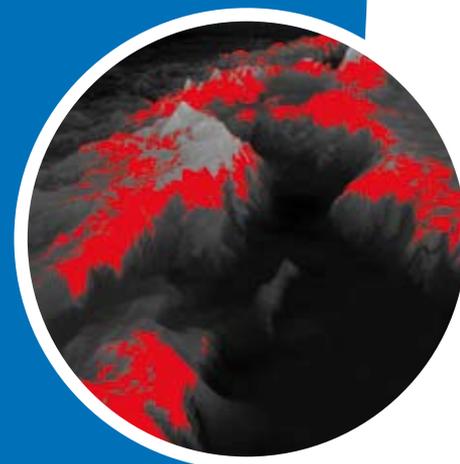


BirdLife International's Position on Climate Change

*Adopted by the
BirdLife International Partnership
June 2008*



Recommended citation:

BirdLife International (2008) *BirdLife International's Position on Climate Change*.
Cambridge, UK: BirdLife International.
© 2008 BirdLife International

The BirdLife Global Task Force on Climate Change

The Task Force in 2007 and 2008 comprises Audubon (Betsy Loyless, Senior Vice President for Public Policy); Guyra Paraguay (Alberto Yanosky, Director); Malaysian Nature Society (Anthony Sebastian, President); Nature Canada (Mara Kerry, Director of Conservation); NABU (Carsten Wachholz, Policy Officer, Renewable Energy and Nicolai Schaaf, Policy Officer Climate Change and Biodiversity); The RSPB (John Lanchbery, Principal Climate Change Policy Advisor); Ole Siosiomaga Society Incorporated (OLSSI), Samoa (Fiu Matese Elisara, Executive Director); BirdLife Africa Partnership Secretariat (Maaïke Manten, Fundraiser for Africa, in 2007 and Mathias Behangana in 2008); European Division (Konstantin Kreiser, EU Policy Manager) and Cambridge Secretariat (Melanie Heath, Senior Advisor, Science and Policy).

BirdLife's Position on climate change was prepared by the BirdLife Global Task Force on Climate Change with contributions, advice and comments received from many staff from BirdLife Partners and the Secretariat. The Position was adopted by the BirdLife Partnership in June 2008.

A special thanks to Stephen Rumsey for his support and encouragement.

For further information please contact:

Melanie Heath
Senior Advisor, Climate Change, BirdLife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, UK
Telephone: +44 (0)1223 277318 Email: melanie.heath@birdlife.org

Cover picture credits (From top to bottom)

3-D representation of the modelled distribution of Regal Sunbird *Nectarinia regia* – The BirdLife Africa Partnership, The RSPB, Durham University and Wildlife Conservation Society (WCS), funded by the MacArthur Foundation, have mapped the current and future distributions of all bird species on mainland Africa by using climate change models;

Climate Action Now public march, London (G. Madge, RSPB-Images.com);

More extreme weather, such as prolonged droughts, is predicted with increasing global temperatures (M. Fowlie);

Tropical rainforest is an important carbon store. BirdLife is committed to reducing carbon emissions from deforestation in developing countries (B. Lascelles).

The presentation of material in this report and the geographical designations employed do not imply the expression or any opinion whatsoever on the part of BirdLife International concerning the legal status of any country, territory or area, or, concerning the delimitation of its frontiers or boundaries.

WHY THE BIRDLIFE PARTNERSHIP IS CONCERNED ABOUT CLIMATE CHANGE

The scientific evidence is overwhelming: climate change is happening, it is largely caused by human activities, it presents very serious global risks for people and biodiversity around the world and it demands an urgent global response. The direct and indirect impacts of climate change are of central concern to BirdLife's objectives and targets, in terms both of biodiversity and of human development. The BirdLife Partnership operates in over one hundred countries and territories worldwide with over 2.5 million members, 10 million supporters and over 1 million hectares owned or managed. Together the BirdLife Partnership forms the leading authority on the status of birds, their habitats and the issues and problems affecting bird life. BirdLife has a significant contribution to make to the climate change debate.

Climate change threatens to undermine BirdLife's mission and affects each of BirdLife's strategic objectives for species, sites, habitats and people.¹ Climate change clearly poses new challenges to BirdLife's main approaches to conserving species and Important Bird Areas. It is already having multiple impacts on birds and their habitats, including:

- ⇒ changes in behaviour and phenology, such as timings of migration;
- ⇒ range shifts and contractions;
- ⇒ disruption of species interactions and communities
- ⇒ exacerbation of other threats and stresses, such as disease, invasive species and habitat fragmentation, destruction and degradation.

Climate change mitigation and adaptation measures such as badly placed wind farms, unsustainably produced biofuels and harmful irrigation and flood defence measures, are posing new threats and stresses on birds and their habitats too.

The impacts on species, particularly the shifts in range and abundance, may have profound implications for site-based conservation approaches such as the Important Bird Area (IBA) Programme, which play a significant role in both climate regulation and in helping biodiversity and people to adapt to climate change. Work is needed to strengthen the resilience and connectivity of the IBA network and habitats in general. The multiple threats posed by climate change also underline the need to intensify work on the 'Habitats' and 'People' pillars of BirdLife's strategy through effective policy and advocacy.

We know that the changes biodiversity faces due to climate change will be huge and wide-reaching in terms of scale and speed. However, we cannot yet predict with certainty how and when individual species will respond to climate change, or how ecosystems will change. We do know that efforts now to improve the resilience of species and habitats through strengthening populations and addressing existing pressures will help them adapt to climate change in the future. This has implications for conservation planning and practice.

Biodiversity and people are very closely linked. Importantly, assisting species and habitats to adapt should also improve the capacity of people to adapt to climate change through the maintenance of the ecosystem services on which they depend.

BirdLife recognises that a wide range of conservation responses will be required, and these will differ across the world.

¹ BirdLife International (2008a)

BACKGROUND

BirdLife's Position on climate change was prepared by the BirdLife Global Task Force on Climate Change with contributions, advice and comments received from many staff from BirdLife Partners and the Secretariat. The Position was adopted by the BirdLife Partnership in June 2008.

The Position contains a set of context statements that underpin the position, setting it in the context of biodiversity and bird conservation (pages 5-11), followed by a **series of key policy messages** (pages 12-18) which BirdLife advocates to address climate change.

The objectives of the position are:

- ⇒ to articulate what BirdLife believes the key issues are and what should be done about them;
- ⇒ to help the Partnership advocate appropriate action to political forums and external audiences; and
- ⇒ to provide guidance for the Partnership on the role BirdLife as a whole, and each organisation in the network can play in effectively tackling climate change.

The Position underpins BirdLife's Programme of Work on Climate Change. The Programme of Work has four main themes addressing raising awareness of climate change issues within and outside the BirdLife Partnership; conservation of habitats and the reduction of greenhouse gas emissions; renewable energy; and adaptation. Each theme comprises activities on science, policy analysis, advocacy and communication, capacity building and conservation to be undertaken by the BirdLife Partnership and Secretariat during the period 2009-2012. These activities are mainstreamed across the Regional Programmes and Global Programme for the period 2008-2012.

The BirdLife Science-Policy Framework on Climate Change (available on www.birdlife.net) provides a comprehensive and up-to-date rationale for BirdLife's approach to climate change issues.

The BirdLife Global Task Force on Climate Change is also developing linked and complementary global positions and policy briefs that focus on specific aspects of our climate change work in greater detail.

These areas include:

- 1 Reducing emissions from deforestation – linking conservation with the reduction of greenhouse gas emissions;
- 2 Wind energy;
- 3 Bioenergy;
- 4 Adaptation: the conservation response to climate change.

Table 1 – The links between elements of the BirdLife Position and the themes within the BirdLife Programme of Work on Climate Change

BirdLife Position		Policy Briefs/Sub-Positions	BirdLife Programme of Work on Climate Change
Policy message	Context statement		
1	D F	REDD Bioenergy Wind energy	Raising awareness
2	A B E	All	All
3	C	REDD	Conservation of habitats Raising awareness
4	E F	Bioenergy Wind energy	Raising awareness Renewable energy
5	E	Bioenergy Wind energy	Renewable energy
6	A B	Adaptation	Adaptation
7	A B	All	All
8	A B F	All	All
9	F		Raising awareness

CONTEXT STATEMENTS FOR BIRDLIFE'S POLICY POSITION ON CLIMATE CHANGE

- A** *Climate change and the alarming rate of biodiversity decline worldwide are the most important human-induced environmental challenges that society faces today. Policy must strive to address both of these closely inter-related challenges at the same time. Many other processes threaten biodiversity and will be compounded by climate change. Urgent action continues to be required to address these pressures.*
- B** *People's lives and well-being are being affected by climate change – climate change, biodiversity and livelihoods are very closely linked.*
- C** *As well as their importance for biodiversity, habitats play a key role in regulating greenhouse gas levels in the atmosphere, by functioning as carbon sinks and sequestering carbon from the atmosphere.*
- D** *Climate change is an issue of extreme urgency – we need to act now to avoid large scale catastrophic impacts.*
- E** *The potential benefits of renewable sources of energy are recognised. However some renewables only deliver limited carbon savings over their life-cycle – biofuels in particular will often provide minimal carbon savings; indeed some may result in higher emissions than the fossil fuel they substitute. Also climate change mitigation measures such as unsustainably produced biofuels and badly placed wind farms are posing new threats and stresses on birds and their habitats.*
- F** *Climate change is global in its causes and consequences – recognising common but differentiated responsibility we all have a role to play to mitigate and adapt to climate change.*

BIRDLIFE'S KEY POLICY MESSAGES ON CLIMATE CHANGE

- 1** *BirdLife supports the target of keeping the average rise in the Earth's surface temperature to less than 2 °C above pre-industrial levels (before the late 18th Century).*
- 2** *The impacts of climate change on biodiversity, and the role of biodiversity in helping to mitigate climate change, should be reflected in all policy sectors and across all relevant conventions.*
- 3** *Habitat conservation and appropriate management, including habitat restoration, can play a crucial role in sequestering carbon and reducing greenhouse gas emissions. There is a need for effective mechanisms to maintain and restore these carbon stocks.*
- 4** *It is essential to reduce emissions of greenhouse gases from fossil fuels through reduced energy consumption and increased energy efficiency.*
- 5** *The switch from fossil fuels to renewable energies needs to avoid harm to ecosystems and biodiversity. There is an urgent need for investment in existing technologies to develop truly sustainable renewable sources of energy plus investment in research for even better renewables fit for future use.*
- 6** *Adaptation (building adaptive management strategies that increase the ability of ecosystems to adapt to climate change (resilience) and that enable species and habitats to move into areas with more suitable climatic conditions (accommodation)) is an important and necessary element of sustainable development and future conservation planning and practice, and needs to be effectively integrated and coordinated with development planning. Addressing existing threats to species, sites and habitats is vital to build resilience in the face of climate change.*
- 7** *There is a need for further studies, including monitoring and modeling, to understand the impacts of climate change on birds and biodiversity, and how this is related to development and human livelihoods needs, particularly in developing countries.*
- 8** *BirdLife works with conservation and development organisations that share the same concerns and solutions regarding climate change. Where possible solutions should benefit both biodiversity and people, especially the poor, and should be agreed through inclusive, participatory processes that use local knowledge as well as sound science.*
- 9** *BirdLife is committed to reducing its own carbon footprint.*

CONTEXT STATEMENTS UNDERPINNING BIRDLIFE'S POLICY POSITION ON CLIMATE CHANGE

A *Climate change and the alarming rate of biodiversity decline worldwide are the most important human-induced environmental challenges that society faces today. Policy must strive to address both of these closely inter-related challenges at the same time. Many other processes threaten biodiversity and will be compounded by climate change. Urgent action continues to be required to address these pressures.*

How the climate is changing

The scale of current and predicted changes in temperature is greater than the Earth has experienced for many hundreds of thousands of years. These changes are happening at a rate that many believe is unprecedented.

Human activities, especially the burning of fossil fuels, are releasing rapidly increasing levels of greenhouse gases such as carbon dioxide. This is causing the atmosphere to heat up. According to the Intergovernmental Panel on Climate Change (IPCC), increased greenhouse gas emissions (including carbon dioxide, methane and nitrous oxide) have already caused the Earth's surface to warm, on average, by 0.74 °C (0.56-0.92) above pre-industrial levels.² The 1990s were the warmest decade on record since regular observations began in the mid-19th century. Scientists can now attach probabilities to the temperature outcomes, and consequent impacts on the natural environment, associated with different stabilisation levels of greenhouse gases in the atmosphere.

The IPCC forecasts that average global surface temperatures will be between 1.5-4.5 °C above 1990 levels by 2100, and will continue to rise after that even if emissions stabilise.³ This is a huge increase. For comparison, the average change in temperature between the peak and trough of a major ice age is 4 or 5 °C. A 2.5 °C warming would be the greatest global climatic shift since the end of the last ice age 10,000 years ago, but would happen far more quickly and would be to a higher average temperature. The IPCC Fourth Assessment Report is recognised as the most reliable report with regards scientific evidence about human induced underlying causes of climate change and will be used in future UNFCCC discussions as the baseline document. The most recent science indicates that the IPCC forecasts are conservative, and the amount of warming for a particular concentration of greenhouse gases is likely to be higher than forecast.

Climate change is one of many threats to biodiversity

Biodiversity is being lost and degraded at an escalating rate. Climate change adds another pressure, which acts in combination with major threats such as habitat loss and alien invasive species, together making their impacts on biodiversity even more detrimental.

Over the past 50 years, humans have changed ecosystems more rapidly and extensively than during any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre and fuel. The result has been a substantial and largely irreversible loss in biodiversity.⁴ Threatened species are becoming more threatened and many common ones are in decline. Current extinction rates are exceptionally high. The Red List Index shows that birds have become more threatened since 1988, with more species slipping closer to extinction. In total 1,226 bird species (12% of total) are globally threatened. Of these 190 are Critically Endangered – facing imminent extinction.⁵

² IPCC (2007 p. 30)

³ IPCC (2007 p. 38)

⁴ Millennium Ecosystem Assessment (2005)

⁵ BirdLife International (2008b)

Most threats to bird species and the sites and habitats in which they live are caused by human activities. Agricultural and forestry activities, and the associated habitat destruction, degradation and fragmentation, threaten 87% of Globally Threatened Birds.⁶ These serious impacts continue regardless of climate change and require urgent attention. Existing commitments to conserve biodiversity must be made more effective and resources available for conservation massively scaled up.

Climate change impacts directly on birds and their habitats but will also compound many of the existing pressures on biodiversity. The impact may be direct: for example, increased stress on water resources may exacerbate water pollution. Or, the impact may be through misguided policy responses to climate change: for example, biofuel initiatives which cause habitat destruction for fuel crops; or, through large-scale human responses such as mass movements of people and the associated loss of biodiversity.

Impacts of climate change on biodiversity

Climate change is already impacting on biodiversity. By the end of the century, climate change and its impacts may be the dominant direct driver of biodiversity loss and changes in ecosystem services globally. Severe effects, including bird extinctions, are predicted. Without urgent action, it is estimated that by the middle of this century almost one-third of land-based species could be committed to extinction as a result of climate change.⁷

The effects of climate change on ecosystems and wildlife are already being felt. They include increased extreme weather (floods and droughts), the retreat of mountain glaciers, the thawing of permafrost, later freezing and earlier break-up of ice on rivers and lakes, changing climatic conditions in cloud forests in the tropical highlands, lengthening of mid- to high-latitude growing seasons, poleward and altitudinal shifts of plant and animal ranges (resulting in declines in some plant and animal populations, and the potential extinction of species where no such shift in range is possible) and phenological changes, such as the earlier emergence of leaves and insects, earlier return of migrant species, and earlier egg-laying by birds. These changes, particularly the shifts in range and abundance, will have profound impacts on species, sites and habitats.^{8,9} Climate change may also impact species indirectly, impacting in combination with major threats such as alien invasive species and the spread of disease. Numerous links between biodiversity and climate change are recognised in the Millennium Ecosystem Assessment, various reports of the Intergovernmental Panel on Climate Change, national communications under the United Nations Framework Convention on Climate Change and others.

The role of biodiversity in climate change mitigation and adaptation

Urgent action now to halt further loss or degradation of biodiversity will help to maintain future options for reducing the extent of climate change and managing its impacts.

Biodiversity can play a significant role in climate change mitigation and adaptation, by strengthening ecosystems and their ability to regulate climate. By conserving habitats rich in carbon, such as forests and peatlands, we can ensure that carbon remains stored in these ecosystems and also continues to be sequestered from the atmosphere.

Habitats also play an important role as buffers against the impacts of climate change. It is predicted that climate change will result in rising sea levels as well as more frequent and more severe extreme weather events leading to an increased risk of flooding at coasts and rivers, but also droughts and forest fires. Healthy ecosystems and habitats can play an important role as natural protection against such extreme weather events and rising sea levels. For example dunes and beaches and coastal wetlands act as natural defences against sea level rise and consequent flooding of inland areas. The conservation of natural coastal ecosystems and mangroves play an important role in reducing the vulnerability of humans to impacts such as hurricanes. Efforts taken now to improve the resilience of species and habitats through strengthening populations and addressing existing pressures will increase the likelihood of successful adaptation in the future.¹⁰ It is also essential that measures

⁶ BirdLife International (2008b)

⁷ Thomas *et al.* (2004)

⁸ Huntley *et al.* (2007)

⁹ Hole *et al.* (in prep.)

¹⁰ The Royal Society (2008)

taken to adapt to changing climate conditions, such as flood defences, hydrological projects or changes in agricultural systems must not harm, but support the resilience of ecosystems and biodiversity.

Policy development and implementation

Policy development and implementation are needed at local, national, regional and global levels to ensure that the twin challenges of climate change and biodiversity loss are addressed.

Due to the interdependencies between biodiversity and climate we believe that it is possible to develop strategies that achieve mutually supportive outcomes. Mitigation of and adaptation to climate change must go hand in hand with more biodiversity-friendly and sustainable land-use around the world. Commitments made under existing international agreements, such as the Convention on Biological Diversity (CBD),¹¹ the United Nations Framework on Climate Change (UNFCCC),¹² the United Nations Convention to Combat Desertification (UNCCD), the Ramsar Convention and the World Heritage Convention have resulted in positive steps in collaboration and integrated action on biodiversity and climate change.¹³ These agreements have enormous potential to achieve biodiversity conservation. However, they need to be activated in national legislation and made effective in practice.

B *People's lives and well-being are being affected by climate change – climate change, biodiversity and livelihoods are very closely linked.*

The effects of climate and land-use change on people

Climate change threatens the basic elements of life for people around the world – access to water, food production, health, and use of land.

Ecosystems and biodiversity underpin biological productivity and socio-economic development, through the provision of many goods and services to people and industry. These ecosystem services include food, water, timber, fuel and fibre; regulating services that affect climate, floods, disease, waste and water quality; and supporting services such as soil formation, photosynthesis and nutrient cycling.

Humans are fundamentally dependent on the flow of ecosystem services: climate change threatens these basic elements of life. For example it is predicted that melting glaciers will initially increase flood risk and then strongly reduce water supplies; declining crop yields, especially in Africa (where over 70% of workers rely on small-scale farming that is dependent on direct rainfall) could result in an additional 80-120 million people at risk of hunger;¹⁴ rising sea levels will result in tens to hundreds of millions more people affected by flooding each year; changing climatic conditions will result in geographic shifts in human diseases; and ocean acidification, a direct result of rising carbon dioxide levels, will have major effects on marine ecosystems, with possible adverse consequences for fish stocks.

Vulnerability of developing countries

The impacts of climate change are not evenly distributed – the poorest countries and people will suffer earliest and most.

Developing countries are often already warmer, on average, than developed ones, and they suffer from high rainfall variability. Further warming will bring higher costs and few benefits. All humans depend on the services provided by natural systems. However, environmental assets and the services they provide are especially important for poor people. Many developing countries are heavily dependent on agriculture, the most climate-

¹¹ Decisions adopted by the Conference of the Parties to the Convention on Biological Diversity, 2008

¹² Decisions adopted by the UN Framework Convention on Climate Change, 2007

¹³ Joint Liaison Group of the Rio Conventions (2007)

¹⁴ Parry *et al.* (2001)

sensitive of all economic sectors. Climate change also threatens to wipe out plant species used in traditional medicines. The World Health Organisation estimates that 80% of the population in developing countries depends on traditional medicine for primary health care. Unchecked climate change will become a major obstacle to continued poverty reduction, as outlined in the Millennium Development Goals,¹⁵ an international blueprint setting targets for poverty reduction, which 189 countries have signed up to meet by 2015.

Vulnerability of low-lying island communities

Small island developing countries have minimal greenhouse gas emissions and contribute little to climate change. Nevertheless, they bear the brunt of its effects.

Most island nation communities are economically dependent on fisheries, agriculture or forestry. These resources may become scarce as a result of changing climate. Sea level rise and extreme weather events particularly threaten island ecosystems and their people.

Healthy and diverse ecosystems help people adapt to the impacts of climate change

Biodiversity conservation has the potential to contribute significantly to mitigating climate change, and to help human societies adapt to its impacts.

Effective management and restoration of natural systems will help provide resilience and secure livelihoods, improving the capacity of the poorest in particular to deal with the impacts of climate change. Developing countries need extra resources to allow them to safeguard and manage their assets sustainably. New policies are needed to integrate options for meeting biodiversity, climate and sustainable development objectives.

C

As well as their importance for biodiversity, habitats play a key role in regulating greenhouse gas levels in the atmosphere, by functioning as carbon sinks and sequestering carbon from the atmosphere.

Ecosystems such as tropical forest, peatlands, wetlands and oceans play an especially large role in climate regulation. Conserving existing ecosystems enables them to continue to function as carbon sinks, while environmentally-appropriate afforestation, reforestation and restoration, increases the carbon being sequestered from the atmosphere. Many of these sinks already face considerable threats.

Land use change is a major driver of biodiversity loss and greenhouse gas emissions. The world's forests are disappearing at the rate of one football pitch per second.¹⁶ In climate terms, tropical deforestation accounts for about 20% of all human-induced emissions every year, roughly the same volume of greenhouse gas emissions as produced by the USA or China.¹⁷ In biodiversity terms tropical forests are the most ecologically rich of all forest types, home to 70% of the world's vascular plants, 30% of all bird species and 90% of invertebrates. Over 3,000 Important Bird Areas are forested and 76% of Globally Threatened Birds are dependent on forests.¹⁸ Forests provide huge benefits to local communities who depend on them for the ecosystem services they provide.

Current proposals to reduce emissions from deforestation in developing countries should help to maintain carbon stocks (see separate BirdLife Policy Brief on reducing emissions from deforestation). Afforestation and reforestation provisions within the Clean Development Mechanism (CDM) of the Kyoto Protocol also aim to increase carbon stocks.

¹⁵ United Nations (2006)

¹⁶ FAO (2005)

¹⁷ Baumert *et al.* (2005)

¹⁸ Analysis of data held in BirdLife's World Bird Database (2008)

Although peatlands only cover 3% of the global land surface they hold huge carbon stocks, equivalent to around 100 years of fossil fuel emissions. The majority of the world's tropical peatlands are in Indonesia, Malaysia and Papua New Guinea, and were almost entirely covered with peat swamp forests. Mainly within the past 20 years over 12 million hectares (45%) of these peat swamp forests have been systematically drained, clear-felled and converted into plantations, initially rubber and now oil palm and acacia.¹⁹ The conversion rate and extent is phenomenal, especially in Sumatra, Kalimantan and Sarawak. This process transforms a stable carbon stock into a major source of emissions. The current total peatland CO₂ emission of 2000 Mt/y equals almost 8% of global emissions from fossil fuel burning. These emissions have been rapidly increasing since 1985 and will further increase unless action is taken. In addition, over 1997-2006 an estimated average of 1400 Mt/y in CO₂ emissions was caused by peatland fires that are also associated with drainage and degradation.²⁰

Unsustainable intensive agriculture practices are also a major cause of greenhouse gas emissions. The application of nitrogen fertiliser causes the emission of N₂O, one of the most potent greenhouse gases. Cattle and other livestock raising, particularly in intensive farms, causes very significant emissions of CH₄, another key greenhouse gas. The ploughing of permanent grassland and intensive management of arable land causes the loss of soil carbon contributing to CO₂ emissions. As an example, it is estimated that 9% of the European Union (25 Members) greenhouse gas emissions are from agriculture (compared with 21% from the transport sector).²¹ All of these emissions can be reduced through more sustainable agricultural practices, which also usually benefit biodiversity and the wider environment.

The oceans are the main sink for CO₂. Ocean warming and acidification reduce this sink, impact oceanic productivity, threaten coral reef systems and calcareous invertebrates, and have knock-on effects on the whole ecosystem. Climate change will also impact oceanic ecosystems through changes in invasive species, parasites and disease. Ocean ecosystems are already affected by several threats including excessive fishing pressure which may also be compounded by climate change.

D

Climate change is an issue of extreme urgency – we need to act now to avoid large scale catastrophic impacts.

Current estimates are that there is a window between now and 2015 within which it may be possible to significantly slow down or lower the expected increases in global temperatures through reductions in global emissions. Energy use patterns within society need to change.

It is clear that some climate change is inevitable. We have already seen an increase in average global temperatures, and even applying the most effective mitigation strategy we are likely to experience a further 1 °C increase. It is widely recognised that if the worst impacts of climate change are to be avoided then the average rise in the surface temperature of the Earth needs to be kept at less than 2 °C above the levels prevailing during the pre-industrial period, i.e. before the late eighteenth century. We must act now to reduce emissions of greenhouse gases from fossil fuels through reduced energy consumption and increased energy efficiency.

This means setting and sticking with hard targets. Energy use patterns within society need to change. A growing share of our current and future energy production worldwide has to shift from fossil fuels to truly sustainable renewable sources. There is an urgent need to raise awareness on the impact of climate change on birds, biodiversity and people, and on the positive steps people can and must take to adapt to and mitigate climate change. In economic terms alone, as summarised in the Stern Review: 'The evidence shows that ignoring climate change will eventually damage economic growth. The earlier effective action is taken, the less costly it will be.'²²

¹⁹ Hooijer *et al.* (2006)

²⁰ Hooijer *et al.* (2006)

²¹ European Environment Agency (2007)

²² Stern (2007)

E

The potential benefits of renewable sources of energy are recognised. However some renewables only deliver limited carbon savings over their life-cycle – biofuels in particular will often provide minimal carbon savings; indeed some may result in higher emissions than the fossil fuel they substitute. Also climate change mitigation measures such as unsustainably produced biofuels and badly placed wind farms are posing new threats and stresses on birds and their habitats.

Demand for biofuels is leading to the conversion of natural habitats such as grasslands and tropical forests on a potentially huge and catastrophic scale with limited savings in greenhouse gas emissions.

The replacement of conventional fossil fuels with bioenergy could help reduce global greenhouse gas emissions to a limited but significant extent. The biggest potential for bioenergy lies in heat and combined heat and power production through a range of technologies such as modern high performance wood stoves and biogas producing anaerobic digesters which can be sustainable energy sources, especially on a small, decentralised scale and utilising agricultural waste, manure and by-products. Biomass, mostly wood, is a major energy sources worldwide and especially in poor countries. Investing in better combustion technologies is vital, not only to allow better use of the same resources but also to reduce the impacts on natural forests which in many cases are significant. Win-win solutions should be explored where habitat restoration and management can be combined with biomass harvesting. Purpose-grown energy crops can play a role but may displace natural habitats and impact biodiversity and water, both positively and negatively, depending on feedstock choice, siting and management.

Biofuels have received huge media coverage as a key renewable energy source. However, the exact contribution biofuels could make is unclear. Calculations vary as to the greenhouse gas savings biofuels will make and this also depends in part on the feedstock (e.g. oil palm, soya, sugar cane, oil seed rape, jatropha) as well as its siting and cultivation. Emissions savings are also dependent on the energy involved in the production and transport of any fertilisers and other agrochemicals used, on emissions caused by fertiliser use, on how the processing stage is powered, and what happens to any by-products. Some biofuels can result in significant emission savings while in the worst cases they may result in higher emissions than the fossil fuel they substitute. Savings may also be reduced dramatically where biofuel production results in the conversion of natural and semi-natural, carbon-rich habitats such as rainforests, peatlands, savannahs and grasslands. The loss of these habitats will result in greenhouse gas emissions as well as a loss in biodiversity. The establishment of oil palm plantations is already a major driver of lowland forest loss in Indonesia and Malaysia.²³ There are also concerns over biofuels displacing food crops, raising food prices or leading to food scarcity, which would particularly impact the poor in society.²⁴

So-called second-generation biofuels (produced from woody feedstocks) are expected to have much better greenhouse gas performance and much higher yields per hectare. These technologies are advancing fast but are not available for mass production at the moment. Opinions vary enormously as to the timescale of viable industrial production of second-generation biofuels, and on the most likely feedstock.

Wind farms can be beneficial in tackling climate change but poorly-sited windfarms have been shown to have detrimental effects on bird populations.

Of the most advanced renewable technologies, wind energy is the only renewable technology in the short term that can be competitive in price with fossil fuels, initially onshore, but with offshore installations now being deployed. Wind farms can be beneficial in tackling climate change but must be located, designed and managed so that there are no significant adverse impacts on birds of acknowledged national and international importance, or their habitats. Special attention needs to be given to wind farms along migration flyways. The main potentially detrimental effects of wind farms on birds are: collision leading to direct mortality; disturbance

²³ Hai (2000)

²⁴ FAO (2008)

displacement from around the turbines or exclusion from the whole wind farm; barriers to movement disrupting ecological links between feeding, wintering, breeding and moulting areas; change to or loss of habitat due to wind turbines and associated infrastructure.^{25,26,27} There are still many uncertainties about the potential impacts of offshore windfarms.

Other sources of renewable energy

Developments for other sources of renewable energy such as solar, hydro and tidal power must also be appropriate to the site/region/country concerned and be subject to strategic planning, including assessments of their environmental impacts on habitats, biodiversity and local communities.

F Climate change is global in its causes and consequences – recognising common but differentiated responsibility we all have a role to play to mitigate and adapt to climate change.

We all have a responsibility to adapt our behaviour and actions to help reduce future impacts of climate change.

BirdLife has an important role to play regarding climate change. BirdLife is committed to raising awareness of the key issues within and outside the BirdLife Partnership. BirdLife's worldwide network comprises over 100 autonomous non-governmental organisations (NGOs) supported by a large grassroots membership of over two million people, representing civil society and local communities.

Birds are well-established indicators of biodiversity that can provide early warning of changes to the stability of ecosystems.²⁸ Birds tell us many things about the state of the environment, partly because a great deal of high quality data exists on birds, and new data are relatively inexpensive to collect, especially through a global network as substantial as the BirdLife Partnership.

Clearly BirdLife cannot work on this agenda on its own. The BirdLife Partnership has strong relations with many local, national and international organisations, as well as national and local governments and institutions. At the national and international level, BirdLife is a member of networks working together to minimise the impact of climate change on biodiversity. These include the Climate Action Network (CAN), a worldwide network of over 340 Non-governmental Organisations working to promote action by governments and individuals that will limit human-induced climate change to ecologically sustainable levels. Given the close links between climate change, biodiversity and livelihoods, it is clear that agendas of organisations concerned with climate change, biodiversity and people must converge to achieve our shared goals. Policy development and implementation will need to result in mutually supportive outcomes.

All countries have a role to play. Developed countries should, for reasons of both fairness and practicality, take the lead in cutting emissions, but the rapidly industrialising developing nations must act effectively too. Countries with little industry must attend to the conservation of their natural habitat.

There are currently massive inequalities in global energy access. According to the World Energy Council (WEC), the 20% of the world's population which live in industrialised countries, slightly more than one billion people, consume nearly 60% of the world's energy supply. Meanwhile about 27% of the world's population does not have any access to electricity – in Africa only 15% of the population has electricity and in South Asia only 40% have electricity.²⁹ Addressing these inequalities is critical – developing countries have a right to expand their energy use for development, and support should be given to help them onto a green pathway to development.

BirdLife is committed to reducing its own carbon footprint through reduced energy use associated with its activities, including running its offices and all forms of travel, especially air.

²⁵ Hotker *et al.* (2006)

²⁶ Langston and Pullman (2003)

²⁷ BirdLife International (2007)

²⁸ BirdLife International (2008b)

²⁹ International Energy Agency (2006)

BIRDLIFE'S KEY POLICY MESSAGES ON CLIMATE CHANGE

1 *BirdLife supports the target of keeping the average rise in the Earth's surface temperature to less than 2 °C above pre-industrial levels.*

- 1.1 It is widely recognised that if the worst impacts of climate change are to be avoided then the **average** rise in the surface temperature of the Earth needs to be kept at less than 2 °C above the levels prevailing during the pre-industrial period, i.e. before the late eighteenth century. This is the view not only of many scientists but also of many countries and blocs of countries. It is the official position of the European Union (EU), agreed not only in the Environment Council but also by heads of government (Council Decision of December 2004). Importantly it is recognised that some areas have already experienced 'too much' temperature change, such as the Arctic and marine environments.
- 1.2 To keep average global temperature rise to less than 2 °C will be hard. This would require atmospheric concentrations of greenhouse gases being stabilised at less than 450ppm (parts per million) and probably 400ppm.³⁰ There are many possible emission pathways for attaining greenhouse gas stabilisation at a particular atmospheric concentration. However, a widespread view is that achieving the 2 °C target requires that global emissions will need to have peaked and started to decline steeply by 2015.
- 1.3 Developed countries should take a lead in reducing emissions, by at least 30% by 2020 (from 1990 levels) and by at least 80% (from 1990 levels) by 2050. There is the need for global post 2012 agreement on these targets. Rapidly industrialising countries need to follow this lead, and must immediately start to slow down the rate of increase in their emissions, otherwise it will not be possible to stay below 2 °C.

2 *The impacts of climate change on biodiversity, and the role of biodiversity in helping to mitigate climate change, should be reflected in all policy sectors and across all relevant conventions.*

- 2.1 BirdLife believes that the value of biodiversity should be more explicitly recognised by the United Nations Framework Convention on Climate Change.
- 2.2 BirdLife wishes to see continuation and improvements of crediting afforestation and reforestation activities within the carbon markets under the Kyoto Protocol's Clean Development Mechanism (CDM).
- 2.3 BirdLife strongly supports the initiative on 'reducing emissions from deforestation in developing countries' (REDD) submitted to the UN Framework Convention on Climate Change (UNFCCC). BirdLife urges Parties to apply a co-benefits approach that requires that policy and action be aligned to achieve results that maximise benefits for biodiversity, climate change mitigation and adaptation and poverty reduction.
- 2.4 BirdLife supports continued efforts of the Convention on Biological Diversity, the Ramsar Convention, the United Nations Convention to Combat Desertification (UNCCD) and the Convention on Migratory Species (CMS) to integrate climate change impacts and response activities across their programmes of work.
- 2.5 Climate change is projected to affect agricultural biodiversity, diminishing some crop yields and threatening food security. Agricultural policy needs to recognise the impacts climate change may

have, and the value of biodiversity to help mitigate these impacts. Policy-makers need to recognise the potential for reducing emissions through low-impact farming and sustainable land management.

- 2.6** Climate change impacts need to be recognised in all sectoral policies, and should include complimentary and sustainable responses – adaptation actions in one sector should not compromise sustainable development in another.

3

Habitat conservation and appropriate management, including habitat restoration, can play a crucial role in sequestering carbon and reducing greenhouse gas emissions. There is a need for effective mechanisms to maintain and restore these carbon stocks.

- 3.1** By working to conserve and effectively manage forests, peatlands and other habitats for birds and biodiversity, BirdLife is already reducing emissions of greenhouse gases. The BirdLife Partnership has extensive experience of conserving and managing such habitats in different parts of the world. BirdLife's efforts to conserve forests and other habitats will help strengthen these ecosystems, so that they make an increasing contribution to better regulating future climate change.
- 3.2** BirdLife seeks recognition of the diverse values that ecosystems such as forests provide, in terms of biodiversity and other ecosystems services, and of the benefits to local communities and human wellbeing.
- 3.3** BirdLife strongly supports the initiative on 'reducing emissions from deforestation in developing countries' (REDD) submitted to the UN Framework Convention on Climate Change (UNFCCC) by Papua New Guinea, Costa Rica and the Coalition of Rainforest Nations in late 2005.³¹ The proposal would enable developing countries to benefit financially from protecting their forests. With this change could come the chance to protect the unique wildlife of tropical forests and offer sustainable livelihoods to the many people who depend on them. BirdLife wishes to see this proposal firmly embedded in the UNFCCC global climate change agreement.
- 3.4** BirdLife wishes to see continuation of the carbon markets under the Kyoto Protocol including afforestation and reforestation projects.
- 3.5** Carbon offsetting should not be encouraged in place of reducing emissions for either companies or individuals. Nevertheless, BirdLife recognises that carbon trading and offsetting mechanisms under strict regulatory standards have potential value in mitigating unavoidable emissions, and in combining climate change and biodiversity benefits. BirdLife will continue to explore the potential of natural habitat conservation and management for responsible carbon offsetting, monitored and certified to a high standard.
- 3.6** National, regional and global legislation to provide for robust habitat conservation measures in the light of climate change needs to be strengthened and fully implemented.
- 3.7** Extreme caution should be exercised regarding claims that changing semi-natural habitats will be carbon positive. The conservation benefit of conserving a given habitat important for biodiversity should not be sacrificed for conversion to a different habitat type for potential but often negligible carbon benefit.

Note: A detailed BirdLife Working Policy Brief on reducing emissions from deforestation in developing countries (REDD) is available.

³¹ Reducing emissions from deforestation in developing countries: approaches to stimulate action. Submission to UNFCCC COP11, Montreal 2005

4***It is essential to reduce emissions of greenhouse gases from fossil fuels through reduced energy consumption and increased energy efficiency.***

- 4.1** BirdLife strongly advocates the reduction of emissions of greenhouse gases from fossil fuels through reduced energy consumption (by changing energy consumption patterns within society) and increased energy efficiency (through investment and legislation).
- 4.2** BirdLife advocates specific and appropriate energy reduction and efficiency targets at local, national and regional levels and for different sectors (e.g. energy conversion, industry, transport, agriculture, forestry and waste management).
- 4.3** BirdLife advocates far stronger emission reduction targets for developed countries (compared to developing ones) and promotes means of making incentives available to developing countries to limit their emissions.
- 4.4** BirdLife believes a large and growing share of our current and future energy production worldwide has to shift from fossil fuels to truly sustainable renewable sources.
- 4.5** BirdLife recognises that there are currently massive inequalities in global energy access and consumption. Addressing these inequalities is critical – developing countries have a right to expand their energy use for development, and support should be given to help them on a green pathway to development.

5***The switch from fossil fuels to renewable energies needs to avoid harm to ecosystems and biodiversity. There is an urgent need for investment in existing technologies to develop truly sustainable renewable sources of energy plus investment in research for even better renewables fit for future use.***

- 5.1** The full environmental impacts (e.g. extraction, large power plants, emissions) caused by continued or extended use of fossil fuels need to be taken into account when assessing the comparative impacts of alternative renewable technologies.
- 5.2** Truly sustainable renewable energy sources offer an important contribution to combat climate change by reducing dependence on fossil fuels and hence reducing harmful emissions of greenhouse gases.
- 5.3** Reductions in energy consumption and increased efficiency are essential. Any switch to or investment in renewable energy should not be at the expense of efforts to reduce energy consumption and increase overall efficiency generation and use.
- 5.4** No energy generation is without its own potentially damaging consequences for nature conservation. This applies as much to renewable sources as it does to fossil fuel sources. There is a need to balance the risks and benefits and to minimise any adverse environmental effects. Energy production from renewable sources should not be at the expense of biodiversity. There should be strategic planning, careful assessment and transparency for such investment to avoid conflict with biodiversity concerns.
- 5.5** It is essential that renewables have a major positive carbon balance across their entire life cycle (i.e. renewable energy only makes sense if it leads to much lower greenhouse gas emissions over its whole life cycle). They must provide at least 60% greenhouse gas savings across their whole life-cycle.
- 5.6** Renewable energy projects should be considered within a framework for sustainable development that integrates energy demand reduction and efficiency, a mix of renewable energy sources to meet an increasing proportion of overall energy demand, and the protection of biodiversity.

- 5.7** BirdLife supports and promotes the local generation of energy. Local generation by use of efficient technologies brings benefits to people and nature, especially in less developed regions of the world – but lots of small local developments may result in conflicts with local biodiversity. This needs to be examined on a case by case basis to try to balance benefits and risks.
- 5.8** Developments (for wind energy, bioenergy, solar and hydropower) must be appropriate to the site/ region/country and subject to strategic planning, including assessments of their environmental impacts e.g. on habitats, biodiversity and local communities.
- 5.9** Standards based on sound research must be set and advocated for – safeguards must be in place in terms of certification, greenhouse gas emissions guarantees, and impact assessments prior to development.

Wind Energy

- 5.10** A wind farm's location is critically important in determining the likelihood of negative impacts on birds. Wind farms must be located, designed and managed so that there are no significant adverse impacts on birds of acknowledged national and international importance, or their habitats.
- 5.11** There should be precautionary avoidance of locating wind farms in Key Biodiversity Areas (including IBAs). Special attention needs to be given to offshore wind farms, and wind farms along migration flyways.
- 5.12** Any wind farm development should be part of a wider strategic planning framework (at national level) including "sensitivity mapping" of biodiversity and high-quality environmental impact assessments undertaken at plan and project level.
- 5.13** Independent rigorous research and monitoring should be implemented, funded by national governments and the wind energy industry, in consultation with relevant experts, to improve our understanding of the impacts of wind farms on nature conservation. This should be an iterative process that should inform decision-making, appropriate site selection and wind farm design.

Bioenergy

- 5.13** BirdLife believes that promoting bioenergy makes sense only if there are significant and clearly demonstrable greenhouse gas benefits to be gained. They must provide at least 60% greenhouse gas savings across their whole life-cycle. Calculations of greenhouse gas savings should include the contribution to greenhouse gas emissions made by any land-use changes and include inputs such as fertilisers.
- 5.14** Bioenergy production must avoid further encroachment on natural habitats. Specifically biofuel development must avoid areas of exceptional biodiversity, such as Key Biodiversity Areas (including IBAs). The only, rare, exception should be IBAs in multiple use where such production does not compromise the conservation needs of such sites, as may be the case in sustainable harvesting of natural vegetation or maintaining traditional high nature-value agriculture systems.
- 5.15** BirdLife calls for all countries to work together to reach international agreement on sustainability standards for the global biofuels market, to ensure biofuel development delivers carbon savings without adversely affecting the environment. In practice this means an accreditation scheme that would ensure policy support is given only to sustainably produced biofuels, while unsustainable practices are discouraged. Safeguards should be put in place before any incentives are given for biofuel production – otherwise such incentives are unacceptably risky.

6

Adaptation (building adaptive management strategies that increase the ability of ecosystems to adapt to climate change (resilience) and that enable species and habitats to move into areas with more suitable climatic conditions (accommodation)) is an important and necessary element of sustainable development and future conservation planning and practice, and needs to be effectively integrated and coordinated with development planning. Addressing existing threats to species, sites and habitats is vital to build resilience in the face of climate change.

- 6.1** Considerations of climate change only strengthen BirdLife's commitment to its existing strategy and programmes which address the conservation of species, sites and habitats. Addressing existing threats will increase the resilience of species, sites and habitats to future climate change.
- 6.2** Nevertheless, BirdLife recognises that conservation strategies and work need also to include and integrate adaptive strategies for moderating and coping with climate change consequences now and in the future.
- 6.3** The IBA network must continue to function to conserve birds and other biodiversity, and to provide ecosystem services to people. To ensure this BirdLife will continue to conserve, manage and monitor the existing Important Bird Areas network, and expand it to include additional sites and corridors projected to become important as a result of actual and predicted changes in species distributions.
- 6.4** BirdLife strongly advocates biodiversity friendly land-use everywhere. Species should be helped to adapt by facilitating their movements through the countryside. This can be done by avoiding habitat fragmentation, increasing site connectivity and maintaining a biodiversity-friendly wider landscape.
- 6.5** Conservation planning and practice should address the future impacts of climate change and be more strongly focused on the support and maintenance of ecosystem functions generated by natural systems.
- 6.6** It is essential that measures taken to adapt to changing climate conditions, such as flood defences, hydrological projects or changes in agricultural systems must not harm, but support the resilience of ecosystems and biodiversity.
- 6.7** A variety of conservation responses may be appropriate, and these may differ across the world depending on local circumstances.
- 6.8** BirdLife calls for national, regional and global legislation to provide for robust conservation measures in the light of climate change.
- 6.9** Much knowledge and information crucial to finding effective adaptation responses will come from the local level where change is being experienced. This must be taken into account in planning and decision making.
- 6.10** More resources, capacity and research are needed on adaptation – linking development and biodiversity/natural systems at local and national levels in particular.

7 *There is a need for further studies, including monitoring and modeling, to understand the impacts of climate change on birds and biodiversity, and how this is related to development and human livelihoods needs, particularly in developing countries.*

- 7.1** Science is needed that demonstrates the impacts (and potential impacts) of climate change on birds and advises responses. BirdLife will continue to work collaboratively with other scientific organisations to assess climate change impacts on species, sites and habitats under future climate scenarios, especially through monitoring studies. The need for further science should not however be a reason for delaying taking immediate action to reduce emissions.
- 7.2** Models should be used to identify areas of vulnerability. These areas should be a priority focus for monitoring, from which appropriate responses can be developed. In particular, models of predicted changes in the climate envelopes of bird species will enable BirdLife to assess the impacts of climate change on the functioning of the Important Bird Areas network, in order to recommend adaptive measures to help ensure that the network continues to function into the future. Ideally models would also be able to inform development and would resonate with those engaged with human adaptation and development needs who are most closely linked to decision making in governments and development agencies.
- 7.3** There is a need for further detailed research and assessment of the potential impacts of renewable energy sources (including bioenergy, wind farms, solar and hydropower) on bird species, especially Globally Threatened Birds and IBAs.

8 *BirdLife works with conservation and development organisations that share the same concerns and solutions regarding climate change. Where possible solutions should benefit both biodiversity and people, especially the poor, and should be agreed through inclusive, participatory processes that use local knowledge as well as sound science.*

- 8.1** BirdLife believes that effective policy and action is informed by sound science and indigenous and local expertise. In particular, we recognise that communities have always adapted to changes in their ecosystems and therefore have essential knowledge to contribute in the development of policy and action for climate change adaptation. We are committed to using participatory and inclusive processes that engage with local people, their knowledge and capacity for change.
- 8.2** BirdLife recognises that climate change and poverty are linked and neither can be addressed individually. Actions to mitigate and adapt to climate change can either enhance or erode natural resources and ecosystems. People living in degraded ecosystems are more vulnerable to the impacts of climate change including through loss of livelihood opportunities and disasters. As such, BirdLife will promote a co-benefits approach in which policy and action for climate change mitigation and adaptation will aim to maximise on opportunities to benefit natural resources, ecosystems and human livelihoods.
- 8.3** BirdLife works in partnership with development and conservation organisations that share the same concerns and solutions regarding climate change.

- 9.1** The BirdLife Partnership is committed to reducing its own carbon footprint. The primary focus is the reduction of direct emissions through efficient use of electricity and heating fuel, improving energy efficiency, and reducing carbon emissions from air travel. BirdLife's conservation work necessitates travel, including by air. However, BirdLife will invest, as far as possible, in greater use of and training in technologies which can potentially reduce travel, such as web-, phone- and video- conferencing.
- 9.2** Wherever possible BirdLife also aims to cut indirect emissions by sourcing its products and services (including energy) from companies that are offering low-carbon products or processes. BirdLife will explore using renewable energy sources for the generation of electricity, heating and cooling. This will not only reduce BirdLife's carbon footprint, but will encourage the companies and organisations with which it works to consider their carbon emissions and environmental impacts.
- 9.3** For all those direct emissions (from travel, office running and other sources) that cannot be avoided, BirdLife will aim to pay towards activities which support the maintenance and enhancement of the carbon value of natural ecosystems, favouring projects that invest in conservation which prevents habitat loss.

REFERENCES

- Baumert, K., Herzog T. and Pershing J. (2005) *Navigating the numbers: Greenhouse gas data and international climate policy*. Washington D.C: World Resources Institute.
- BirdLife International (2005) *Position Statement on Windfarms and Birds – adopted by the BirdLife International EU Birds and Habitats Directive Task Force on 9th December 2005*. Brussels, Belgium: BirdLife International.
- BirdLife International (2008a) *A Strategy for birds and people: Responding to our changing world – Future Directions of the Birdlife Partnership 2009-2015*. Cambridge, UK: BirdLife International.
- BirdLife International (2008b) *State of the world's birds: Indicators for our changing world*. Cambridge, UK: BirdLife International. www.birdlife.org/sowb
- Decisions adopted by the Conference of the Parties to the Convention on Biological Diversity at its ninth meeting. Bonn, 19-20 May 2008. IX/5 Forest Biodiversity and IX/16 Biodiversity and Climate Change. <http://www.cbd.int/decisions>
- Decisions adopted by the UN Framework Convention on Climate Change Bali 3-14 December 2007. Decision 1/CP.13 Bali. Action Plan. <http://unfccc.int/2860.php>
- European Environment Agency (2007) *Greenhouse gas emission trends and projections in Europe 2007*. Copenhagen, Denmark: European Environment Agency.
- FAO (2005) *State of the World's Forests*. Rome, Italy: United Nations.
- FAO (2008) *Bioenergy, food security and sustainability – towards an international framework. High Level Conference on food security*. Rome, Italy: United Nations.
- Hai, T. C. (2000) *Land Use And The Oil Palm Industry In Malaysia*. Malaysia: WWF.
- Hole, D.G., Willis, S.G., Pain, D.J., Fishpool, L. D. Butchart, S. H. M., Collingham, Y. C.; Rahbek, S and Huntley, B. (in prep.) *Projected impacts of climate change on a continent-wide protected area network*.
- Hooijer, A., Silvius, M., Wösten, H. and Page, S. (2006) *PEAT-CO₂, Assessment of CO₂ emissions from drained peatlands in SE Asia*. (Delft Hydraulics report Q3943 2006).
- Hötker, H., Thomsen, K.-M. and Jeromin, H. (2006) *Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats - facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation*. Bergenhusen: Michael-Otto-Institut im NABU.
- Huntley, B., Green, R., Collingham, Y. and Willis, S. G. (2007) *A climatic atlas of European breeding birds*. Barcelona, Spain: Lynx Edicions.
- International Energy Agency (2006) *World Energy Outlook*. Paris, France: IEA.
- IPCC (2007) *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. 104 pp. Geneva, Switzerland: IPCC. <http://www.ipcc.ch/>
- Joint Liaison Group of the Rio Conventions (2007) *Forest, climate change, biodiversity and land degradation*.
- Langston, R. H. W. and Pullan, J. D. (2003) *Windfarms and Birds: An analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues*. Brussels, Belgium: BirdLife International.

Millennium Ecosystem Assessment (2005) *Ecosystems and human well-being: synthesis*. Washington, DC: Island Press.

Parry, M., Arnell, N., McMichael, T., Nicholls R., Martens, P., Kovats, S., Livermore, M., Rosenzweig, C., Iglesias, A. and Fischer, G. (2001) Millions at risk: defining critical climate change threats and targets. *Global Environmental Change*. 11(3) 181-183

Reducing emissions from deforestation in developing countries: approaches to stimulate actions. Submission to UNFCCC COP11 Montreal 28 November – 9 December 2005. <http://www.rainforestcoalition.org/eng/>

The Royal Society (2008) *Biodiversity-climate interactions: adaptation, mitigation and human livelihoods. Report of an international meeting, June 2007*. London, U.K.: The Royal Society.

Stern, N. (2007) *The Economics of Climate Change: The Stern Review*. Cambridge, UK: Cambridge University Press.

Thomas, C. D., Cameron, A., Green, R. E., Bakkenes, M., Beaumont, L. J., Collingham, Y. C., Erasmus, B. F. N., Ferreira de Siqueira, M., Grainger, A., Hannah, L., Hughes, L., Huntley, B., van Jaarsveld, A. S., Midgley, G. F., Miles, L., Ortega-Huerta, M. A., Peterson, A. T., Phillips O. L. and Williams, S. E. (2004) Extinction risk from climate change. *Nature*. 427. 145-148.

United Nations (2006) *The Millennium Development goals report 2006*. New York: United Nations.



BirdLife International comprises more than 100 conservation organisations working together to promote sustainable living as a means to conserve biodiversity



www.birdlife.org

BirdLife International is a partnership of people for birds and the environment.

As a worldwide community, we are the leading authority on the status of birds and their habitats. Over 10 million supporters support the BirdLife Partnership of national non-governmental conservation organisations and local networks. Partners, operating in more than 100 territories, work together on shared priorities, programmes, and policies, learning from each other to achieve real conservation results.