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Introduction

Climate change presents a severe threat to the future well-being of all life on earth and in particular presents substantial short and long-term risks to the conservation of forests, woodlands and trees. This document sets out the Woodland Trust's position on addressing climate change through the inter-related themes of public engagement, mitigation and adaptation.

Evidence for accelerating climate change has built relentlessly over the past few years. Global average temperatures increased 0.74°C in the last 100 yearsⁱ; the 1990s was the warmest decade in the last 1,000 years; many ice sheets and glaciers worldwide are retreating; the frequency of floods, droughts and storms is increasing; populations, ranges, migration patterns, and seasonal and reproductive behaviour of animals and plants, on land and in the sea, are changing. The evidence that these changes are caused principally by human activity releasing greenhouse gases is now incontrovertible^{ii,iii}.

The Intergovernmental Panel on Climate Change projects that atmospheric carbon dioxide (CO₂) levels (the main greenhouse gas), which have already risen from pre-industrial levels of 275-285 parts per million (ppm) to 379 ppm in 2005^{iv}, will rise to between 730 and 1,020ppm by 2100^v. Global average temperatures are projected to rise by between 1.1 and 6.4°C and sea levels by between 18 and 59cms by 2100^{vi}. The current rate of warming is almost certainly without precedent since the end of the last Ice Age 10,000 years ago.

Global climate change will have wide-ranging effects on human societies and the economies upon which they depend through, for example, impacts upon water supply, crop productivity, disease and flooding. It is already clear that even if CO₂ emissions were reduced by 80% overnight, the accelerated warming of the last 50 or more years would continue. Mankind is sitting on a greenhouse gas timebomb. So while it is crucial that strenuous efforts are urgently made to reduce CO₂ emissions, adapting to the change that has already begun is a necessity and has to start now.

We know that change is happening and happening fast. Global climate models show broad agreement about what will happen by 2050 but whilst the UK Climate Impacts Programme (UKCIP) has sought to apply these global projections to the UK there is far greater uncertainty as to their accuracy. So if projective models can only give us some idea of what climatic changes might be in store^{vii}, it is even harder to project what these changes might mean in turn for wildlife^{viii}, agriculture, forestry, health, flood control, business and leisure. Such models focus on general trends rather than on the expected increase in frequency of extreme events such as droughts and storms which are likely to drive both policy and ecological responses.

One thing is certain. Without international co-operation it will not be possible to tackle the spiralling CO₂ emissions. Governments, businesses and other organisations must work in partnership and every individual has a responsibility to respond to mankind's greatest challenge. This is truly a global and trans-generational crisis without precedent. And yet, despite the urgency, to date there has been an almost complete failure in the UK and abroad to match the rhetoric with political action.

Climate change and forests, woodland and trees

Human society has been responsible for increasing the input of CO₂ into the atmosphere mainly because of the exploitation of fossil fuels (oil, gas and coal), which have been huge carbon stores under the earth's crust for millions of years. However carbon is also stored for considerably shorter periods of time at the planet's surface in vegetation, soil and sediments under the sea and in fresh water, and disturbance of these also releases CO₂ into the atmosphere. Forests and trees are therefore inextricably linked to the causes of, and responses to, climate change.

Global deforestation, despite attempts to prevent it, accounts for 18% of total human greenhouse gas emissions^{ix}. Deforestation in the Amazon rainforest in 2004 was the second greatest ever according to the Brazilian government's own figures. Satellite photos and other data showed that ranchers, loggers and especially soy bean farmers felled more than 10,000 square miles^x. Such major deforestation releases massive amounts of stored carbon into the atmosphere.

Moreover the response of the remaining forests to rises in global temperatures is complex. Their ability to absorb CO₂ may also diminish. The Hadley Centre, for example, has developed a climate change model which takes account of the carbon cycle. This shows that release of carbon from soils will outstrip the ability of vegetation including trees to absorb it as temperatures rise. Substantial forest dieback in some areas such as northern South America will occur as the area becomes warmer and drier, also leading to release of carbon^{xi}. On the other hand increases in CO₂ are likely to enable Northern Hemisphere forests to grow faster because of increased photosynthesis. The net result of all these interactions is a substantial increase in projected CO₂ concentrations and in the rate of climate change.

Climate change will also impact upon forest habitats and the species they support, by creating problems for species life cycles, disrupting the interdependence between species, and forcing species to adapt or move to keep pace with suitable climatic conditions. In the UK it is anticipated that forests may be subject to greater risk of wind throw, fire and attack from pests and pathogens^{xii}.

Examples of climate induced impacts include certain species such as beech suffering from increased periods of summer drought stress particularly in South East England while oak is generally coming into leaf three weeks earlier than the 1950s. The cumulative impact of climate-induced stresses on the appearance of our woods and forests is uncertain but the forests of the future will certainly look different from today and may well be less diverse as the wildlife they support struggles to adapt to rapid change.

But forests can also be part of the solution. Forests are a global store of carbon and therefore preventing deforestation and encouraging reforestation are crucial. ^{xiii}Young trees take up carbon (a process known as sequestration), although even if deforestation was rapidly reduced and most of the available land for forestry worldwide was planted with trees, this would only delay the doubling of CO₂ concentrations in the atmosphere by 20-30 years, assuming fossil fuel consumption continues to rise as expected. However the protection, restoration and creation of forests as a major land use in many countries will contribute substantially to helping wildlife adapt to climate change.

Retention and expansion of forests will also deliver many wider benefits to society which may help to counter other negative impacts of climate change by protecting soils from erosion (as long as planting new forests is done sympathetically and avoids massive disturbance to carbon rich soils), reducing the likelihood of flash flooding, and helping to control storm surges and the impacts of rising sea-levels in tropical areas. In addition, by providing a renewable source of energy and materials^{xiv}, there is considerable potential for biofuels such as wood to reduce reliance on fossil fuels in the short term.

The Woodland Trust's view;

As the premier guardians and champions of the richest natural habitat in the UK we are committed to a three-pronged approach to tackle climate change:

- Public engagement in understanding and addressing climate change
- Mitigation of the forces driving climate change
- Adaptation to the effects of climate change

Engagement

The issue: Everyone needs to be aware of the scale and urgency of the threat and its implications. Everyone should be encouraged to become active in pressurising governments across the globe and to take a myriad of individual actions in order to reduce personal energy consumption and greenhouse gas emissions.

The Trust's perspective: the Trust believes that whilst awareness of climate change can be built through the media, its stark messages may lead to a sense of helplessness and despair. We support participation in simple 'citizen science' projects which, through observation and increased knowledge, help to bring home the scale of the issue. This awareness can then help to create an articulate public voice to persuade government to fulfil its own targets and to provide clear realistic information about action which can be taken by individuals, families, organisations, companies and society as a whole.

Given our objective is to find ways of engaging supports in our work and concerns, the Trust promotes the UK Phenology Network^{xv}, which provides an opportunity for young and old alike to contribute observations on the timing of natural events associated with spring and autumn, in effect observing climate change in their own back garden. Our Tree for All campaign focuses on the symbolic act of planting trees as a way of re-engaging people, especially children, with their natural environment while focusing activity particularly on areas where it can contribute most effectively to conserving wildlife for the future in the face of climate change.

Mitigation^{xvi}

The issue: Mitigation measures are about controlling and reducing greenhouse gas emissions, (especially CO₂), the main cause of global warming, to slow down the rate of climate change. Everyone should be encouraged to take all possible measures at personal, community, business and governmental levels to tackle the causes of climate change by helping to create a 'low carbon' society

The Trust's perspective: we believe that a mitigation strategy should involve the following actions in a descending order of importance.

- Cutting greenhouse gas emissions and increasing energy efficiency
- Using renewable sources of energy which achieve genuine reductions in CO₂ emissions
- Substituting products and materials that use less energy for those that require high amounts of energy to process such as concrete and aluminium
- Protecting carbon stores such as forests and peatlands
- Sequestration of carbon (taking up of carbon from the atmosphere for example by trees)
- Compensating for residual carbon emissions through carbon offsets e.g. through funding renewable energy projects in developing countries.

The Climate Change Act is a welcome first step on this road. It introduced legally-binding national targets for the reduction of carbon emissions by 26% below 1990 levels by 2020 and by 80% below 1990 levels by 2050. The targets include all greenhouse gases, not just carbon dioxide. The Act also requires the Secretary of State to publish five-year carbon budgets setting out how the longer term targets will be met. Emissions from domestic aviation and shipping are included in the target, but not emissions from international aviation and shipping. The Act states that there will be limits on the number of international carbon credits that can be used towards meeting the 2050 target, to ensure that domestic action is the primary focus. In 2009, the UK Budget updated the carbon emissions reduction commitment to achieve a 34% cut by 2020. It is vital to ensure that voluntary measures like carbon offset schemes are not seen as a substitute for mandatory emission trading schemes. Other routes to reduction of energy use include development of low-carbon technologies and reducing energy wastage.

Increasing energy efficiency is something everyone needs to undertake through choices about how we live and work, our homes, the transport we use, what we buy and where we buy it, and by business practices we support and engage in. Everyone needs straightforward messages with clear actions through which to engage individually with the climate change issue. The Trust is working hard to put its own house in order as we recognise that our own performance on travel, energy use and waste must be exemplary. Individual action is important but it must be supported by clear government targets for improving energy efficiency, and incentives and grants for improving home insulation for example.

Renewable sources of energy should be used to replace fossil fuels to avoid release of ancient stocks of carbon accumulated over millions of years. The Trust supports the use of wood as part of the suite of renewable energy options as long as a balance between environmental protection and responsible harvesting is maintained. We believe this is possible and see a potential 'win win opportunity' to restore ancient woods planted with conifers while using such material to supply biomass energy for power stations and wood chip or pellets for consumers.

^{xvii} Wood can be a carbon-lean fuel as long as adequate replanting takes place to sequester carbon released

through burning of wood. We support other forms of renewable energy on the basis that renewable energy will help to move towards a low-carbon society so long as construction of plant and infrastructure does not destroy or damage ancient woodland, impact on sensitive landscapes or otherwise significantly reduce the quality of human life and as long as the energy generation process really does bring an overall reduction in CO₂ emissions.

Product substitution involves substituting materials that require high levels of fossil fuel consumption to extract, process and transport them in favour of renewable products such as timber where these are produced sustainably^{xviii}. The Trust is committed through its procurement policy to sourcing products which have sound environmental credentials, and especially low energy requirements, as part of its wider commitment to sustainable purchasing.

Protecting carbon stores; it is crucial to protect existing stores of carbon in forests and other semi-natural habitats from being released by deforestation and habitat destruction. Strong legislation and policies are required both nationally and internationally.

Carbon sequestration is the process by which carbon is taken up by forests, other habitats and other living organisms^{xix}. Planting new woodland has a role within this process but it cannot sequester more than a small proportion of total carbon emissions generated each year. The Trust supports woodland carbon sequestration projects where carbon storage can be assured in perpetuity and where additional benefits to society such as new and enhanced public access, greater biodiversity, and landscape maintenance and enhancement are included within the project outputs from the start. The Scottish Forest Alliance, of which the Trust is part, is creating native woodland that is being used as a testing ground to promote greater understanding of the role of forestry in carbon sequestration^{xx}.

Carbon offsets are actions/steps taken to compensate for the irreducible carbon emissions we all make. They usually work on the principle of making an investment now that will help reduce atmospheric CO₂ in the future. The Trust believes that it is crucial to cut emissions as a priority through other means and offsets should only be used to compensate for residual emissions. It is also important to be crystal clear that offsets, with the exception of afforestation carried out under the Kyoto Protocol's Clean Development Mechanism, do not in themselves help to reduce emissions, merely compensate for them. Nonetheless they have an important role in raising public and business awareness of climate change, the costs to society and to prompt examination of areas of business practice where real reductions can be made.

Adaptation

The issue: *Adaptation is about developing resilient natural systems that can absorb and respond to change. Developing strategies to help the natural environment cope with these changes are not an alternative to mitigating the effect of increased CO₂ emissions; indeed they should add to the urgency for action by recognising that change is already with us.*

The Trust's perspective: There is an urgent need to implement adaptation strategies to conserve and create landscapes that will be welcoming to wildlife in a time of rapid climate change^{xxi}. The urgency is because of the scale of action required and the timescale needed for habitats to develop to maturity. Such strategies have to focus on whole landscapes rather than on individual sites. Moreover by making natural systems more resilient, not only will biodiversity benefit but human society will also benefit from the 'services' which natural ecosystems provide such as flood relief, healthy soils, carbon sinks and future sequestration, water quality and renewable natural resources. Woodland, as the most widespread semi-natural habitat in the UK, is uniquely placed to act as a key component of a more sympathetic and receptive landscape for wildlife in the face of climate change.

Developing resilient natural systems in the face of climate change requires landscape scale action. Much of this is sound conservation practice which becomes even more relevant in the face of climate change. In terms of woodland and wildlife this means:

- conserving all semi-natural habitats not just a representative sample of sites,
- restoring all woodland and semi-natural habitats planted with non-native conifers,
- targeting habitat creation in areas where there is greatest potential to put woodland on a sustainable footing, namely in the greatest existing concentrations of ancient or semi-natural habitats,
- buffering semi-natural habitats from negative effects of intensive land use and extending their core area

- and reducing the intensity of the intervening land-use practices between semi-natural habitats in order to increase the ability of biodiversity to move across landscapes. This in turn means
 - reducing air and water pollution
 - improving soil management
 - limiting herbicide and pesticide inputs,
 - reducing grazing pressure to deliver more sympathetic management of existing habitats
 - re-establishing more gentle transitions from one habitat to another particularly at woodland edges and
 - creating more natural green space within urban environments.

What the Trust will do in practice

The Trust is committed to action and advocacy on climate change. We will constantly analyse our work to challenge ourselves to do more whenever and wherever we can. The Trust will endeavour to act as a strong advocate for woodland, as a careful steward of over 1,100 woodland sites and as an exemplary business in our daily work.

Engagement

We will:

- Continue to promote phenology (Nature's Calendar) as a way of involving thousands of individuals in understanding the impacts of climate change on the world about them and we will use the results to persuade governments of the need to act
- Promote guidance about positive personal action on climate change issues, especially to our 300,000 members and supporters
- Promote and further develop our carbon sequestration product for businesses and individuals (Woodland Carbon)
- Campaign in alliances especially with other environmental NGOs to encourage public awareness of the issue
- Use our education programme to raise awareness of the significance of climate change
- Encourage members, supporters and the general public to sign up to relevant campaigns for mitigation and adaptation
- Focus on trees and in particular on the symbolic act of tree planting.

Mitigation - in our operational work we will:

- Establish new woodland to support projects which further our understanding of carbon sequestration as a process, especially those where other benefits also accrue (e.g. Scottish Forest Alliance)
- Promote Woodland Carbon to companies so as to raise awareness of their carbon emissions and their responsibilities to reduce them
- Develop small-scale practical examples where possible of wood as a supply of renewable energy where they also deliver conservation wins e.g. use of timber from the restoration of planted ancient woodland sites to fuel local schools and small scale power plants
- Implement our 'greening the Trust' policy, tracking our emissions, publicly reporting them and aiming to reduce them still further all our working practices
- Manage our woods under the UKWAS certification scheme to ensure that they meet independently audited standards of sustainable forest management

In our advocacy work we will also campaign in alliances on the broader mitigation agenda especially in pursuit of:

- Delivery of Government commitments as an absolute minimum
- Proper recognition of the true environmental costs of air transport
- Removing barriers to expansion of renewables and Government action to increase the level of renewable energy production across the UK
- Promoting the need for heat to be included in a strategic energy policy with a view to increasing the proportion of heat from renewables and increasing efficiency of heat production.
- Government action to help individuals to take action urgently, creating a legislative framework where personal action on climate change is rewarded and climate damaging activities are penalised
- Green taxes to raise the price of goods and services which damage the environment, the revenue from which can be used to support lower prices of those which benefit or are neutral in their impact and tax incentives for environmentally positive actions

Adaptation – in our operational work we will:

- Continue to focus acquisition on woodland creation sites and planted ancient woodland sites within areas where there is already a high concentration of ancient woodland and other semi-natural habitats to help make them more robust
- Actively seek out partners to develop landscape-scale projects, again within areas where there is a high concentration of ancient woodland by encouraging restoration and habitat creation in these areas
- Continue our current commitment to planting native trees given that we cannot anticipate with any certainty which tree species, native or otherwise, will respond better to future climatic trends but as new research gives us more information we will review our approach to woodland creation regularly
- Support research to better understand current and projected climate change impacts on woodland, and so inform the development of our thinking on adaptation strategies and action
- Continue to develop our thinking in relation to native species and use of local provenance

In our advocacy work we will campaign in alliances on the broader adaptation agenda in order to:

- Continue the process of CAP reform to help further reduce intensity of land use especially through the new Rural Development Programmes but also through cross compliance
- Ensure that regional and national spatial planning takes account of the environment and provides positive direction to make the countryside more robust to climate change especially using Strategic Environmental Assessment and sustainability appraisals
- Ensure that the delivery of the Water Framework Directive which focuses on managing whole catchments rather than individual water bodies helps to create landscapes that benefit wildlife and society as a whole
- Make best use of forestry incentives to focus on the priorities for action
- Ensure the review of the UK Biodiversity Action Plan sets targets and actions sufficiently challenging to put species and habitats on a sustainable footing.
- Achieve full protection of all ancient and semi-natural habitats
- Target use of resources to best effect, i.e. concentrate efforts in areas of existing concentrations of semi-natural habitats.

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