Climate Emergency and Biodiversity Crisis: The Facts and Figures

CIEEM Briefing Paper

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THE CHARTERED INSTITUTE OF ECOLOGY AND ENVIRONMENTAL MANAGEMENT (CIEEM) IS THE PROFESSIONAL BODY FOR ECOLOGISTS AND ENVIRONMENTAL MANAGERS WORKING TO MANAGE AND ENHANCE THE NATURAL ENVIRONMENT IN THE UK AND IRELAND.

Human activities which result in the release of greenhouse gases are estimated to have caused 1.1°C (0.8-1.3°C range) of global heating above pre-industrial levels[1]. As a result, there have already been sea level rises, increased likelihoods of extreme weather events and melting of sea ice and permafrost[2]. This has direct and devastating impacts on society, including land loss[3]; increased severity and occurrence of wildfires[4]; drought; and difficulties producing food[5]. These effects have been particularly severe in recent years, with unprecedented arctic wildfires in 2020[6], and destructive floods across Europe in 2021[7].

Alongside this, there have been unprecedented declines in global biodiversity, with the average abundance of native species in most major land-based habitats falling by at least 20%, mostly since 1900[8] and analyses finding global biodiversity in below the 'safe limit' to maintain vital ecological processes[9]. The quality of habitats which support this biodiversity has also declined, with a 30% reduction in global terrestrial habitat integrity caused by habitat loss, fragmentation and deterioration.

Biodiversity is essential both to humans, through the provision of ecosystem services such as food, fuel, flood prevention and enjoyment; and in its own right as part of the natural world.

The 2019 *Global Assessment Report on Biodiversity and Ecosystem Services* by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)[10] states that the key drivers of biodiversity decline are:

- Changes in land and sea use
- Direct exploitation of organisms
- Climate change
- Pollution
- Invasive alien species

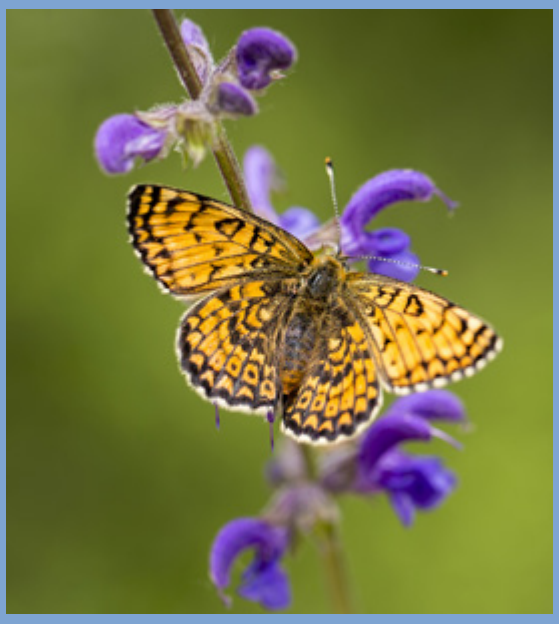
The combined effects of these human activities have put an estimated one million species at risk of extinction, threatening the stability of ecosystems and the services we receive from them. For example, more than 75% of global food crop types rely on animal pollination, meaning declines in pollinator diversity and abundance have severe implications for human food production[11].

There is already evidence that biodiversity has been affected by the 1.1°C rise in global average temperature. Poleward and upwards shifts in species' distribution have been recorded in Britain[12] and Ireland[13], and on a global scale[14]. In some cases, changes in migration[15], breeding[16] and flowering dates[17] have resulted in a mismatch between predator and prey species, resulting in species having difficulties finding food[18]. The Sixth IPCC Assessment Report, the first part of which was published in 2021, states that "*climate zones have shifted poleward in both hemispheres, and the growing season has lengthened by up to two days per decade since the 1950s*"[19].

Temperature rises are also affecting entire ecosystems, with heatwaves in the central Indian Ocean responsible for the death of more than two-thirds of corals in two years[20].

Models predict further temperature increases of between 1.4°C and 4.4°C by 2100 under a range of scenarios of human activity, with the greatest temperature increases at higher latitudes[1]. The Intergovernmental Panel on Climate Change (IPCC*) Special Report: Global Warming of 1.5°C*[21] clearly outlined the need to limit warming to 1.5°C, and the severe impacts just an additional 0.5°C rise could have on biodiversity. For example, coral reefs would decline by 70-90% with global warming of 1.5°C, whereas 99% would be lost with 2°C. The likelihood of an Arctic Ocean free of sea ice in summer would be once per century with global warming of 1.5°C, compared with at least once per decade with 2°C. This would have devastating implications for species which rely on sea ice to hunt. The latest report from the IPCC shows that by 2020, the average area of Arctic sea ice has reached its lowest level since at least 1850 and late summer Arctic sea ice area was smaller than at any time in at least the past 1000 years[1]. Alarmingly, the report also warns "*global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO2) and other greenhouse gas emissions occur in the coming decades*".

The melting of land-based icesheets in Greenland and the Antarctic is pushing global sea level rise. The annual rate of



sea level rise is increasing, from 1.4mm across much of the 20th Century to 3.6mm between 2006 and 2015. At the most optimistic end of predicted ranges for global gas emissions, sea levels are predicted to rise by 0.3m above 2000 levels by the end of the century, with a worst-case forecast of a 2.5m rise being possible[22,23]. Coastal zones will be pressured, especially where natural inland movement of habitats such as salt marsh and mangroves are prevented by human development, resulting in loss of habitat through coastal squeeze. As well as biodiversity impacts, it is estimated that 1.2 million people currently living in low-lying islands could possibly be displaced by a sea level rise of 0.5m[24].

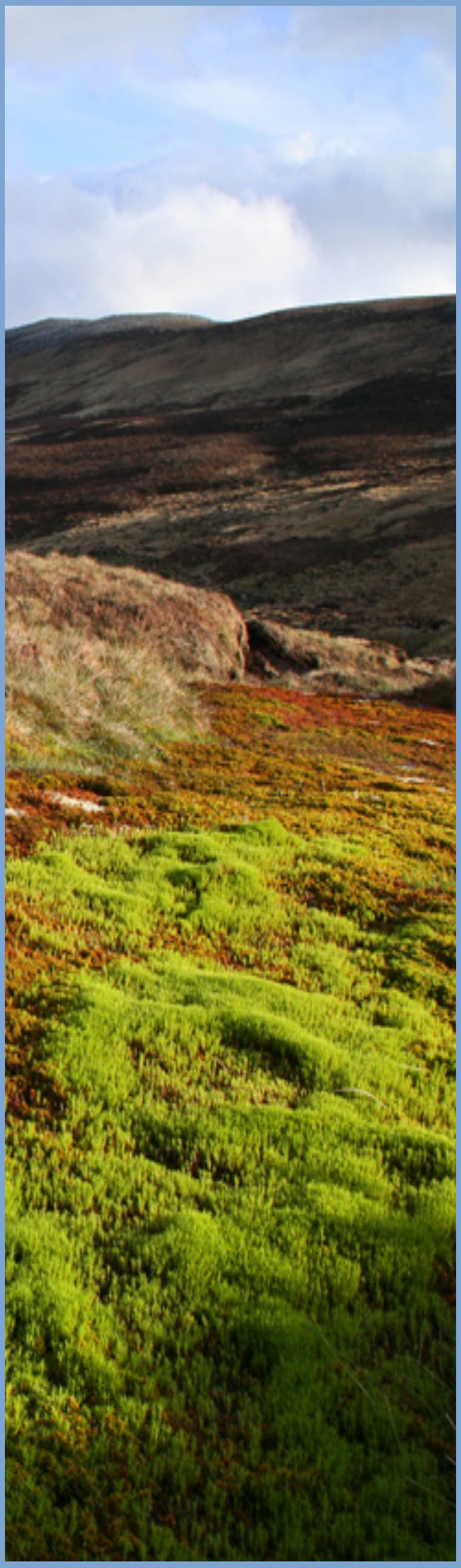
The impacts of climate change on biodiversity are also exacerbated by the other drivers outlined above. For example, loss of habitat and human-created barriers mean species may not be able to shift their ranges to match climate. Climate-related range shifts will also increase the threat of invasive alien species introduction and prevalence of insect-borne diseases such as malaria and West Nile Virus[25].

Conversely, the destruction of biodiverse ecosystems, such as deforestation of tropical rainforests and damage to peat bogs, results in significant production of carbon dioxide and reduces ongoing sequestration, leading to a feedback effect of further climate change.

What Needs to Change?

In 2021, the IPCC estimated that the world can emit around 460bn tonnes of CO2 (GtCO2) to have a 50% chance to limit warming to an average of 1.5°C[26]. The analysis found that we are likely to surpass 1.5°C by the early 2030s. Unavoidable emissions of CO2 must be removed from the atmosphere as fast as they are added. Achieving this, and limiting the impacts on biodiversity, will require fast and strong action globally. We welcome the UK Government's commitment to net zero emissions by 2050 and the proposed net zero targets in Scotland, Northern Ireland and Wales. However, **this must now be followed with immediate, ambitious and continued action**, and wherever possible, efforts must be made to achieve this goal early.

Due to the existing and predicted effects the predicted exceeding of the 1.5°C target will have on society and biodiversity, there is an urgent need for both mitigation to reduce emissions and adaptation to minimise detrimental impacts on the natural world and society.



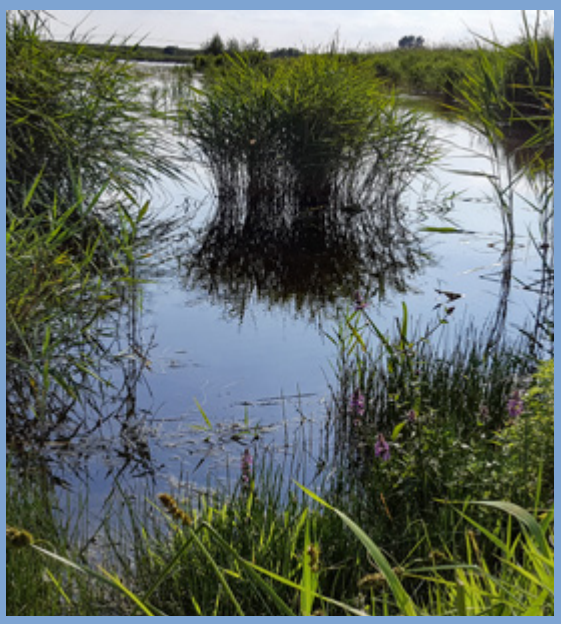
The climate emergency and biodiversity crisis are inextricably linked and must be addressed in tandem.

In conjunction with addressing climate change, action is needed by humanity to halt biodiversity decline and begin its restoration. Planning, land use and agricultural systems must be adapted to work with nature. For example, by implementing Biodiversity Net Gain in planning and moving to agricultural systems of 'public funds for public benefit'. Regulators must be strong and independent to address issues of pollution and over-exploitation, and humanity must reduce our global ecological footprint, for example, through decreasing the reliance on rare metals extraction, tropical timber, and crop and animal production, all of which can induce tropical deforestation.

There are promising initiatives coming from UK and international governments, including strong links the climate emergency and biodiversity crisis in Scotland's updated National Planning Framework[27], passing of the Agriculture Bill in England introducing a 'public money for public goods' payment system and introductions of similar proposals in Scotland and Wales, the agreement of the Glasgow Declaration on Forests and Land use at COP26 which pledges leaders to end and reverse deforestation by 2030, and the UK-wide pledge to protect 30% of land for nature by 2030. But there is still a long way to go. Over a third of England's existing SSSIs are in poor condition[28], and the 30 by 30 designations much not simply include National Parks and AONBs as they are, as they are not currently designated for nature protection. We also need large-scale strategic restoration to link these core habitats with nature corridors: it is essential that new farming schemes and planning reforms incorporate this aim.

Mitigation

Human consumption of fossil fuels is the primary cause of greenhouse gas emissions[29], meaning **an urgent and rapid global shift to low-carbon alternatives is essential**. There is, however, concern that UK Export Finance is undermining the UK's targets for climate by investing £2.5 billion in fossil fuel projects over five years, most of which are in low- and middle-income countries[30]. We welcome committments at COP26 for the UK to end support of fossil fuel industries internationally. The UK must not export its emissions and should therefore also reduce its reliance on external imports.



Greenhouse gases are also emitted by agricultural practices and waste management, particularly methane, which is 30 times more potent than carbon dioxide, from livestock and landfill. We support the calls from the recent IPCC report on 'Climate Change and Land' for sustainable land use, including farming and forestry, and reducing waste[31]. Future land and waste management schemes must be implemented in a way that tackles the causes of both climate change and biodiversity decline, for example by using regenerative farming techniques.

Nature-based solutions must play a key role in mitigating against and adapting to climate change. Restoration of degraded peat bogs, wetlands, legume and species-rich grasslands, heathland, salt marshes, seagrass beds and woodlands will increase carbon sequestration and storage potential[32]. A wide range of habitat restoration and creation projects, supporting both short-term and long-term carbon sinks, are needed to address the climate and biodiversity crises. Additionally, protecting and improving the ecological condition of existing habitats important in carbon storage must be a priority[33].

Biodiversity must be restored and enhanced both for its intrinsic value and for the tangible benefits that it has for society and the economy. Biodiversity and ecosystem services contribute to clean air, fresh water, crop pollination, food production, soil regeneration, fuel and fibre production, physical and mental health and well-being, and many, many more goods and services for society. Intact ecosystems (i.e. that have a complete assemblage of species) are more resilient to change[34] and are better at providing ecosystem services, upon which human life and livelihoods depend.

Adaptation

A 2021 report by the Committee on Climate Change found none of the 34 priority areas in the UK Government's National Adaptation Plan (NAP) assessed are demonstrating strong progress in adapting to climate risk[35]. This must change. Society and biodiversity must be supported to adapt to the inevitable changes we face with clear actions laid out in the National Adaptation Plan that are implemented urgently in light of the already-present challenges.

Adaptation, in addition to mitigation, for climate change must be embedded across all goals in policies for nature recovery and vice versa. Ecological networks, such as the developing Nature Recovery Network and Local Nature Recovery Plans in England, require defining and implementing nationally and

regionally to allow species to migrate as the climate changes. Restoration of degraded ecosystems and habitats will help nature to adapt to climate change by reducing barriers to migration and will have significant benefits for the human population. For example, restoring wetlands and riverbeds can act as natural barriers against flooding, green spaces can provide refuge from heat extremes in cities, and woodland can help reduce soil erosion[36].

Land should be used to offset major impacts of climate change, for example, using Integrated Coastal Zone Management to mitigate against sea level rise. Sustainable flood management should also be required through the planning process.

Offsetting

Offsetting of residual emissions, i.e. removing CO2 from the atmosphere (for example, tree planting or peatland restoration) or reducing the release of CO2 to the atmosphere (for example, energy efficiency or renewable energy) to 'cancel out' emissions that cannot be avoided, is increasing becoming part of plans to tackle the climate emergency, at a national, local and individual level. This can provide a useful source of investment in nature from the private sector. However, there are concerns due to the lack of regulation around schemes which can mean poor quality schemes do not actually offer additional carbon sequestration, they are implemented in a way that has negative social or environmental impacts, and they could distract from the need to actively reduce emissions being produced[37]. It is essential that offsetting schemes must be verified and used appropriately once all avoidable emissions have been removed.

CIEEM utilises such schemes to offset unavoidable residual emissions from our activities including office operations, events, and staff and committee travel. In our selection of offsetting projects, CIEEM abides by the a set principles as much as feasibly possible, which have been developed to take into account of the British Standard: PAS 2060, the Oxford Offsetting Principles[38] and the Environment Agency review of offsetting[39]. These include ensuring a chosen offsetting project is additional, verifiable, permanent, undertaken in real time, based locally, avoids negative impacts and removes CO2 from the atmosphere. More information about this approach is set out in Box and Connett (2021)[40].

Action is Needed at All Levels

Every government, every business, every organisation and every individual must play a role in reducing greenhouse gas emissions, assisting in the adaptation to climate change, halting biodiversity loss, and restoring habitats and species. This should be aided through changes in laws and regulations, policies, and behaviours and lifestyles at local and regional levels, as well as the international and national scales for example through COP15 and COP26. The implementation of measures introduced in new agriculture policies and laws, and the Environment Act must be supported with adequate funding and skilled professionals to ensure they deliver for biodiversity.

Governments, nationally and locally, must lead by example to provide the regulatory frameworks that give businesses the confidence to change on a level playing field and that provide incentives to innovate new solutions. Individuals and businesses must step up, through altering behaviours and lifestyles, in ways that clearly indicate to Governments that robust changes in legislation and policy are supported.

Ecologists and environmental managers are at the forefront of the fight against biodiversity loss and climate change adaptation. We must lead the way in restoring degraded habitats and landscapes, ensuring developments and other land, freshwater and marine use practices deliver biodiversity net gain and sharing best practice and evidence, both within the profession and with decision-makers. We must do so with both biodiversity recovery and climate change adaptation and mitigation in mind.

It is vital, as never before, that the work of CIEEM, its members and our profession continue to be at the forefront of targeted action.

The purpose of this briefing paper is to review the most accessible evidence that is relevant to the scope of CIEEM.

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