same site in 2021, and has now also been recorded at the Copeland Islands. This moth highlights the range shifts seen by a multitude of species, and

the importance of providing suitable habitat across landscapes to facilitate such change.

#### N4 Risk to soils from changing climatic conditions, including seasonal aridity and wetness

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this risk as 'More Action Needed' at the national level due to the absence of a national soil monitoring survey and a lack of evidence of action being taken to improve soil health.

We do not have comprehensive soil health monitoring for Wildlife Trust reserves. However, we consider that it is likely that the majority of nature reserves managed by Trusts will have relatively good soil health (dependent on habitat) and that Wildlife Trusts will be undertaking management activities which result in increased soil health – simply as a by-product of appropriate management of the above-ground habitat. For example, managing a species-rich

grassland often involves reducing inputs, diversifying flora, and supporting the recovery of insect populations, all of which are expected to improve soil health. That being said, we need to collect more evidence to confirm the state of soil health across our reserves, so have scored this risk as 'Further Investigation' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- [Upstream Thinking \(UST\)](#) is a South West Water funded initiative to protect water quality in the South West, in which Devon and Cornwall Wildlife Trusts are active partners. Cornwall Wildlife Trust farm advisers, ecologists, practical officers and a water quality scientist work with farm and landowners to introduce changes in land use that benefit soil quality as well as raw water quality. The work of Cornwall Wildlife Trust is centred on the Cober, the Drift reservoir and the Falmouth reservoirs, and in 2021 Stithians catchment joined the portfolio. So far, 188 farms in Cornwall have engaged with the project, improving soils across 180 hectares of habitat.

#### N5 Risks and opportunities for natural carbon stores, carbon sequestration and GHG emissions from changing climatic conditions, including temperature change and water scarcity

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
Sustain Current Action

CCRA3 scored this risk/opportunity as 'More Action Needed' at the national level due to the lack of attention being paid to climate change impacts on national plans to boost natural carbon sequestration in order to meet net zero greenhouse gas emissions by 2050.

The Wildlife Trusts have restored or are restoring over 40,000 hectares of peatlands, an enormous amount for a federation of our size. Some of our current programmes cover thousands of hectares of upland and lowland peat, such as the [Yorkshire Peat Partnership](#) and [Great Fen](#). Through this work, we are directly improving the resilience of these habitats now to increased heat, drought, and fire.

Across the country, we also care for over 20,000 hectares of woodland, half of which is ancient woodland. All new woodland planting projects undertaken by Wildlife Trusts includes mixed species planting and often natural regeneration, which will help to spread the risk to woodlands from pests, diseases and extreme conditions. At sea, we are still gathering information to help gain a better understanding of how climate change is going to affect marine carbon stores and sequestration and how human activity is impacting on marine carbon stores.

Given the high level of action against this risk and because resilience is included as a core requirement for both our peatland restoration and tree planting activities, we have scored this as 'Sustain Current Action' for The Wildlife Trusts, but there is an obvious need for further research, especially around blue carbon stores.

Some other examples of action from The Wildlife Trusts include:

- Lancashire Wildlife Trust's [Winmarleigh Carbon Farm](#) is investigating the impact of peatland rewetting upon carbon emissions from peat soils, and looking into how this might be able to provide alternative income streams for landowners. Wildlife is also returning to Winmarleigh, with avocets and curlews nesting on site in 2021 and 2022 respectively.
- Somerset Wildlife Trust purchased [Honeygar Farm](#) in 2021, a former working dairy farm located on lowland peat soils. The Trust is rewetting the site and halting damaging activities to reduce carbon emissions and protect the remaining peat layer. When restored, Honeygar Farm will form a stepping-stone between peatlands, contributing to the overall vision to establish a 'Super National Nature Reserve' in the Avalon Marshes.
- In the Welsh Marches, on the Shropshire border, a large peat bog know locally as [Mosses](#), has been dug for peat for centuries and become very degraded. Shropshire Wildlife Trust has been involved in a Natural England-led project to re-wet and restore the Mosses, thanks to novel engineering techniques, felling of woodland and even removal of a scrapyard on the site. A network of wetlands is re-emerging, allowing dragonflies, hobbies, short-eared owls and weird insectivorous plants to flourish.

- As part of their tree planting schemes, Worcestershire Wildlife Trust is referring to Forestry Commission guidance on adaptation in woodland schemes<sup>20</sup>, and is aiming to select species that have maximum suitability while still being local to the area. Worcestershire has neutral, calcareous and acid/sandy soils so species mixes vary across the county.
- As part of the [Care-Peat programme](#), North Wales Wildlife Trust is restoring an area of previous conifer plantation to a functioning peatland at Cors y Sarnau Nature Reserve.
- Ulster Wildlife have completed a project called *Getting Northern Ireland Restoration Ready* to map and model marine habitats, including blue carbon habitats. The project produced predictive habitat models for marine habitats (seagrass, saltmarsh, kelp, native oysters, and blue mussels) to inform prioritisation of sites for restoration. It recommended field methodologies to estimate blue carbon values for these habitats and modelled coastal protection provided by kelp along the Outer Ards Peninsula.

**N6 Risks to and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)**

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this risk/opportunity as 'More Action Needed' at the national level due to the lack of adaptation apparent, particularly in the agriculture sector, given the large future level of risk and the need for more action to strategically plan land use to match future conditions.

While The Wildlife Trusts are not significantly involved in agricultural activities as a primary activity (and risks to our woodlands are covered under risks N1 and N6), between the Trusts we own over 30 working farms and use a variety of grazing livestock as part of our conservation grazing activities. We also provide advice to farmers and other landowners, which in 2021 covered over 240,000 hectares of land. A significant gap in knowledge is what the implications of future climate change are for conservation grazing, which also makes up 68% of the federation's collective direct greenhouse gas emissions. We need to

include future climate change impacts in our assessment of how our conservation grazing activities need to change over time, and hence have scored this risk/opportunity as 'Further Investigation'.

Examples of action from The Wildlife Trusts:

- Herefordshire Wildlife Trust have installed a solar-powered borehole water system at Parkey Meadow, a wetland site, to improve the availability of water for grazing livestock at times of low flows.
- Worcestershire Wildlife Trust had to resow 16.5 ha of conservation seed mixtures at Lower Smite Farm in 2022, as the original seeds planted in 2021 under their Countryside Stewardship scheme failed to establish due to a very cold and dry early spring in 2021, followed by heavy rains. This came at an additional cost of £8,000 to the Trust.
- Through several strands of grant funded work on peats, national Environmental Land Management System Test, and farm cluster work with key supermarkets and suppliers, Lincolnshire Wildlife Trust is identifying areas that could be given to make more space for water in order to reduce flood risk to key areas of farmland. They are also working with partners, through schemes such as the South Lincolnshire Water Partnership, to improve water management practices across whole landscapes.

**N10 Risks to aquifers and agricultural land from sea level rise, saltwater intrusion**

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
More Action Needed

CCRA3 scored this risk as 'Further Investigation'/'Watching Brief' at the national level due to a low level of overall future risk which is concentrated in specific areas, with sites in England and Wales benefitting especially from more investigation to understand the risk level before the amount of adaptation needed can be estimated.

The risk to aquifers from sea level risk is a high risk for some individual Trusts such as the Isles of Scilly Wildlife Trust, where sea level rise threatens groundwater supplies which make up 60% of the drinking water available on the island, as well as leading to the loss of

very rare coastal species on the island such as [shore dock](#). Because of the high level of localised risk to some Trusts, we have scored this risk as 'More Action Needed' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- North Wales Wildlife Trust is starting to investigate how saline intrusion may affect the habitat at Spinnies Aberogwen, an important wetland lagoon site near Bangor. The reserve is next to the estuary of the River Ogwen and the tidal mudflats known as Traeth Lafan, and its tidal flows attract a range of wildfowl, waders and raptors including osprey.
- Trimley Marshes are an entirely man-made freshwater habitat created to compensate for the loss of adjacent inter-tidal habitat when Felixstowe Docks were extended in the 1980s. The marshes are owned by Trinity College and Suffolk Wildlife Trust manage the marshes for the Felixstowe Dock and Railway

Company, who operate the port. These man-made marshes sit behind an earth flood-bank, and there is growing recognition that as sea levels rise, saltwater inundation and failure of the flood-bank will lead to losses. To help wildlife adapt, it will be necessary to create compensatory freshwater habitat further inland. Suffolk Wildlife Trust is proactively working with Trinity College to explore opportunities to create new freshwater habitats on arable land adjacent to the existing reserve, which in turn may develop into new inter-tidal habitats in the future.

- The Lincolnshire Wildlife Trust hosts the River Ancholme Catchment Partnership. Through its efforts developing the Partnership's catchment strategy, Lincolnshire Wildlife Trust is now working with local landowners to identify water storage areas, sited on low grade agricultural land in the lower catchment. Such interventions will help to reduce the impacts from increased fluvial flood risk up catchment of the Humber Estuary, predicted due to sea level rise and resultant bottlenecks at the tidal sluice gate where the river enters the Estuary.

**N11 Risks to freshwater species and habitats from changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts**

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
More Action Needed

CCRA3 scored this risk as 'More Action Needed' at the national level due to insufficient attention being paid to risks to freshwater habitats apart from reduced water availability; this includes a lack of plans and actions for increased water temperature and reduced water quality due to the concentration of pollutants at times of low flows.

Maintaining The Wildlife Trusts' nature reserves in good condition and expanding our reserves network will help to reduce the impact on freshwater species from changing climatic conditions and extreme events. However, we do not have a picture of risk for our freshwater sites and do not yet know what level of additional action is required to achieve a net increase in abundance and diversity of wildlife on our freshwater sites in the context of climate change. It is very likely that further adaptation of our freshwater sites will be required including addressing some of the off-site hydrological issues which affect our sites, hence we have scored this risk as 'More Action Needed' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Herefordshire Wildlife Trust is observing algal blooms on the River Wye, mainly caused by pollution but exacerbated by low flows and high summer

temperatures. The blooms are destroying water crowfoot beds as well as impacting on a range of other protected species. Action includes campaigning to reduce pollution from farm run-off into the river to control the incidence of blooms and improving the overall health of the river ecosystem.

- Suffolk Wildlife Trust and the Environment Agency have [planted over 900 trees](#) along exposed reaches of the River Gipping and its tributaries. The trees provide shade which limits heating of the water in summer, benefitting fish and invertebrate populations.
- London Wildlife Trust has observed that Farm Bog on Wimbledon Common, one of London's largest lowland mires, has been drying out for some time, and two other mires on the Common have disappeared. Much of its work has been about reducing encroachment by purple moor-grass, bramble and birch, and wetting the mire with the aid of sluices. The Trust is now working with the Wimbledon & Putney Common Conservators (the landowners), South East Rivers Trust and the Environment Agency on a Commons-wide project of restoration of all historic mires and streams.
- Suffolk Wildlife Trust undertook a £4 million project to rewet the 405 hectare [Carlton Marshes](#), which now comprises a jigsaw of grazing marsh, fens, peat pools, short fen meadow, tall fen (called 'tall litter fen'), dykes, pools and scrub. The site is now home to many marshland birds and birds of prey which include hobby and marsh harrier; to rare plants such as bog pimpernel, marsh cinquefoil, water soldier and frogbit; and to animals such as water vole and the rare fen raft spider which was successfully reintroduced to the reserve in 2012. Carlton and Oulton Marshes are also one of the best places in the UK for a range of freshwater snails, which reflects the good water quality in the dykes.

**N13 Opportunities to freshwater species and habitats from new species colonisations**

**National Score**  
Sustain Current Action

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 stated that at the national level, it was unclear whether further action was needed to improve conditions to allow freshwater species to move (including birds and insects associated with freshwater habitats), and so scored this opportunity as sustain current action.

Given that there is a lack of evidence both on the national risk and the sorts of actions that The Wildlife Trusts could take beyond protecting and restoring freshwater habitats, we consider this opportunity to be an urgent research priority for us and the urgency score is therefore 'Further Investigation' for The Wildlife Trusts.

Key to realising opportunities for freshwater species movements is likely to be the removal of barriers that impede connectivity and natural function, both within river channels, and between rivers and their floodplains.

Examples of action from The Wildlife Trusts:

- Warwickshire Wildlife Trust is developing a scheme to restore the River Sherbourne in Coventry which includes creating new wetlands and tackling barriers to fish passage. Detailed design is underway for schemes to remove or modify several weirs.
- Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust is involved in a 50-100 year [habitat restoration project](#), with 14 square miles of land restored to wild fen, creating a huge nature recovery network, covering 3,700 hectares. Currently 1,200 hectares have been restored (wetland created from arable reversion) and overall, 1,700 hectares are managed for conservation (this includes the two

National Nature Reserves, Woodwalton Fen and Holme Fen). Since the project started, the fenland area has seen the return of avocets, common cranes and of breeding lapwings, as well as rare wetland plants such as water dropwort.

- Essex Wildlife Trust is leading on the [Essex Fish Migration Roadmap](#), a decade long project to remove many of the 400 barriers to fish passage in the county. The roadmap, developed in conjunction with the Environment Agency and the Thames Estuary Partnership, is now driving delivery of a source-to-sea reconnection of rivers with the potential to allow species such as river lamprey and eels to recolonise Essex rivers.

N14

**Risks to marine species, habitats and fisheries from changing climatic conditions, including ocean acidification and higher water temperatures**

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this risk as 'More Action Needed' at the national level because current government-led plans and implementation are too generic given the size of the risk, and that major changes are expected to marine habitats and species even under moderate levels of warming.

Wildlife Trusts report that they are unclear on what can be actively done to manage climate change risks to our marine species beyond protecting and improving the condition of marine habitats. Actions to maintain and enhance habitat condition include management in all offshore Marine Protected Areas, introduction of Highly Protected Marine Areas, the operationalisation of the UK Marine Strategy to deliver Good Environmental Status and marine spatial planning and prioritisation. The protection and enhancement of carbon stores must be considered across all of these areas, especially with the scale of future infrastructure development we expect to see to meet net zero. Furthermore, more action is required to understand the accelerated risk of ocean acidification. This risk is therefore marked as 'Further Investigation' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- In response to a mass seabird wreck in 2014 linked to high storm activity, the Wildlife Trust for South and West Wales held an emergency appeal and also now includes seabird wrecks in its risk register. Its long-term monitoring and research programmes on Skomer and Skokholm Islands provide a 50-year data set to track changes in population trends over time, and monitor the impacts of climate change. Research has identified important marine areas for seabirds and cetaceans that can provide evidence for the Trust on the best areas to protect.
- North Wales Wildlife Trust is involved in a partnership to restore seagrass meadows with funding from the National Lottery Heritage Fund. [Seagrass Ocean Rescue](#) is also investigating how people are connected to the marine environment and how to share their knowledge through a public engagement programme.
- Ulster Wildlife is generating a baseline data set for elasmobranch and intertidal species in Northern Ireland, which are both data poor groups. The data is essential to make evidence-based management and conservation decisions, and to track changes in species distribution which may be due to a changing climate. The work is part of the [Sea Deep](#) programme funding through Esmee Fairbairn and the National Lottery Heritage Fund. The data is provided to CEDaR and is used by DAERA in decision-making.

N15

**Opportunities to marine species, habitats and fisheries from changing climatic conditions**

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this opportunity as 'Further Investigation' at the national level due to a lack of non-government as well as government action to consider the opportunities from beneficial new marine species coming into UK waters.

From The Wildlife Trusts' perspective, these benefits include enriching biodiversity in our UK waters and increasing public interest in marine wildlife. Each year, we publish an annual marine review which includes a review of unusual or new species being observed in UK waters; for the 2021 report, this included a walrus, pufferfish, ringneck blenny and furrowed crab. It is not clear however how much climate change is driving these changes, or what additional action The Wildlife Trusts should be taking to enable this opportunity, so we have scored it as 'Further Investigation'. We also need to consider how new species could compete with existing species and so recognise that not all new species will be beneficial (see risk N16).

Examples of action from The Wildlife Trusts:

- Sussex Wildlife Trust is working to support the Sussex nearshore trawling byelaw which will enable over 300

km<sup>2</sup> of marine ecosystem restoration. This will add resilience to marine species and habitats in the face of changing conditions, also providing better conditions for the arrival of any new species.

## N17 Risks and opportunities to coastal species and habitats due to coastal flooding, erosion and climate factors

### National Score

More Action Needed

### The Wildlife Trusts' Score

More Action Needed

CCRA3 scored this risk/opportunity as 'More Action Needed' at the national level because priority coastal habitats and species continue to be lost, coupled with a lack of strategic long-term planning for the coast.

The Wildlife Trusts are involved in a range of projects to realign the coast, restore and create new coastal habitat such as saltmarsh and mudflat, and protect our coastal species. We are also heavily involved in reviewing and objecting to planning applications that would result in the destruction of important coastal habitats. We are very active in this space, however we need a strategic plan to identify which sites we should prioritise for managed realignment and/or restoration. We hope the current refresh of Shoreline Management Plans will be informative, setting out priorities for investment in coastal defences which will provide an indication of likely future changes at these coastal sites. We have therefore scored this risk as 'More Action Needed' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Norfolk Wildlife Trust is restoring a naturally functioning floodplain at Hickling Broad, as an adaptation to sea level rise. Monitoring of the change in water level and habitat mix is ongoing. For example, there is likely to be a loss of woodland and wet grassland and a significant increase in wet reedbed/fen and open water.
- The Caen Wetlands project is looking to see how the Braunton Marshes can adapt to rising sea levels. Braunton Marshes is a low lying area of over 500 acres adjacent to Horsey Island, a Devon Wildlife Trust reserve that has reverted to mudflats and saltmarsh following a recent breach of the outer sea defences. The Trust has worked with APBmer and others to model the likelihood of a breach to the remaining sea defences and the costs of upgrading them. They have explored a number of possible managed breaches and wetlands creation designs and are working with Triodos Bank to model the financial investment that would be needed to make these work.
- Essex Wildlife Trust (with the help of the Environment Agency and Partners) restored valuable saltmarsh and coastal habitat in the Blackwater estuary at Essex Wildlife Trust's Abbots Hall nature reserve. In October 2002, the 3.5 km sea wall was breached in five places. The managed realignment area reverted 49

hectares of previously arable land into saltmarsh and intertidal habitat, with a further 35 hectares of coastal grassland and other terrestrial features created, including a lake. A subsequent managed realignment project was undertaken in 2015 by Essex Wildlife Trust and the Environment Agency on the Colne estuary at the Trust's Fingringhoe Wick nature reserve. This project provides 22 hectares of intertidal wetland and 1 hectare of reedbed on previously arable land. Both sites are fully functional for feeding waders and wetland birds and provide valuable fish nursery areas.

- Since Suffolk Wildlife Trust purchased Dingle Marshes (91 hectares) in 1999, almost 3 hectares of this coastal area has been lost to the sea, as natural processes 'roll' the shingle ridge that separates the brackish and freshwater habitats from the sea inland. Saltwater inundation of the marshes is a regular winter occurrence that impacts on freshwater fish populations which in turn impact on bittern that historically bred in the reedbed areas. It is anticipated that within the next 25-50 years, the freshwater habitats will be largely replaced by brackish and saltwater habitats. One species that will benefit however is the rare and endangered starlet sea anemone that can be found in the brackish lagoons on the marsh. The Trust is accepting and working with the natural processes to drive both the pace and nature of the changes.
- Cley and Salthouse Marshes lie within an area of Norfolk's coastline designated for managed realignment. The site is experiencing episodic saltwater intrusion on to freshwater reedbed and grazing marshes. Norfolk Wildlife Trust is assisting wildlife and the habitats at these sites to adapt to the shifting geomorphology of this coastline. They are actively rolling back drainage features, developing on-site features to aid evacuation of saltwater ingress across the sites, and have worked with the EA to create a new wetland site inland to compensate for the freshwater losses at Cley and Salthouse.



**N18 Risks and opportunities from climate change to landscape character**

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
More Action Needed

CCRA3 scored this risk as 'Further Investigation' at the national level due to a limited understanding of how far current actions to protect landscapes are managing the risk.

Landscape-scale action is at the heart of what we do, and most of our large conservation programmes are about protecting entire landscapes and restoring previously lost landscapes such as Celtic rainforest or through introducing native but lost species to renew landscape areas, such as reintroduction of beaver and bison. We are working to deliver a Nature Recovery Network – a joined up system of places needed to allow nature to recover and thrive. Wildlife Trusts are also undertaking community engagement schemes. For example, Somerset Wildlife Trust is using adaptation pathways to engage communities with a programme looking at the future of the Somerset Levels landscape. However, we are not yet considering or addressing landscape-scale change due to climate change across all our reserves and protected landscapes, so have marked this risk as 'More Action Needed' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- As of 20/21, 11 Wildlife Trusts have undertaken beaver re-introductions, with other Trusts investigating feasibility. The projects include ongoing monitoring and research to understand the landscape changes resulting from beaver activity. Early results from schemes in Cheshire, Cornwall and Devon suggest that there is better moderation of both high and

low flows in the catchments, as well as increased biodiversity and greater plant diversity around the beaver sites. In Devon, the site was intensively studied and monitored by the Trust and University of Exeter, looking at signs of change in habitat type and structure, biodiversity, land form, water quality and water flow. The research showed that the beavers have made a major difference, reducing peak flows and increasing basal flow, improving water quality and leading to marked enhancements to biodiversity, as well as storing significant amounts of water and carbon on site.

- Lincolnshire Wildlife Trust created Willow Tree Fen over 10 years ago which saw, in 2020, common crane return to breed successfully for the first time in 400 years. Bourne North Fen, purchased in 2022, will soon offer an additional multi-functional wetland nearby, helping to address water quality and resources issues as well as capture carbon. The Trust also propagates rare and common native, local provenance plants and will use these to repopulate Nature Recovery Networks across the county. The Trust piloted its 'Naturehoods' approach at Baston, where they worked with the local community across the village, creating nature highways, which is evolving into part of a new national programme called Nextdoor Nature.
- North Wales Wildlife Trust is part of the Alun and Chwiler Living Landscape scheme, currently being delivered through the Welsh Government's Sustainable Management Scheme. The three-year 'Woodlands for Water' project aims to create, connect and enhance habitats within the catchments of the Afon Alun and Afon Chwiler, with a particular focus on woodlands and improving water resource management within the two catchments. The scheme promotes sustainable land management approaches and works with farmers and land managers within the river catchments, particularly those looking to improve sustainability on the farm and strengthen the resilience of ecosystems in the face of climate change, as well as pests and diseases.

**H1 Risks to health and wellbeing from high temperatures**  
**B5 Risks to business from reduced employee productivity due to infrastructure disruption and higher temperatures in working environments**

**National Score**  
More Action Needed / Further Investigation

**The Wildlife Trusts' Score**  
More Action Needed

CCRA3 scored risk H1 as 'More Action Needed' at the national level due to the lack of action in place to address overheating risk in the built environment, and risk B5 as 'Further Investigation' due to a lack of understanding of how much autonomous adaptation businesses would take in the future.



NEW SHUTTERS AT DWT HEAD OFFICE © DEVON WILDLIFE TRUST

We have some examples of adaptations that Wildlife Trusts have put in place to reduce internal temperatures in our offices using passive measures rather than air conditioning. For example, Devon Wildlife Trust’s head office has had external shutters fitted. However, it is not yet clear whether all Trusts have undertaken an assessment of overheating risk in their offices, or whether measures are in place to ensure outdoor working is safe during periods of hot weather. We also need to produce more guidance on managing overheating risk for staff working from home. The Wildlife Trusts manage just over 300 hectares of reserves in urban areas for nature and want to see this increase markedly in part to improve urban cooling, working in collaboration with other partners in our towns and cities. As such, we have scored this risk as ‘More Action Needed’ for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- London Wildlife Trust’s new [Camley Street](#) centre has been designed with passive cooling built in alongside sustainable urban drainage measures, replacing an older building which was very prone to overheating in the summer.
- Although the advice and advocacy work of the Wildlife Trusts is outside of the scope of this report, it is worth noting that Trusts give advice on how nature-based solutions can be deployed in urban areas to reduce extreme heat risk; something we can also make use of ourselves. One example is London Wildlife Trust’s [A Cool Place to Live](#) report. The Trust also records its own spaces on the Greater London Authority’s [‘Cool Spaces’](#) webpage, showing shaded places of refuge for Londoners when temperatures are high.

**H3 Risks to people, communities and buildings from flooding**  
**B1 Risks to business sites from flooding**

**National Score**  
More Action Needed

**The Wildlife Trusts’ Score**  
More Action Needed

CCRA3 scored risk H3 and B1 as ‘More Action Needed’ at the national level due to an escalation of risk from flooding even under the most ambitious flood risk management plans currently in place nationally.

The Wildlife Trusts are involved in multiple projects to increase natural flood management in order to protect communities downstream, as well as to help support biodiversity. However, we do not yet have evidence of flood risk assessments being undertaken for all of our own buildings, whether measures are in place to ensure outdoor working is safe during periods of flooding, and we need to produce more guidance for staff on understanding flood risk for staff working from home. In addition, sites and staff can be impacted indirectly when flooding affects utilities and transport networks which can be very challenging to predict

in advance. As such, we have scored this risk as ‘More Action Needed’ for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Herefordshire Wildlife Trust is undertaking an urban natural flood management project to reduce flood risk in Hereford City by improving management of brookside habitats. This involves tree planting (also to improve urban cooling), improved management of bank side vegetation to increase water retention in rainfall events, and clearance of debris along the channel. The benefits to the local community are yet to be quantified.
- [The Sussex Flow Initiative](#) is being led by Sussex Wildlife Trust. The scheme is targeting natural flood management measures along the River Ouse in Sussex, including the creation of flood storage areas, cross-slope hedge planting and restoring washland meadows.
- [Adapting the Levels](#) – a partnership project between Somerset Wildlife Trust, FWAG SW, Somerset County Council and the Somerset Rivers Authority – works with communities in the Somerset Levels to create adaptation plans for flooding (and other climate impacts), with a focus on nature-based solutions. The programme is based around community and landholder involvement.

**N4 Risks to people, communities and buildings from sea level rise**  
**B2 Risks to business locations and infrastructure from coastal change from erosion, flooding and extreme weather events**

**National Score**  
More Action Needed

**The Wildlife Trusts’ Score**  
More Action Needed

CCRA3 scored risk H4 and B2 as ‘More Action Needed’ at the national level due to a lack of understanding of which places will be lost to sea level rise, as well as rising risk to business sites and clear benefits from additional support to critical sites along the coast.

The Wildlife Trusts are involved in multiple projects to reduce the impacts of sea level rise, including our work to restore and recover coastal habitats (see risk N17), and to engage communities in planning for the future using adaptation pathways such as in Somerset Wildlife Trust’s Adapting the Levels programme. However, we have not yet assessed the risk to our assets and all of our reserves from sea level rise, hence this risk is scored as ‘More Action Needed’ for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Lancashire Wildlife Trust is a member of the [Fylde Sand Dunes project](#), located south of Blackpool. Here, the Environment Agency is funding the project partners to deliver cheaper alternatives to hard-engineered flood alleviation schemes. The Trust is

overseeing a number of interventions including a scheme where local people plant old Christmas trees to help build up the width of the dunes. The scheme is protecting 493 homes from coastal erosion and 8 from flooding, and it should also protect a further 400 from projected sea level rise. The dune restoration does this at about one third of the cost of concrete sea defences. As an added biodiversity benefit, the Trust

has also been able to [reintroduce sand lizards to the dunes](#).

- Lincolnshire Wildlife Trust is working with key partners including Natural England, local planning authorities, and other environmental NGOs in the Lincolnshire open coast to develop a series of natural habitat sites that will form a super National Nature Reserve, but also act as natural barriers to storm surges.

**H5 Risks to building fabric**

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this risk as 'Further Investigation' at the national level due to a lack of evidence regarding the prevalence of damage to dwellings or household costs

for damage associated with climate hazards to building fabric. The magnitude and direction of future changes is also uncertain.

We have not undertaken any assessments of the risks from changing extreme weather (driving rain, wind storms, or landslips) to the building fabric of our offices and wider estate. As we do not know whether additional adaptation action is needed, we have also scored this as 'Further Investigation' for The Wildlife Trusts.

**B3 Risks to businesses from water scarcity**

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
More Action Needed

CCRA3 scored this risk as 'Further Investigation' at the national level due to a growing risk of drought but lack of information about possible future trends in water demand from businesses during times of water scarcity.

We do not yet have evidence that water efficiency measures have been installed in all of our premises and/

or that staff have been given guidance on how to improve water efficiency when working from home. As such, we have classed this risk as 'More Action Needed' for The Wildlife Trusts.

Examples of action from The Wildlife Trusts:

- Herefordshire Wildlife Trust has installed self-closing taps and water hippos to reduce water use in their offices.
- Hampshire and Isle of Wight Wildlife Trust has installed a rainwater harvesting system at Testwood Lakes Visitor and Education Centre.

**B4 Risks to finance, investment and insurance including access to capital for businesses**

**National Score**  
Sustain Current Action

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this risk as 'Sustain Current Action' at the national level due to emerging corporate and regulatory activities to measure and improve the resilience of the finance sector in particular, including the Taskforce on Climate-related Financial Disclosure (TCFD).

The Wildlife Trusts need to undertake an assessment of climate risk to our investments and check our insurance cover for risks such as flooding. We also need to better understand how climate change will affect future funding opportunities for nature recovery and community engagement programmes. Another factor is how the Trusts can buffer their financial reserves against shocks including repairs after flood events, investment needed to deal with invasive non-native species, and other threats which can be highly unpredictable and quickly empty financial reserves. Therefore this risk is classed as 'Further Investigation' for The Wildlife Trusts.



BEAVER © RUSSELL SAVORY

**B6 Risks to business from disruption to supply chains and distribution networks**

**National Score**  
More Action Needed

**The Wildlife Trusts' Score**  
Further Investigation

CCRA3 scored this risk as 'More Action Needed' at the national level due to the potential for major disruption to

supply chains and limited evidence of effective analysis and adaptation.

The Wildlife Trusts need to undertake an assessment of climate risk to our supply chains and the impacts of possible supply chain disruption before we can assess if more adaptation is needed, hence this risk is classed as 'Further Investigation' for The Wildlife Trusts

**B7 Opportunities for business from changes in demand for goods and services**

**National Score**  
Further Investigation

**The Wildlife Trusts' Score**  
More Action Needed

CCRA3 scored this opportunity as 'Further Investigation' at the national level due to a very low amount of evidence of demand for new goods and services, particularly at higher levels of global warming.

The main area where this opportunity applies for The Wildlife Trusts is in securing new funding for nature restoration primarily for its resilience benefits (such as natural flood management or urban cooling) for which markets are still small but growing. This is an active area of interest and we are working with a range of organisations to make the case for more investment directly in climate change adaptation products and services. Because we want to continue to encourage growth in the adaptation market for nature-based solutions, we have scored this opportunity as 'More Action Needed' for The Wildlife Trusts.



URBAN WILDFLOWER MEADOW © PAUL HOBSON

## 3. Adaptation assessment

### WHAT IS ADAPTATION?

Adaptation is defined as the process of adjustment to actual or expected climate change; in other words, preparing for climate change impacts. Adaptation actions are grouped into those that reduce the risks from climate change or facilitate opportunities where these exist. It is important to note that adaptation related to the natural environment is different from adapting human systems, because there are limits to how far human intervention can directly help species and habitats to adapt to the changing climate. Adaptation for the natural environment is mainly about improving the quality and extent of habitats and removing other human pressures such as pollution. It also involves active intervention to change the species composition on a particular site, or in some cases to actively move wildlife (plants or animals) from one location to another. This difference in the types of adaptation available is noted by the Intergovernmental Panel on Climate Change which has a separate definition of adaptation for the natural environment ([see glossary](#)).

### ADAPTATION FOR THE NATURAL ENVIRONMENT

The principles for good adaptation have for the past decade centered around the Lawton Principles, set out in Sir John Lawton's Making Space for Nature Report from 2010<sup>21</sup>. The Lawton 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.

The Lawton principles underpin the actions we and other environmental NGOs take to recover nature on our own reserves, as well as the advice we give to others. Ten years on from its publication however, there remain unanswered questions about what the outcomes and priorities should be for adaptation in the natural environment. These include:

- What constitutes good quality in a changing climate?
- Should there be greater prioritisation between maintaining ecosystem function, and conserving specific species, especially those that are rare?
- What does effective ecological connectivity actually look like, and how can it be delivered?
- Should other principles start to gain more recognition such as habitat diversification, establishment of refugia (small patches of habitat within larger areas which maintain a different micro-climate), or active translocation of species to help with dispersal?

An active area for consideration for The Wildlife Trusts over the next five years will be to debate these questions with our partners.

### NATURE-BASED SOLUTIONS

As well as helping to support adaptation of the natural environment to climate change, nature provides us with adaptation solutions that help to protect people from extreme weather impacts and improve their physical and mental health as the climate changes. These include the use of green and blue spaces in urban areas and around homes to reduce overheating and surface water flood risk, natural flood management measures such as tree planting on hillsides, peatland restoration to reduce the risk of wildfire, flooding to improve water quality, and retaining more water in the natural environment to help to reduce the effects of drought.

There is also good evidence that health and wellbeing are improved from access to good quality open and green spaces<sup>22</sup>. An update of the Marmot Review in 2020<sup>23</sup> found that health harm from climate change was increasing, and likely to affect more older people and deprived communities the most. To exacerbate this, access to nature is also worse for people in deprived areas and those with higher proportions of minority ethnic groups<sup>24</sup>. The Wildlife Trusts are in a strong position to address these challenges. People who regularly connect with nature, or take action for local wildlife and climate change, are more active, mentally resilient, experience reduced social isolation and loneliness and have better all-round health<sup>25, 26</sup>. Through our Team Wilder initiative, we will work with communities to take action for climate and nature.

These principles of adaptation form the basis of the adaptation action that we include in this report and are the cornerstone of all of the conservation work undertaken by The Wildlife Trusts, so that most of what we do counts as adaptation in one form or another.

### ADAPTATION ACTIONS FOR THE WILDLIFE TRUSTS FOR THE NEXT FIVE YEARS

Based on our assessment of the urgency of adaptation action above, the adaptation priorities for the next five years for The Wildlife Trusts are shown below, year by year.



**Table 1: The Wildlife Trusts' urgent adaptation actions for the next five years**

Adaptation actions for 2022:

- Take forward conversations with key partners (National Trust, RSPB, UK Government and devolved administrations, local authorities, National Parks, AONBS) on a framework for future conservation in a changing climate, building on the Lawton principles ([All N risks](#) and opportunities, in particular [N18](#))
- Assess how far our current reserves management practices and land advice go towards protecting and facilitating the movement of terrestrial and freshwater species and habitats up to 2050 in a changing climate, including a review of dispersal ability of key species and habitat connectivity for The Wildlife Trusts ([N1](#), [N3](#), [N11](#), [N13](#))
- Review, across our reserves, network plans for managing climate hazards. Share information across Trusts and create lists of actions that can be taken to reduce each hazard ([N1](#), [N4](#), [N5](#), [N6](#), [N11](#), [N17](#), [N18](#))
- Sustain planned actions to record and manage pests, pathogens and invasive non-native species and consider future risks, including emerging trends across the rest of Europe ([N2](#), [N12](#), [N16](#))
- Consider climate change impacts to future conservation grazing regimes ([N6](#))
- Include an assessment of overheating, flood and extreme weather risk for our offices in corporate policies, and provide guidance for home-based working on managing extreme heat and flooding ([H1](#), [B5](#), [H5](#))
- Collect information through our impact measures on money spent/area covered by natural flood management measures ([H3](#), [B1](#))
- Continue to scope out new funding opportunities for nature-based solutions based on their adaptation benefits ([B7](#))

Adaptation actions for 2023:

- Assess how we can plan for cascading and compound risks arising from climate change ([all risks](#))
- Develop new or different approaches to reserves management and land advice to facilitate adaptation for terrestrial and freshwater species and habitats ([N1](#), [N3](#), [N11](#), [N13](#))
- Review approaches to new reserve creation to maximise resilience in the future through e.g. fire breaks, choice of tree and other species, hydrology modelling ([N1](#), [N3](#), [N11](#), [N13](#))
- Sustain planned actions to record and manage pests, pathogens and invasive non-native species ([N2](#), [N12](#), [N16](#))
- Review how we can monitor new species that are arriving on our reserves and in marine protected areas around the UK ([N3](#), [N13](#), [N15](#))
- Review how climate change will affect plans for nature recovery networks ([All N risks and opportunities](#))
- Bring together Wildlife Trust evidence and research on soil condition and changes for our land holdings ([N4](#))
- Gather more evidence on the risk of saline intrusion for Wildlife Trust landholdings and review possible adaptation options ([N10](#))
- Working in partnership with relevant stakeholders, assess what additional adaptation actions can be taken to help marine wildlife to adapt to climate change ([N14](#))
- 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 ([N17](#), [H4](#), [B2](#))
- Scope out available evidence and undertake research to inform us of possible future options for managing lowland and upland farming, to inform our land management advice ([N6](#))
- Assess how far our urban land holdings are contributing to reducing overheating and flood risk and how these benefits can be enhanced ([H1](#), [B5](#))
- Assess what additional passive cooling, water efficiency, property-level flood management or other measures to manage risks from extreme weather are needed for our buildings ([H1](#), [B5](#), [H3](#), [B1](#), [B3](#), [H5](#))
- Review climate risks to our supply chains, investments and insurance coverage for flooding and other extreme weather ([B4](#), [H3](#), [B1](#), [H5](#), [B6](#))
- Continue to scope out new funding opportunities for nature-based solutions based on their resilience benefits ([B7](#))
- Devise a framework for considering climate risk in land acquisition strategies ([all N risks and opportunities](#))

Adaptation actions for 2024:

- Sustain planned actions to record and manage pests, pathogens and invasive non-native species ([N2](#), [N12](#), [N16](#))
- Review the condition of peatland, woodland and saltmarsh sites we manage, including impacts that have led to carbon losses (e.g. wildfire) and evidence of improved resilience due to management such as re-wetting ([N5](#), [N6](#))
- Design a new framework or principles for managing landscape-scale change due to climate change on our sites ([N18](#))
- Review and quantify the provision of adaptation services through our nature restoration work and report on this ([B7](#))
- Continue to scope out new funding opportunities for nature-based solutions based on their resilience benefits ([B7](#))

Adaptation actions for 2025 - 2027:

- Sustain planned actions to record and manage pests, pathogens and invasive non-native species ([N2](#), [N12](#), [N16](#))
- Report on new species arriving and species being lost across our reserve network and marine protected areas around the UK ([N3](#), [N13](#), [N15](#))
- Continue to scope out new funding opportunities for nature-based solutions based on their resilience benefits ([B7](#))
- Review the latest assessment of risks and opportunities at the national level in the fourth UK Climate Change Risk Assessment (CCRA4)
- Update our adaptation report and/or report in line with the next reporting cycle of the Adaptation Reporting Power

**ADAPTIVE CAPACITY IN THE WILDLIFE TRUSTS**

As part of this first report, we have undertaken a high level assessment of adaptive capacity across The Wildlife Trusts. This measure gives us a sense of the resources, skills and information (the capacity) we have available to adapt to climate change. We have used the same framework provided to UK local authorities back in 2010 (National

Indicator 188); this indicator is no longer used but it carries an excellent reputation with the UK adaptation academic community and is a quick and useful measure to apply to the movement.

The four measures of adaptive capacity are explained in detailed guidance<sup>27</sup>, and are summarised below.

**Table 2** – Definitions of adaptive capacity levels taken from the NI188 indicator

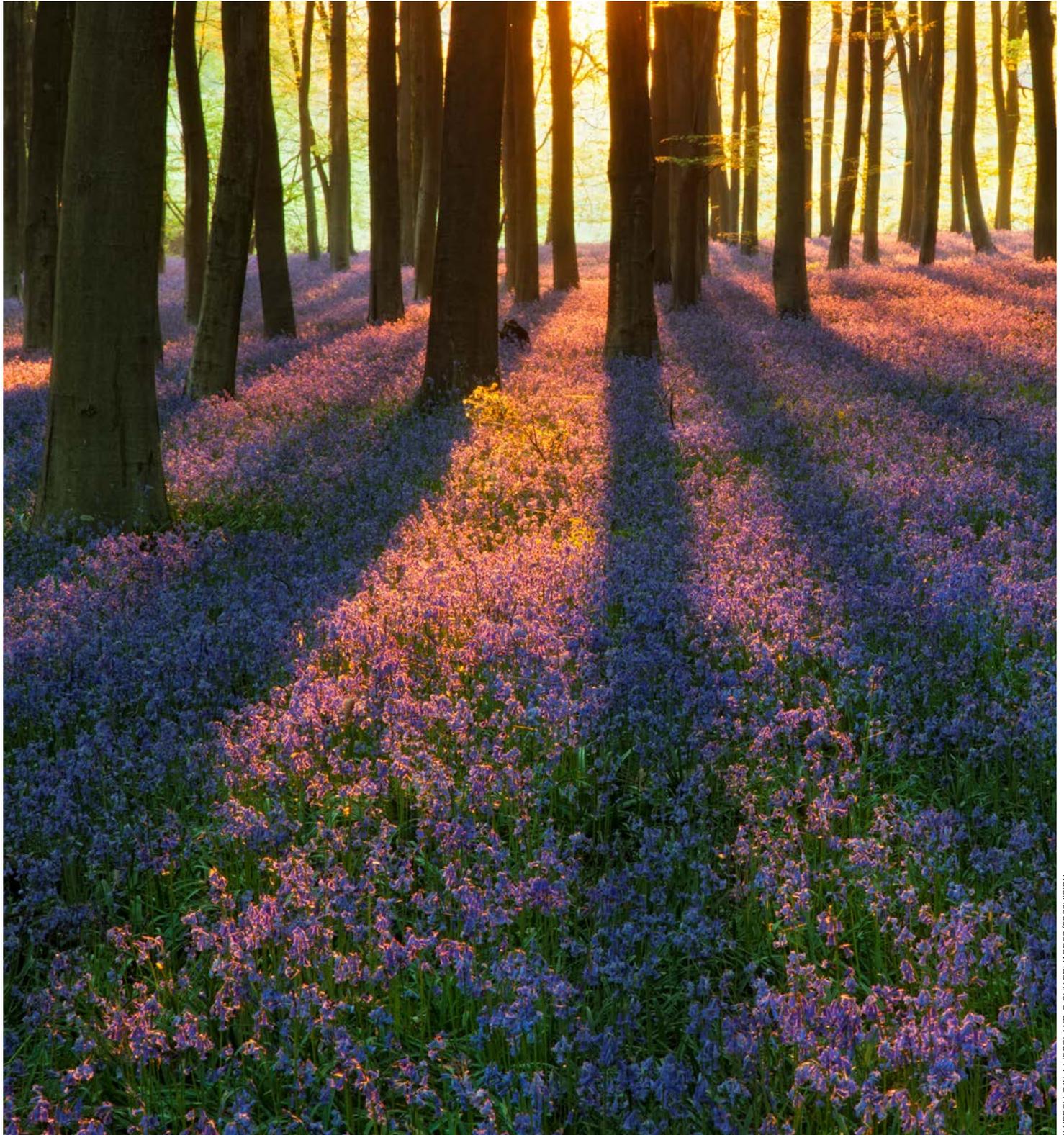
Adaptive Capacity Level	Description
0 – Getting started	The organisation has begun the process of assessing the potential threats and opportunities across its estate and services and has identified and agreed the next steps to build on that assessment in a systematic and coordinated way.
1 – Public commitment and impacts assessment; assembling an evidence base	The organisation has made a public commitment to identify and manage climate-related risk. It has undertaken a local risk-based assessment of significant vulnerabilities and opportunities to weather and climate, both now and in the future. It can demonstrate a sound understanding of those not yet addressed in existing strategies and actions. It has communicated these potential vulnerabilities and opportunities to internal staff and other local partners and has set out the next steps in addressing them.
2 – Comprehensive risk assessment (with prioritised action in some areas)	The organisation has undertaken a comprehensive risk-based assessment of vulnerabilities to weather and climate, both now and in the future, and has identified priority risks for its services. It has identified the most effective adaptive responses and has started incorporating these in its strategies, plans, partnerships and operations. It has begun implementing appropriate adaptive responses in some priority areas.
3 – Comprehensive action plan (and prioritised action in priority areas)	The organisation has embedded climate impacts and risks across its decision making. It has developed a comprehensive adaptation action plan to deliver the necessary steps to achieve the existing objectives set out in its strategies, plans, investment decisions and partnership arrangements in light of projected climate change and is implementing appropriate adaptive responses in all priority areas.

As is the case for our risk and adaptation assessment, at the level of individual Wildlife Trusts, adaptive capacity scores will differ significantly. A small number of Trusts are likely to be achieving level 3, while some will be at level 0. Across the movement as a whole, our assessment is that we are operating at level 1, for the following reasons:

- The Wildlife Trusts have made a public commitment to identify and manage climate risk, both through this report and The Wildlife Trusts’ [Climate Change Position Statement](#).
- Individual Trusts are recognising the interconnectedness of the climate and nature crises and are beginning to include specific adaptation objectives alongside mitigation.
- Through this report, we have started the process of undertaking a movement-wide risk assessment, with some local elements such as the spatial assessment of risk to our reserves.
- We have a good understanding of gaps in our adaptation planning.
- RSWT has employed a senior Director for Climate Change and Evidence, who is also an adaptation specialist and can help to boost resource across The Wildlife Trusts.
- Staff from across The Wildlife Trusts have been engaged in a webinar series through 2021 and 2022 on climate risk and adaptation, and we have also started hosting dedicated public events on adaptation such as in our Wild LIVE series on Youtube.
- We have not yet undertaken a comprehensive assessment of vulnerabilities to weather and climate. Only a few Wildlife Trusts report that adaptation is included in their own strategies.
- We have not yet identified the most appropriate adaptation actions for many of our priority risks, including how we manage our reserves in the future.
- We have not yet embedded climate risk and adaptation across all of our decision making.
- A survey of Wildlife Trusts suggests that on the whole, staff time spent explicitly on adaptation planning is low. Only 1 Trust has reported that it has full-time staff working on adaptation exclusively. Though many Wildlife Trusts report having dedicated staff working on climate and sustainability, it is not known how much staff time is spent exclusively on adaptation as opposed to mitigation or wider sustainability work. We have also not yet measured the extent to which nature reserve managers and wider countryside advisory staff are building adaptation into their regular work.

- Wildlife Trusts have reported that they have not yet developed any specific approaches to measuring the climate resilience of landscapes, assets or operations.
- Feedback from one Wildlife Trust sums up the position many Trusts are in; “We are so focussed on the day-to-day of managing sites and accessing funding for biodiversity enhancement projects that we have not prioritised this forward looking work, which is long overdue”.
- No Wildlife Trusts have reported that they are measuring their own climate resilience.

We will update our assessment of our adaptive capacity across the movement in the next iteration of this report.



## 4. Working with others

### PARTNERSHIPS ON ADAPTATION

The Wildlife Trusts are one of the largest land-holding NGOs in the UK. We have an important role in delivering adaptation to support nature on the ground, in addition to implementing actions that will make our federation more resilient to the changing climate.

For the first of these in particular, partnership working is critical. Nature does not operate in silos across the country; everything is connected. The decisions that other land-holders make, whether that is farmers, foresters, estate owners, councils or other NGOs, all affect our own work to build better resilience for wildlife.

We are therefore involved in a number of partnerships to bring adaptation for the natural environment together. Individual Wildlife Trusts help to coordinate hundreds of local partnerships that aim to restore and expand high quality habitats and support species. There are too many to summarise here, but each Trust has details of its local partnerships on its own website. Some of the national partnerships we are involved with that include climate change adaptation are:

- A coalition of nine of the largest land-holders in the UK, led by the National Trust, signed a Nature-based Solutions Compact in 2021, which included a principle to ensure all nature-based solutions had resilience as a key objective<sup>28</sup>.
- The Wildlife Trusts are a member of Wildlife and Countryside Link's climate and nature-based solutions working group, and we also meet regularly with RSPB and National Trust to share information and updates on our work to adapt to climate change.
- The Wildlife Trusts are a member of the Climate Coalition, which is working to develop public understanding of actions that can make a difference to climate change adaptation.
- We are a key partner in the development and piloting of the IUCN Global Standard for nature-based solutions, which includes a criteria that nature-based solutions must address climate change adaptation. Risk assessment and adaptive management are also built in as core components to the standard.
- The Royal Society of Wildlife Trusts currently hosts the IUCN peatland programme.
- The Wildlife Trusts are represented on the UK Government's National Adaptation Programme biodiversity and ecosystems working group (England only).
- We are represented on a number of relevant health networks including the Climate Cares Coalition, Collaboration for Wellbeing & Health, Advisory Group for the Government's Green Prescribing for Mental Health demonstration programme, WCL Link's 'Nature and Wellbeing Strategy Group' and the UK One Health Coordination Group.

### OVERCOMING BARRIERS AND PROMOTING ENABLERS TO ACTION

As well as investing in building our own capacity to adapt, The Wildlife Trusts are also reliant on wider shifts in policy and practice to better enable us to take action. Some of the key barriers highlighted by Trusts where we need wider change to facilitate adaptation are:

- SSSI designations based on historic site features or presence of particular species is hindering the flexibility needed to adapt the protected sites we manage for the future climate. In England, Natural England are undertaking a review of the designations framework to consider how this barrier can be addressed.
- Funders of nature-based solutions are not yet supporting adaptation activities to the same degree as nature recovery or climate change mitigation activities; a market with clear returns on investment does not yet exist.
- Countryside Stewardship agreements limit the physical changes that can be made to land.
- Complex land ownership patterns can mean that ownership is highly fragmented, making it difficult to conduct adaptation projects across large enough areas.
- There are too few opportunities to share best practice and learn from others, partly due to the pressures of keeping up with day-to-day operations with stretched resources, but also due to a lack of opportunities and fora to share adaptation actions with others in the UK and overseas.
- There is a lack of government support to build the right skills and knowledge to help small organisations to address their climate risk and take adaptation action.
- There are limitations in how much we can engage with academic research due to resource constraints.

One of the major enablers for action in The Wildlife Trusts is our members, volunteers, and wider citizen science. The Wildlife Trusts have a special role across the UK in promoting and supporting grassroots action to protect and recover nature and address climate change, given our history and federated structure with local focus but national relevance. Working with volunteers and communities, we can build strong, relatable narratives around specific schemes that promote climate resilience, with a strong spatial focus. One example is the public campaign around the River Wye, in which several Wildlife Trusts are involved. Herefordshire Wildlife Trust is now supporting several citizen science groups who are carrying out independent monitoring of conditions on the river. Another example is in Somerset where the Trust is developing a Community Climate Adaptation toolkit as part of the Team Wilder initiative. North Wales Wildlife Trust is part of the all-Wales 'Stand for Nature Wales' youth engagement project on Anglesey, collaborating with young people to take action on both adaptation and mitigation and improve skills and knowledge, funded through the National Lottery Communities Fund. These are only a few of dozens of such examples

One of our greatest strengths as The Wildlife Trusts is in supporting this kind of action in our local areas, bringing people together to create a truly national effort on nature restoration and climate adaptation.

## Annex A — CCRA3 risks considered in this report

The list below shows the 61 risks and opportunities assessed in the most recent UK Climate Change Risk Assessment, with the 26 highlighted as most relevant to The Wildlife Trusts.

**Table 3** – Risks and opportunities (highlighted in green) covered in the risk assessment for The Wildlife Trusts

Natural Environment	Infrastructure	Communities, health and built environment	Business	International
<b>N1</b> Risks to terrestrial species and habitats from changing climatic conditions and extreme events	<b>I1</b> Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures	<b>H1</b> Risks to health and wellbeing from high temperatures	<b>B1</b> Risks to business sites from flooding	<b>B7</b> Opportunities for business from changes in demand for goods and services
<b>N2</b> Risks to terrestrial species and habitats from pests, pathogens and invasive species	<b>I2</b> Risks to infrastructure services from river, surface water and groundwater flooding	<b>H2</b> Opportunities for health and wellbeing from higher temperatures	<b>B2</b> Risks to business locations and infrastructure from coastal change from erosion, flooding and extreme weather events	<b>ID2</b> Opportunities for UK food availability and exports from climate impacts overseas
<b>N3</b> Opportunities from new species colonisations in terrestrial habitats	<b>I3</b> Risks to infrastructure services from coastal flooding and erosion	<b>H3</b> Risks to people, communities and buildings from flooding	<b>B3</b> Risks to businesses from water scarcity	<b>ID3</b> Risks and opportunities to the UK from climate-related international human mobility
<b>N4</b> Risk to soils from changing climatic conditions, including seasonal aridity and wetness.	<b>I4</b> Risks to bridges and pipelines from flooding and erosion	<b>H4</b> Risks to people, communities and buildings from sea level rise	<b>B4</b> Risks to finance, investment and insurance including access to capital for businesses	<b>ID4</b> Risks to the UK from international violent conflict resulting from climate change on the UK
<b>N5</b> Risks and opportunities for natural carbon stores, carbon sequestration and GHG emissions from changing climatic conditions	<b>I5</b> Risks to transport networks from slope and embankment failure	<b>H5</b> Risks to building fabric	<b>B5</b> Risks to business from reduced employee productivity due to infrastructure disruption and higher temperatures in working environments	<b>ID5</b> Risks to international law and governance from climate change overseas that will impact the UK
<b>N6</b> Risks to and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions	<b>I6</b> Risks to hydroelectric generation from low or high river flows	<b>H6</b> Risks and opportunities from summer and winter household energy demand	<b>B6</b> Risks to business from disruption to supply chains and distribution networks	<b>ID6</b> Opportunities from climate change (including arctic ice melt) on international trade routes
<b>N7</b> Risks to agriculture from pests, pathogens and invasive species	<b>I7</b> Risks to subterranean and surface infrastructure from subsidence	<b>H7</b> Risks to health and wellbeing from changes in air quality	<b>B7</b> Opportunities for business from changes in demand for goods and services	<b>ID7</b> Risks from climate change on international trade routes
<b>N8</b> Risks to forestry from pests, pathogens and invasive species	<b>I8</b> Risks to public water supplies from reduced water availability	<b>H8</b> Risks to health from vector-borne diseases		<b>ID8</b> Risk to the UK finance sector from climate change overseas
<b>N9</b> Opportunities for agricultural and forestry productivity from new/alternative species becoming suitable.	<b>I9</b> Risks to energy generation from reduced water availability	<b>H9</b> Risks to food safety and food security		<b>ID9</b> Risk to UK public health from climate change overseas

<b>N10</b> Risks to aquifers and agricultural land from sea level rise, saltwater intrusion	<b>I10</b> Risks to energy from high and low temperatures, high winds, lightning	<b>H10</b> Risks to health from water quality and household water supply		<b>ID10</b> Systemic risk arising from the amplification of multiple risks cascading across sectors and borders
<b>N11</b> Risks to freshwater species and habitats from changing climatic conditions and extreme events	<b>I11</b> Risks to offshore infrastructure from storms and high waves	<b>H11</b> Risks to cultural heritage		
<b>N12</b> Risks to freshwater species and habitats from pests, pathogens and invasive species	<b>I12</b> Risks to transport from high and low temperatures, high winds, lightning	<b>H12</b> Risks to health and social care delivery		
<b>N13</b> Opportunities to freshwater species and habitats from new species colonisations	<b>I13</b> Risks to digital from high and low temperatures, high winds, lightning	<b>H13</b> Risks to education and prison services		
<b>N14</b> Risks to marine species, habitats and fisheries from changing climatic conditions, including ocean acidification and higher water temperatures				
<b>N15</b> Opportunities to marine species, habitats and fisheries from changing climatic conditions				
<b>N16</b> Risks to marine species and habitats from pests, pathogens and invasive species				
<b>N17</b> Risks and opportunities to coastal species and habitats due to coastal flooding, erosion and climate factors				
<b>N18</b> Risks and opportunities from climate change to landscape character				

## Annex B — Projections used in hazard mapping

a) Indicators selected from the [UK Climate Risk Indicators project](#)

CRI Indicator	CRI Variant	CRI Metric	CRI Scenario	CRI Strand	CRI Member	CRI Spatial resolution	CRI Time period
Max Temperature	Summer	Change - °C from 1981-2010 baseline	3°C in 2100	UKCP18 probabilistic	Median	Local authority	2041-2070
Low river flows	2-year	Change - % from 1981 - 2010 baseline	Warming Level of 2°C	UKCP18 Global HadGEM3	Median	Region	N/A (we are taking the 2°C scenario to reflect the change in the 2050s in a scenario of a 3°C rise in global temperature by 2100)
Met Office fire danger	Very High	Absolute number – Days per year	3°C in 2100 (compared to a separate run of number of days in 1981-2010 baseline)	UKCP18 probabilistic	Median	Local authority	2041-2070

**Notes:**

Where it is an option, we have used the 3°C by 2100 scenario. Otherwise, where only a generic warming level is available we have used the 2°C warming level as a change for 2050 that is roughly consistent with 3°C of warming by 2050 (see table SPM.1 in IPCC (2021) Summary for Policymakers, in: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change).

We have used local authority areas where these are provided to give the most detailed spatial information available, otherwise we have used regions.

Where provided, we have either used the UKCP18 probabilistic scenarios or the UKCP18 HadGEM3 scenarios as these have a good spread of uncertainty (probabilistic scenarios), or because most published papers have used the HadGEM3 dataset which also has a slightly higher drying effect in summer than the alternative CMIP5 dataset (low river flows). We have used median estimates where a probability range is provided.

We have used the time period centred on the 2050s as a sensible period to aim for in adaptation planning for The Wildlife Trusts.

b) Indicators taken from the third [UK Climate Change Risk Assessment Evidence Report](#) – Projections of Future Flood Risk led by Sayers and Partners

Spatial Area	Time period	Climate Scenario	Adaptation scenario	Sources of flooding	Metric name	Population change	CRI Time period
Country (England, Northern Ireland, Scotland, Wales)	2050s	4°C by 2100	Current level of adaptation (CLA)	All	No. of hectares of most important habitats exposed to frequent flooding (SAC, SPA, Ramsar)	Low	2041-2070

**Notes:**

Scenarios chosen to be most consistent with the scenarios selected using the CRI metrics. A 3°C scenario by 2100 is not available under the Sayers and Partners flood projections, so instead we have selected 4°C by 2100 rather than the alternative 2°C by 2100. The metric ‘number of hectares of most important habitats’ does not accurately reflect the same spatial distribution as The Wildlife Trusts’ reserves network, but at a national level gives a high level indication of the scale of change in flood risk from all sources (coastal, fluvial, and pluvial).

## References

- 1 <https://www.wildlifetrusts.org/about-us>
- 2 The Wildlife Trusts (2021) *Our Year for Wildlife: Impact Report 2020/21*.
- 3 <https://www.wildlifetrusts.org/about-us/our-history>
- 4 <https://www.wildlifetrusts.org/sites/default/files/2018-11/A%20Living%20Landscape%20%28full%20report%29.pdf>
- 5 <https://www.wildlifetrusts.org/strategy-2030>
- 6 Intergovernmental Panel on Climate Change (2021) *Sixth Assessment Report: Working Group 1 – The Physical Science Basis*.
- 7 IPBES (2019): *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. S. Díaz, J. Settele, E. S. Brondízio E.S., H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBES secretariat, Bonn, Germany.
- 8 [Global Biodiversity Intactness Index](#) | Natural History Museum (nhm.ac.uk).
- 9 Intergovernmental Panel on Climate Change (2022) *Sixth Assessment Report: Working Group 3 – Mitigation of Climate Change*.
- 10 Intergovernmental Panel on Climate Change (2022) *Sixth Assessment Report: Working Group 2 – Impacts, Adaptation and Vulnerability*.
- 11 Climate Change Committee (2021) *Independent Assessment of UK Climate Risk*.
- 12 Berry, P. and Brown, I. (2021) *Natural environment and assets*. In: The Third UK Climate Change Risk Assessment Technical Report [Betts, R.A., Haward, A.B. and Pearson, K.V. (eds.)]. Prepared for the Climate Change Committee, London.
- 13 [Climate Risk Indicators](#). Available at <https://www.uk-cri.org/>
- 14 <https://www.ukclimateresilience.org/>
- 15 Sayers, P.B., Horritt, M, Carr, S, Kay, A, Mauz, J., Lamb R, and Penning-Rowsell E (2020). *Third UK Climate Change Risk Assessment (CCRA3): Future flood risk*. Research undertaken by Sayers and Partners for the Committee on Climate Change. Published by Committee on Climate Change, London.
- 16 UK Climate Risk sector briefings on high temperatures and flooding/coastal change, available at <https://www.ukclimaterisk.org/independent-assessment-ccra3/briefings/>
- 17 <https://www.nbcnews.com/news/world/wildlife-animals-suffer-europe-s-summer-extreme-heat-n899096>
- 18 <https://www.bbcwildlife.org.uk/news/some-it-hot-our-wetlands-do-not>
- 19 Hayhow DB, Ausden MA, Bradbury RB, Burnell D, Copeland AI, Crick HQP, Eaton MA, Frost T, Grice PV, Hall C, Harris SJ, Morecroft MD, Noble DG, Pearce-Higgins JW, Watts O, Williams JM. *The state of the UK's birds 2017*. The RSPB, BTO, WWT, DAERA, JNCC, NE and NRW. Sandy, Bedfordshire.
- 20 Forestry Commission (2020) *Managing England's woodlands in a climate emergency; Forestry Commission (2010) Climate change: impacts and adaptation in England's woodlands; UK Forestry Standard Practice Guide: Adapting forest and woodland management to the changing climate*.
- 21 Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.J., Tew, T.E., Varley, J., & Wynne, G.R. (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra.
- 22 *Fair Society, Healthy Lives, a strategic review of health inequalities. The Marmot Review*. (2010) UCL Institute of Health Equity.
- 23 *Health Equity in England: the Marmot Review ten years on*. (2020) UCL Institute of Health Equity.
- 24 *What are health inequalities (Williams; Buck; Babilola)* - The King's Fund (2020)
- 25 *Urban green spaces and health - a review of evidence: World Health Organisation Europe* (2016)
- 26 Defra evidence statement on the links between the natural environment and human health (Lovell et al; 2017)
- 27 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/218800/ni188-guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/218800/ni188-guidance.pdf)
- 28 [Some of the nation's largest landowners make unprecedented pact to jointly tackle the climate and nature crises | National Trust](#)



The Wildlife Trusts is on a mission to restore a **third of the UK's land and seas** for nature by 2030. We believe **everyone, everywhere, should have access to nature** and the joy and health benefits it brings.

No matter where you are in the UK, there is a Wildlife Trust inspiring people about nature and **standing up for wildlife and wild places**. Each Wildlife Trust is an independent charity formed by people getting together to make a positive difference for wildlife, climate and future generations. Together we care for 2,300 diverse and beautiful nature reserves and work with others to manage their land for nature, too. You can help us bring wildlife back in abundance by becoming a **member of your Wildlife Trust** today.

### The Wildlife Trusts

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