



for birds
for people
for ever

CLIMATE CHANGE

wildlife and adaptation



20 TOUGH QUESTIONS, 20 ROUGH ANSWERS

Foreword

Mark Avery, RSPB Director, Conservation

No-one working in nature conservation or environmental protection can now doubt the extent of the climate crisis. We are facing unprecedented change to the conditions that support life on earth, with more than likely devastating consequences for people and wildlife.

Yet although we know that the coming change will be huge and wide-reaching, we do not yet have the knowledge to predict exactly how ecosystems will change – or indeed the precise weather patterns of the future.

So, like any endeavour facing uncertainty, nature conservation must rise to the challenge of protecting existing assets, whilst also retaining the flexibility to respond to new dangers and opportunities. The balance between consolidation and innovation will have to be finely judged if we are to do our duty by our planet's extraordinary diversity of life.

The RSPB's plan for adapting to climate change – which we readily acknowledge as work in progress – is based on securing healthy populations of wildlife today whilst also preparing for future changes in the distribution of

species and the composition of habitats. We will build flexibility into our nature reserve management and take climate change into account in all future conservation plans. We will invest boldly in creating new habitat, set within landscapes that allow for the movement of species. Such landscapes should also yield other benefits to society, such as climate mitigation, water regulation and the provision of local high-quality food.

This document seeks to explore the key questions we face in refining and implementing this plan. As well as sharing our current thinking as a 'rough guide' to nature conservation adaptation, we are seeking to learn from fellow practitioners, decision makers, business and the public. We'd like to hear your thoughts, as this will help us build a strong, shared strategy for nature conservation that will meet the challenges of climate change. Send your comments to climateadaptation@rspb.org.uk or adaptscotland@rspb.org.uk



1

Climate change: how much, how fast?

The Earth's climate has changed repeatedly in the past, and there is evidence to show how life on our planet has responded to these changes. However, three things make the current situation different: the changes we are experiencing now are largely attributable to human activity; their scale is greater than has been experienced for many hundreds of thousands of years; and they are happening at what many believe to be an unprecedented rate. We know that a rise of 2°C would be at least equivalent to the warmest global climate conditions of the last 2 million years, while a rise of 3.5°C or more might be unparalleled for as many as 10 million years. The significance of this is that most of the world's species have evolved in a world much cooler than the one we now face.

The change for the UK will be large, perhaps dramatic: 40% of our land area is expected, under the 2050s' High Emissions' scenario, to have climate unlike any currently found here. All future climate scenarios for the UK point towards hotter, drier summers and milder, wetter winters. Extreme weather events – such as heavy rainfall, high winds, very hot days – will become more common.

'Both the "destination" and the rate of the changes in global climate projected for the present century are very likely to be without any precedent in recent Earth history – and hence unprecedented during the "evolutionary lifetime" of most species on Earth today, ourselves included.'
Brian Huntley¹

Recent flooding is consistent with climate change predictions for more frequent extreme weather events



2

How will climate change affect wildlife?

Studies of the global impact of climate change on wildlife have rightly made headlines: a million species on the path towards extinction by 2050; the end of polar bears by the 2080s; the collapse of seabird populations. There are some climate change winners, but scientists predict that the overwhelming effect of climate change upon biodiversity will be damaging. The ways in which climate change will affect wildlife are quite complex and all of them interact.

They fall into the following broad categories:

- **Impacts on 'climate space':** favourable climate conditions are moving location, requiring species distributions to shift typically north and uphill.
- **Changes in the timings of seasonal events:** these can lead to a range of ecological mismatches, such as the availability of food for young birds, leading to their starvation.
- **The impacts of extreme weather events:** extreme events such as storms and droughts can kill individuals through cold, wetness, inundation or starvation. Where these become more frequent, they can have effects at the population and species levels.
- **Changes in community ecology:** changes to competitive advantages between species and the spread and impacts of invasive species and diseases are likely to lead to markedly different communities of plants and animals than those we know now.
- **Changes in land use and management:** as the climate changes, farming, forestry, water management and many other land uses are likely to change with it. These activities are all-important for wildlife, and the way they adapt may offer both opportunities and threats to biodiversity.

Climate change affects wildlife in a variety of inter-related ways



3

Can we predict individual future fortunes?

There is a growing body of evidence showing how climate change is already affecting wildlife. Examples include wading birds and wildfowl overwintering on the east coast, because harsh weather is no longer driving them further west; British dragonflies expanding their ranges northwards by an average of 75 kilometres in 25 years; and plants growing for an average of three weeks longer than they did in 1980. We can also use models to help us understand the ways in which species may respond to climate change in the future. The Climatic Atlas of European Breeding Birds² gives us a new insight into the scale of the potential distribution changes of European birds, and an early idea about which species are likely to be the most vulnerable to these shifts. A further source of information about how wildlife might respond to climate change is the palaeological record, which shows us that species have tracked suitable climate change in the past, though we must remember that the current rate of climate change is thought to be unprecedented.

However, our current sources of information are not sufficient for us to be able to predict with any great confidence the exact nature and pace of the reaction of any individual species to climate change. There are many sources of uncertainty, including uncertainty about the future climate itself; about the ways in which different kinds of impacts will interact to affect species; and about the speed at which species are likely to be able to track suitable climate space. This uncertainty is a crucial factor in thinking about, and planning for, the response of nature conservation to climate change.

Wading birds and wildfowl overwinter on the east coast, because harsh weather is no longer driving them west.



4

Why won't wildlife adapt naturally?

Even if greenhouse gas pollution by humans ended today, we would still face continued climate change up until the 2050s, culminating in a global temperature rise of just under 2°C above pre-industrial levels. Without urgent mitigation action, this situation could be far worse.

The current situation represents an unprecedented challenge to wildlife, both in terms of its scale and speed. It is also taking place against an historical background of massive habitat loss and degradation, as a result of development, agricultural intensification, pollution, drainage, drought and other pressures. Only relatively small areas of our present countryside are protected or managed as habitat for wildlife, and these are set within a wider landscape which contains many barriers to movement, including roads and railways, urban areas and intensively managed farmland and forestry. In this context, there is every reason to believe that wildlife will find it difficult to respond successfully to the new threat of climate change without further help. Action to strengthen existing populations, to restore habitat and to facilitate movement through the wider countryside must therefore be a priority.

The current situation represents an unprecedented challenge to wildlife, both in terms of its scale and speed.



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How should nature conservation respond?

The RSPB is committed to help implement the Convention on Biological Diversity 1992 in the UK, through promoting the recovery of threatened species, protecting and restoring our best areas of habitat, and ensuring that the wider countryside is managed in ways that support wildlife. We believe strongly that this broad approach to nature conservation will remain appropriate in the years to come. Yet climate change does require new thinking, and a new flexibility in how we address our core mission. We cannot predict the exact future distributions of many species, nor the composition of the communities these species will come to form, so we must adapt to take account of this uncertainty.

The RSPB advocates a twin-track approach to climate change adaptation. We aim to increase the **resilience** of the natural environment against the impacts of climate change through a range of pro-active measures. We must continue to tackle the non-climate pressures that still threaten so much wildlife, including persecution, pollution and habitat loss. At site level, we can 'buy time' for species by maintaining appropriate conditions for their survival in the shorter term and hence bridge the gap

between current and possible future distributions. This might involve planning for future water availability, adjusting grazing and mowing regimes to suit changing phenology of growing seasons, or developing mechanisms to counter the impacts of stronger winds and drier summers.

Secondly, we must **accommodate** change, by making it easier for wildlife to track suitable climate conditions and habitat through the countryside. Modelling shows the broad scale and significant extent of species' expected movements. These need to be accommodated through the creation of a more coherent network of protected sites, linked within wider, sustainably-managed landscapes. Achieving this will require a bold partnership of Government, planners, businesses (including farm and forestry businesses), landowners and NGOs, and will deliver social and economic as well as environmental benefits.

Strong wildlife populations today are needed to face the challenges of the future



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Is today's conservation work still relevant?

Resolving the problems that threaten wildlife today is essential if healthy populations are to survive to colonise new habitat in the future. Our current conservation action is therefore not only relevant but a vital start to adaptation to climate change.

We must however fund conservation action properly. The RSPB has investigated how much investment is required to address existing, non-climate threats to wildlife. We estimate a shortfall of at least £300 million per annum in current resources for implementing the UK Biodiversity Action Plan. Restoring and managing designated sites will require additional funds. Without proper funding to current conservation efforts, it will be much harder, if not impossible, to address the new challenges of climate change, since these will be acting on habitats and species already weakened by a whole range of other human activities.

On land we do at least have many of the structures in place to tackle threats to the natural environment, even if we do not always resource and use them as effectively as we should. These include a protected area network, basic environmental protection measures and management agreements with farmers and other landowners. But the marine environment is different and more vulnerable, because we have no network of marine protected areas, no means of strategically planning for the future and many of the laws controlling the use of the seas are out of date and ineffectual. Climate change is already affecting marine biodiversity, to the extent that scientists are regarding changes in the North Sea as a regime shift, piling additional pressure on this threatened environment. Renewed conservation efforts, including strong and precautionary marine legislation, are essential to increase the resilience of marine ecosystems to climate change, strengthen populations and increase the likelihood of successful adaptation in the future.

We must help wildlife cope with current pressures before climate change adds a further burden



Images of Birmingham (Alamy)

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Should we change biodiversity targets?

The UK's biodiversity targets set an important short-term benchmark for conservation action, identifying species and habitats that have suffered from human development and defining actions to address their declines. They remain valid, even with the likely impacts of climate change on future distributions.

For species, actions to protect existing populations should be reinforced, to make them healthy sources for new populations in the future. Actions to restore or create new populations should focus on areas of overlap between existing and future projected climate space, which are likely to offer the best 'no regret' options under different scenarios. Where no overlap exists, consideration should be given to creating stepping-stones between current and future projected climate space for a species. In some cases new targets may be needed for species which may lose large areas of suitable climate space in the future, even if these are threatened or declining now.

For habitat targets, the challenge is slightly different. Whilst areas of woodland, wetland and grassland will continue to exist across the UK under future climate

scenarios, their ecological composition will probably change. In response to this, we may need to develop different measures of habitat quality to those based on stable species assemblages. For example, we may wish to maintain the structural diversity of a wetland, ensure water quality and availability, and maintain prey species to support populations of water birds and mammals.

Targets for increasing current habitat extent should take these factors into consideration. They nonetheless remain an essential element of the UK's conservation strategy, both to address past losses and to prepare for the impacts of climate change.

Above all, however, target setting needs to be grounded in monitoring of actual changes. Targets cannot be 'proofed' for future climate change, they can only be adapted as changes are observed and understood, retaining the overall objectives of nature conservation: to conserve and restore the biological diversity of our planet.



David Tipling (spb-images.com)

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What's the future for protected areas?

Land managed specifically for nature conservation provides strongholds for wildlife in a changing environment, offering protection from human impacts such as pollution, persecution and development. There is sadly no evidence that these pressures will lessen as a result of climate change; indeed, many of them are likely to intensify as climate impacts compound existing problems and put more pressure on resources such as water and productive land. For this reason alone, climate change will increase the importance of protected areas for wildlife: criticisms that protected areas are static anachronisms in a newly dynamic world are ill-founded.

We can also adapt these strongholds for wildlife to take account of the impacts of climate change, along the principles of resilience and accommodation. By 2015, site management should be working towards optimising biodiversity for the 2050s. The RSPB is reviewing its nature reserve management to this end. We will assess reserve objectives and the risks to these from climate change, and put in place measures to manage these risks at a site level, and to increase resilience. We will also refine monitoring and review, to determine at what point

management objectives need to be revised to reflect observed changes.

Individual sites should also be seen as part of an expanded and strengthened network that can accommodate shifts in species' distributions. This network should reduce the fragmentation of semi-natural habitat and improve the opportunities for dispersal of species. Habitat creation, in particular, should focus on areas that are likely to be of strategic importance with regard to climate change. The RSPB and Durham University have developed a methodology to identify the potential locations of future Important Bird Areas with climate change, in our work with African partners, which will be extended in the future to cover IBAs in Europe.

The lifeline of nature reserves and protected areas will be even more important with climate change



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Are wildlife laws fit for purpose?

The UK is committed, under the Convention on Biological Diversity and the Gothenburg target of halting biodiversity loss by 2010, to ensuring the survival and recovery of species that are declining because of human activities.

A range of laws aims to meet these obligations, with the Birds and Habitats Directives, and those securing national protected sites networks, the most significant. A recent analysis of the Birds Directive shows how very effective these laws can be in protecting and enabling the recovery of wildlife³. We must not lose these benefits, and yet we must also ask whether our laws remain fit for purpose as climate change bites?

The RSPB believes that protected areas are a vital component of adaptation strategies for wildlife. Yet some change in the species interest of particular sites is inevitable, and may in some places be significant. Some newly-arriving species may become new interest features and integrated into site management objectives. Where an interest feature has been irreversibly lost, removal from the designation and management objectives may be appropriate. Our initial analysis of both EU and UK protected area laws suggests that they are already

capable of allowing these adjustments⁴, which must of course only happen as a result of the real-life situation and not ahead of time, based on the uncertainties of predictive models.

The Birds and Habitats Directives both also include Articles which can provide a legal framework for the creation of a more 'permeable' wider countryside. Longstanding they may be, yet these Directives still provide the litmus test for sustainable living and the framework for assessing development proposals. They just need the political will to plan and fund their full and imaginative implementation.



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Will we need more land for wildlife?

Scale matters in nature conservation. Larger sites usually offer a greater variety of conditions for a wider range of species; they buffer sensitive features from external pressures such as pollution and drought; they allow for more cost-effective management, making better use of natural processes; and they support species which require mosaics of different kinds of habitats, or a large range, to complete their life-cycles. The impacts of climate change are likely to strengthen the case for larger areas of habitat, set within sympathetically managed landscapes which can also yield food, fuel and fibre. Areas of suitable micro-climate for vulnerable species are more likely to be retained on sites which are larger, and hence encompass a wider variety of conditions.

New areas of habitat will also be needed to offset losses of habitat, for example at the coast, and from changing countryside management. Habitat regeneration and new nature sites should be planned to take into account likely future climate space for species, as well as the need to reduce fragmentation, by creating an integrated network of protected areas set within sustainably managed landscapes.

Sadly, despite having targets for habitat creation in place since the mid 1990s, Government has consistently failed to live up to its promises in this area. Delivery at the scale required to address historical losses and deal with the new threat of climate change will require a step change in existing habitat restoration and creation effort. The RSPB plans to double the area it manages for nature conservation by 2030 – and this needs to be a component of a much larger programme.

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Would re-wilding help wildlife?

Some argue that because climate change makes it impossible to predict which species will occur where in the future, it would be better to restore the broad conditions that generate and support life, rather than seek to 'pin down' individual species in particular places.

This is certainly an attractive idea. The RSPB is keen to adopt a more dynamic approach to land management on new or expanded sites, particularly where zoning can allow greater flexibility and innovation at a landscape scale. In some places, this may come close to re-wilding. Such experimental management is already underway at some sites and includes projects to develop ecosystems service benefits alongside wildlife conservation. One of our recommendations is for Government to take a much more active role in promoting and facilitating such projects in the future.

However, we must also recognise the reality that large parts of our landscape have been altered to support agriculture, flood protection and urban development. In many places (though not all), reversing these changes would not be compatible with maintaining lives and

livelihoods, and might destroy much-loved and vibrant farmed landscapes.

Nor, sadly, is there a guarantee that re-wilding could provide the conditions needed to help wildlife adapt to climate change. Even in places where some aspects of 'wild nature' can be restored, problems such as water pollution may take many decades to address. The absence of large herbivores in our environment (other than as livestock) means that the landscape we create by re-wilding is unlikely to resemble the conditions in which much of our wildlife evolved. This means that we cannot be certain that such an approach would actually aid the survival of species in the countryside. This is why we propose an approach to adaptation which continues to use site management to support resilient populations of birds, plants and animals, whilst also exploring the potential for more 'relaxed' or 'dynamic' approaches over wider areas.



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Can we help species move with climate change?

Species need to track suitable climate space as it shifts location, generally moving north and east in the UK. Evidence shows that this is happening for some species already, and it is likely that it will accelerate as climate change progresses. And yet we have a landscape which is intensively used by people, includes many barriers to the free movement of species, and has too few habitat features to aid dispersal.

Clearly, nature conservation has a role to play in addressing this issue. However, there is little current consensus on the practical measures needed to make the countryside 'permeable' to species moving in search of new climate space and habitats. Wildlife corridors have been proposed as one solution, but some recent studies suggest that they are unlikely to be effective for all species, and may even have perverse effects, acting as 'predator traps' or conduits for the spread of invasive species. One species' corridor may be another's barrier.

Research is urgently needed to determine which groups of species rely on what type of features in the landscape for dispersal. But in the meantime, some simple approaches can be taken to make the countryside more hospitable to wildlife. Multiplying the numbers of hedges, ponds, water-filled ditches, patches of woodland, scrub and extensively managed grasslands and field margins will help.

Agri-environment schemes are perfectly placed to deliver these features within the farmed landscape. Ensuring that these schemes are fully funded and available to all land managers is a key challenge for any Government wishing to ensure that wildlife survives the impacts of climate change. Land-use planning, too, can help wildlife to respond to climate change by securing habitat and features to support biodiversity in the early stages of new developments.

Species movements need to be accommodated in our modified landscapes



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Should conservation still focus on species?

Lapwings, red kites, bitterns and black grouse: species are the focus of many nature conservation programmes and of much popular support for conservation. But as climate change bites, some question whether the unit of the species will still hold as a valid focus for nature conservation.

This seems to us irrational and potentially dangerous for biodiversity. Species are the building blocks of habitats, from which landscapes, ecological processes and ecological services flow. Climate envelope modelling and the palaeological record both show that species respond individually to climate change, suggesting that conservation should pay attention to species' particular circumstances. Species are also the planet's silent majority of life, subject to and (without our help) many unable to withstand the consequences of human development. Giving up on protecting species would be giving up on our most fundamental duty, and the job our supporters expect us to do.

Action for individual species will remain essential, to protect biodiversity from a whole range of non-climate related threats and to ensure that healthy populations facilitate the colonisation of new climate space, as it becomes available. Until we achieve the utopian position of supporting biodiversity wholly by means of sustainable habitat management at landscape scale, we will need individual interventions to protect threatened species if we wish to avoid the extinction crisis threatened by man-made climate change.

Over time, we will however need to revise which species we choose as the focus of our activities – as indeed conservation has done for many decades. There will be occasions when we need to recognise that changing climate may make species conservation untenable in particular locations or even regions. As stated previously however, this must be based on observation and not modelling projections. And all decisions about species must be made in the context of their long-term survival at bio-geographical and global scales.

Action for individual species remains vital to maintain biodiversity in a changing climate



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Is translocation likely to become important?

Climate change is causing species distributions to change. All future climate projections show continuing average global temperature rises, and the need for species movement will only increase over the coming decades. Yet our landscape is full of physical barriers to movement – such as intensively managed farmland, and towns, roads and other developments. There is thus considerable doubt about the ability of species to track new climate space successfully, without further intervention, particularly in view of the fast rate of climate change.

We have argued for the need to facilitate species' movements by extending and connecting protected areas, creating new areas of habitat and increasing the permeability of the wider landscape through the creation of new habitat features. Some very specific measures to overcome barriers such as roads may also need to be developed, perhaps like the half-kilometre-wide green bridges over motorways in the Netherlands.

However, some species with very low dispersal powers may still not be able to disperse naturally to new locations of suitable climate. Indeed, reptiles and amphibians are actually retreating southwards in the UK, failing to find new suitable areas in what should be an increasingly suitable landscape. Translocation programmes will need to be considered for poorly dispersing species, if these are to survive the impacts of climate change.

The RSPB will monitor the ability of birds to respond to predicted changes in the distribution of suitable climate change, and, where there is evidence of serious problems, we will consider the most effective means of intervention to ensure species' survival. The experience we have gained with red kites, white-tailed eagles, curlew and corncrakes will stand us in good stead to manage translocation programmes in the future.



Both scientific modelling projections and real-world experience show that climate change may make the future unviable for some species. Costa Rica's golden toad has the dubious distinction of being the first species apparently driven to extinction by climate change. Can we predict climate change casualties? And what should we do in situations where the future may look bleak?

Models projecting future climate space for species are useful pointers, but they are not absolute predictions. Future climate scenarios show significant differences, for example, when run through different global climate models. And understanding the likely responses of individual species to climate change remains out of reach at present, since we cannot achieve either the refinement of scale or the detailed consideration of ecology that this would require. The watch-word is uncertainty: we cannot, with confidence, predict which species are likely to be 'doomed'.

What is more, there are good reasons for treating the developing period of climate 'chaos' as a phase of high global temperatures, from which mitigation programmes will take us into a new era of climate stabilisation and recovery. Species thought to be vulnerable from climate change this century should therefore be accorded *more* conservation effort, to see them through a short-term phase of climatic difficulty.

We should also keep in mind that a long-term future in which no suitable climate space exists for species now occurring naturally in the UK equates to a sustained temperature rise above our current mitigation goals. It is widely acknowledged that anything above a 2°C rise represents 'dangerous' climate change, risking unprecedented sea-level rise, millions of deaths, mass migration and a global extinction crisis. If we mitigate climate change sufficiently to sustain our own lives and livelihoods, there will be few, if any, 'doomed' species in the UK.

More conservation effort may be needed for species like twinflower to see them through a period of climatic stress



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Can conservation help adaptation in other sectors?

We all need to adapt to climate change – from building different kinds of houses that are more resilient to floods and more comfortable in hot temperatures, to growing different kinds of crops and treating water as the scarce and precious resource it will increasingly become.

We must avoid a situation where the adaptation actions of one sector compromise sustainable adaptation in another, or threaten our ability to protect the innocent victims of climate change – including vulnerable species and ecosystems. Thus, the RSPB would vigorously oppose an adaptation response in the water sector that sought to reduce the amount of water available to support wetland habitats, in response to future scarcity. Agricultural land use may alter most rapidly of all, especially if genetic modification is used, and could outstrip wildlife's ability to adapt. To avoid such unsustainable outcomes, the Government must take an overview of adaptation actions in different sectors, and include a health check to ensure that they help, rather than hinder, adaptation in the natural world.

Yet while there is the potential for conflict, there is also the potential for synergies across the adaptation plans of different sectors, particularly through sustainable land management which can benefit wildlife conservation. For example, the future costs of flood risk management in the urban environment are alarming. Yet a part of these costs could be offset by scaling down flood defences in some agricultural areas and rewarding farmers instead for recreating wetlands. As well as storing water and alleviating flooding, these would help address losses of wetland habitat due to sea-level rise and reduce habitat fragmentation in farmed landscapes.

Climate change affects all countryside interests, which must work together to develop complementary and sustainable adaptation plans



Can adaptation provide ecosystem services?

Human beings have a moral obligation to sustain the extraordinary variety of life on this planet which we now effectively control. But there are also powerful economic and social arguments for taking action to protect biodiversity and ecosystems. Ecosystems provide a complex web of services for people, which cannot be easily and cost-effectively replaced. Globally, biodiversity conservation has the potential to contribute significantly to mitigating climate change, and to help human societies adapt to its impacts.

The Millennium Ecosystem Assessment developed a typology of ecosystem services, recognising four broad categories:

- **Provisioning services**, eg food, fresh water, fuel wood, genetic resources.
- **Regulating services**, eg climate regulation, disease regulation, flood regulation.
- **Cultural services**, eg spiritual, recreation and tourism, aesthetic, inspirational, educational.

- **Supporting services**, those needed for the provision of the other services, such as soil formation, nutrient cycling, primary production.

Natural and semi-natural habitats in the UK provide all these types of services. Further work is needed to accurately quantify the extent and value of these functions, yet we are able to estimate their value to be in the region of hundreds of millions of pounds in the form of reduced flood risk, better water quality, carbon storage and sequestration, health benefits, tourism and recreation revenues, and education provision.

Action to help biodiversity adapt to climate change will help to maintain and restore these services, and should be seen as a major contribution to ensuring that the UK's land resources are managed in a sustainable manner. The RSPB is committed to further research to identify and quantify ecosystem services, and to integrate their delivery into its own conservation work.



Adaptation to climate change must address uncertainty as a central theme. We do not know exactly what future conditions will be like, or how they will affect species, habitats and ecosystems. Different global climate models have significantly different projections for the local effects of climate change. The exact relationship between atmospheric CO₂ and global temperature rise is also under debate, and we do not know the scale of greenhouse emissions over the coming decades. The scientific models that assess the impact of climate change on biodiversity are built upon these uncertainties, and are relatively simplistic in comparison to the multitude of factors that will affect species distributions in the future.

There are two important responses to these uncertainties. Firstly, we should adopt management approaches that both assess risk and learn from experience. We need to clarify our objectives; identify risks to these objectives under different climate change scenarios; and put in place no- and low-risk responses to these hazards, which take into account short-, medium- and longer-term needs. Monitoring provides an essential feedback loop to assess effectiveness and develop action accordingly.

Secondly, we must also lessen the extent of uncertainty, by increasing our knowledge and understanding of the likely impacts of climate change on biodiversity. The RSPB is already engaged in a wide-ranging programme of conservation science in this area, which includes:

- documenting and understanding the mechanisms by which climate change impacts affect wildlife, for example through ecological studies of single species
- projecting the future impacts of climate change, for example by developing modelling of the distribution of future climate space of birds
- investigating the value of different adaptation strategies, for example by using bio-climate models to assess the ability of Important Bird Area networks to encompass future ranges birds
- examining the potential for land-use to mitigate climate change, for example by reviewing the impacts of peatland management on biodiversity and carbon stores.

What role should Government play?

Historically, the UK's Governments have recognised the special relationship that the people of our islands have with the natural world. Some have been leaders in the fight against biodiversity loss: even in the midst of the Second World War, Churchill was able to establish a committee of natural historians to safeguard the UK's wildlife, because we 'would need something to enjoy when it was over'. Since then, UK Governments have helped to build an important protected areas network; introduced legislation to prevent the persecution of wildlife; and focused the world's attention on wildlife through the Convention on Biological Diversity.

But we have never needed leadership for biodiversity conservation so urgently as we need it today. It is hard to overstate the gravity of the crisis faced by wildlife at home and abroad from climate change, and the responsibility that therefore falls upon today's politicians to address this man-made disaster.

Mitigation is our only hope of long-term salvation – for this reason, the RSPB is pressing for an 80% reduction in CO₂ emissions by 2050, as the UK's fair share of the cuts needed to avoid catastrophic climate change. Yet mitigation should not compromise our wildlife heritage of species or of special places and sound Government planning can, and should, prevent this while still achieving the emissions cuts that we need.

Mitigation alone, however, is not enough. We are already committed to global temperature rises that could wreak havoc on our natural environment if we do not act to adapt. We need our Government to commit itself to this task, to inspire action and to wield the policy tools required to help avert disaster. It is through protected areas governance, and the policies shaping agriculture, forestry, planning and water resources that we can ensure a future for wildlife in a changing world.

There is widespread and growing public support for action to tackle climate change and safeguard our unique wildlife heritage



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What needs to happen next?

We believe that the Government must have a bold vision for adapting to climate change. In essence, we must commit ourselves to **help protect the world's vulnerable people, species and ecosystems from the impacts of climate change, by ensuring that policies and resources are in place to enable them to adapt.**

The framework for delivering this vision will need to be carefully designed. Adaptation needs to be considered in an integrated manner across sectors, rather than in isolation, given that many activities will need to alter alongside changes in nature conservation practice.

We propose that the Government delivers such a vision through adaptation action programmes established in Climate Change legislation. Each key sector (nature conservation, agriculture, forestry, water management, land use planning and international development) must develop objectives within an overall vision. 'No regrets' options for management, that maximise the delivery of multiple benefits across sectors, should then be developed and taken forward.

The overall objective for the nature conservation sector in the UK must be to conserve and enhance biodiversity, by enabling wildlife to survive, thrive and adapt to the conditions imposed by a changed climate. To achieve this, Government should work to achieve:

- **Resilient populations of wildlife in healthy habitats.** At present, 1,149 of the UK's species of plants, birds and animals are listed under the BAP as being under threat or with concerns over their populations⁵. The UK is committed to halting biodiversity loss by 2010.
- **A massively increased area of land managed for environmental benefits.** Data (only available for England) suggest that 4% land is currently managed with nature conservation as a primary objective, whilst 10% of land is protected by law from damaging activity. Another 30% of land delivers some environmental benefit alongside its primary use. We think this is insufficient. At least 20% of land (all land protected by law for its nature value, plus a similar amount to provide buffering and linkage) should be managed with biodiversity as a core

objective, in some cases alongside other activities. Outside this, *all* our land should deliver some environmental benefit.

- **A countryside more permeable to wildlife**, with key habitat features present across all farmed, forested and urban landscapes.
- **Biodiversity conservation and sustainability safeguards built into the adaptation plans of other sectors**, to help deliver the above and ensure that natural resources such as water are available to support wildlife as it adapts to climate change.

We have given thought to the tools required to secure these outcomes, with the best use of available resources and development of innovative new funding sources. The following proposals should be included in the programme for adaptation:

- **Strengthening and fully implementing wildlife laws.** This is key to increasing the resilience of our existing wildlife resources in the face of climate

change, and a key element of sustainable development. In the marine environment, the creation of strong new legislation is needed, and a network of marine protected areas. On land, the UK's nature conservation agencies must fully implement the Birds and Habitats Directives and secure appropriate management of all SSSIs and ASSIs.

- **Delivering current Biodiversity Action Plan targets** for all listed species and habitats as a matter of urgency. The BAP objectives should be formally incorporated into the adaptation plans of all local authorities, public bodies and Government departments.
- **A national map of habitat creation opportunities for all four countries of the United Kingdom, with recommendations for priority locations for new projects.** This should be developed by the Statutory Agencies, to inform agri-environment targeting, forestry planning and regional and local land-use planning regimes. Priority locations should be based on extending and buffering existing semi-natural

habitat, and on providing new habitat in areas that are strategically significant for climate change adaptation.

- **A planning policy requirement in which areas of the highest potential for habitat creation are safeguarded from development**, to be delivered through regional and local planning processes.
- **Novel financial mechanisms to encourage investment in large-scale habitat creation in priority areas**, including (for example) tax incentives for companies to deliver environmental objectives in these areas.
- **A programme of action to improve landscape permeability**, ensuring that all forestry, farmland and urban areas include minimum amounts of key habitat features. This can be delivered through cross-compliance and agri-environment schemes, forestry grant schemes and planning guidance. Such features would often contribute small-scale ecosystem

services, for example buffering water courses from pollution, or providing shade for farm animals.

- **Biodiversity checks on adaptation plans for the water sector, flood risk management, agriculture, forestry and planning**, to ensure that adaptation plans use opportunities to deliver conservation benefits and avoid further damage to wildlife.

These actions should be **underpinned by a continuing and enhanced commitment to agri-environment spending**, and to woodland grants focused on delivering benefits for biodiversity and ecosystem services. These schemes enable land-owners to create a more sustainable countryside and make a core contribution to nature conservation in the UK. If fully funded, they could deliver the enhanced level of effort required to help wildlife adapt to climate change.



Sharing your views References

We will be delighted to hear about anything this document raises with you. Our views represent our current thinking and will develop as we learn more.

We hope that future revisions of this document would reflect the continuing contribution of others in this fascinating, and vital, debate.

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The RSPB is the UK charity working to secure a healthy environment for birds and wildlife, helping to create a better world for us all.

The RSPB is a member of Stop Climate Chaos (www.icount.org.uk), a coalition of environment, development, faith-based, women's and other organisations.

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