

Briefing ahead of Scottish Green Party Debate: Climate Emergency, 27 March 2019

Summary

- Scottish Environment LINK members welcome the debate on Climate Emergency and Motion S5M-16555. **In the context of what is now recognised as climate breakdown and a global climate emergency, LINK members hope that this debate will offer an opportunity for Scottish Parliament to recognise the often-unacknowledged ally in our efforts to tackle climate change: our natural environment.**
- The risks of climate breakdown for our natural environment are two-fold:
 - Ineffective action in setting ambitious greenhouse gas emissions reduction targets perpetuates and magnifies the challenges our environment faces due to a changing climate (e.g. temperature and sea level changes).
 - As our natural world becomes less resilient in the face of climate change, it becomes less able to sequester carbon. Evidence suggests that ecosystem disruption (e.g. through drought, disease and floods) may lead to vegetation becoming a net carbon emitter by the end of the 21st century.
- **Given how much carbon is stored in nature, failure to ensure that our ecosystems can continue to absorb carbon and be resilient to climate change will compromise action to reduce greenhouse gas emissions.** According to Scottish Natural Heritage¹:
 - It is estimated that 50 megatonnes of carbon is locked in Scotland's vegetation.
 - Scotland's soils contain more than 3,000 megatonnes of carbon; 53% of that is held in our peatlands. Agricultural soils have the potential to hold an estimated 115 megatonnes of it, equivalent to 22% of total carbon dioxide emissions from Scotland's energy sector.
 - Scotland's seas store more than 1,700 megatonnes of inorganic carbon.
- Our natural world is already coping with a 1°C change. As the IPCC Special Report on Global Warming of 1.5°C² highlighted the climate risks of a temperature rise of 1.5°C versus 2°C are substantive.
- The LINK-WWF Scotland report '[Scotland's Nature on Red Alert: climate change impacts on biodiversity](#)' shows that Scotland's environment is also experiencing the effects of climate change and impacts are expected to be particularly severe should warming surpass 1.5°C. Species that will be affected include Atlantic salmon, the capercaillie, the freshwater pearl mussel and the kittiwake.
- LINK members agree that it is our duty to take early and effective action against climate change not least given its intergenerational effects. This is also in line with the environmental principle of preventive action enshrined in international climate and EU treaties, which the Government has pledged will continue to guide environmental policy-making³.
- **Scientific evidence clearly indicates that there is an urgent need to limit global warming to 1.5 degrees Celsius. We need effective and timely action to tackle climate change. This means:**
 - 1. Legislating for achieving a net zero greenhouse gas emissions target as soon as possible⁴,**
 - 2. Avoiding an overshoot scenario also through ambitious interim targets and**
 - 3. Rolling out a suite of nature-based solutions to enhance our environment's resilience to the increasingly more difficult challenges that the reality of climate change presents.**

¹ <https://www.nature.scot/climate-change/taking-action/carbon-management/managing-nature-carbon-capture>

² IPCC Special Report: Global Warming of 1.5°C <https://www.ipcc.ch/sr15/>

³ Environmental Principles and Governance in Scotland consultation document: <https://consult.gov.scot/environment-forestry/environmental-principles-and-governance/>

⁴ Before the recent IPCC Special Report on Global Warming of 1.5°C was published in October 2018, LINK members supported reaching net zero emissions by 2050 at the latest.

- LINK members hope that the debate will provide an opportunity to highlight that all policies need to contribute to that end⁵, and this must explicitly include an ambitious post-2020 biodiversity framework to ensure our natural carbon sinks function in the most optimal way, transitioning to a circular economy and ensuring that public subsidies deliver towards joint climate and environmental goals, including rural and agricultural support.

Scottish Environment LINK is the forum for Scotland's voluntary environment community, with over 35 member bodies representing a broad spectrum of environmental interests with the common goal of contributing to a more environmentally sustainable society.

This briefing sets out in greater detail the findings of the '[Scotland's Nature on Red Alert](#)' report authored by ecologist Tamsin Morris. The report is a comprehensive literature review of approximately 150 studies and brings together existing evidence about the damage that climate change is already inflicting and will continue to inflict on Scotland's species and habitats. On the basis of the available evidence, the report concluded that:

1. Scotland's climate trends indicate that annual average temperatures have already increased by an average of 1°C.
2. Scotland's biodiversity is already experiencing a changed climate, affecting species abundance, distribution, their food sources, breeding and ability to adapt.
3. As detailed in the report, species that could be affected through climate pressures are some of Scotland's most well-known and iconic wildlife, including Atlantic salmon, the capercaillie, the freshwater pearl mussel and the kittiwake.

As such, a two-pronged approach should be employed to tackle climate change: (a) increasing emission reduction and (b) ensuring that ecosystems are healthy, so they can continue to absorb greenhouse gases and withstand the impacts of climate change.

The following section summarises the evidence set out in the report.

CLIMATE CHANGE IMPACTS ON SCOTLAND'S BIODIVERSITY

It is now well documented that climate change will impact biodiversity globally as well as locally. According to the IPCC⁶ suggests that even a 1.5°C average temperature rise may put 20-30% of species at risk of extinction, and if the warming goes beyond 2°C nearly all ecosystems will struggle. In order to align to the 1.5°C ambition IPCC recommends Changing climate is also one of the main threats to Scotland's biodiversity, where the impact of those threats is likely to magnify with more climate driven changes⁷.

According to the 'Scotland's Nature on Red Alert' report the following are some key ways in which climate change is affecting Scotland's nature:

a) Water temperature rise:

There has been a **warming of about 1°C in Scotland** over the past few decades⁸. Projections based on past trends indicate that **rise in air temperature could raise water temperature between 0.4 to 0.7°C for every 1°C rise during summer months**, warming up our rivers.

Increased water temperatures can be lethal for cold water adapted species such as **Atlantic salmon and Arctic charr** or severely affect their growth and egg survival rate. There have been declines in the populations of both species, while studies indicate that the threat to Arctic charr is more significant under temperature rise of 2°C as opposed to 1.5°C.

⁵ In 2017, [LINK members highlighted](#) that in the context of the climate crisis, for a hydrocarbon rich country like Scotland to open up a new source of fossil fuels while it remains committed to continued exploitation of North Sea oil and gas reserves would be irresponsible and run counter to the Scottish Government's efforts to be a world leader on climate action. LINK members are therefore of the view that the Scottish Government should act to prohibit onshore oil and gas extraction because of the host of demonstrable risks to the climate, our environment and public health.

⁶ IPCC, 2018, Global Warming of 1.5C <http://ipcc.ch/report/sr15/>

⁷ Biodiversity Climate Change Impacts: Report Card 2015- <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity/>

⁸ The report uses data from a Scotland and Northern Ireland Forum for International Research (SNIFFER, 2014), study which looks at climate trends between 1961 and 2004.

Invertebrate species are impacted in several ways, for example spring macroinvertebrates could decline by 21% for every 1°C temperature rise. With temperature rise of 3°C or more local extinction of some species could be expected. There would be a significant impact from the loss of invertebrate species, due to their position in the food chain.

b) Decrease in snow cover:

Scotland is already experiencing a reduction in **snow cover, where studies suggest over the last 43 years snow cover has declined by 32.1%**⁸. While projections differ for different parts of Scotland, the Highlands snow cover days are projected to reduce by 30% by the 2050s. By the 2080s mountain areas in the UK would also experience a drop of 65 to 80% in mean winter snowfall.

As average temperatures increase it is likely that there will be a decline in climatically suitable habitat for montane and Arctic-alpine species. Estimates suggest that even where projections are based on assumptions of high reductions of GHG emissions, 78% of the **habitat for Arctic / montane species, such as dwarf willow, moss campion and stiff sedge, will be climatically unsuitable**. In the same study when projections consider high levels of GHG emissions being produced with low reduction this number goes up to 93%. Species such as dwarf willow are protected under the EU Habitats Directive as Annex 1 habitats, their loss or change in their conditions is noteworthy.

Bird species at the edge of their southern range in the UK would have reduced range of climatically suitable habitat. For montane birds such as snow bunting and ptarmigan, the difference (in terms of climate impact on species abundance and distribution) between projections that consider ambitious emission reduction and unambitious emission reduction is considerable. Climate models on locations with similar climatic conditions to Scottish habitats of **snow bunting and ptarmigan** suggest that projections considering unambitious emissions reductions would experience a higher rise in temperatures, where the decline in distribution for these species would be nearly 90% and 98% respectively.

c) Changes in precipitation:

Climate change is leading to changed patterns of precipitation. The impacts are not uniform and as such the impacts vary for different species.

Summer precipitation levels are projected to decrease in parts of Scotland, leading to significantly hotter and drier summers and an increased risk of drought

This would lead to lower river levels and in extreme cases could lead to sections of rivers drying up. With lower river levels, species within these freshwater habitats would be affected. Trends suggest that **birds dependent on freshwater habitats such as common scoter, which breed in lochs in North and West of Scotland are already declining** and are at a high risk of extinction in the UK.

The wildlife that makes up our **moorlands** is also under threat from climate pressures of increased temperatures and decreasing summer precipitation. Studies indicate that the abundance of **craneflies**, an important food source for birds such as dunlin, grouse, golden plover and snow bunting, is affected after a hot, dry summer. With rising temperatures their abundance is reduced which in return reduces food availability at key lifecycle stages for these birds.

At the same time, **climate trends suggest that overall there has been an increase in annual precipitation levels in Scotland of 21.1%**. While the expected increase in frequency and intensity of rainfall, under different projections varies across Scotland, overall the expected increase could lead to increased frequency of floods, increased severity of flooding and spate events.

This again will create significant challenges for many species. For example, one of the most critically endangered molluscs in the world, the **freshwater pearl mussel**, has multiple vulnerabilities to climate change. Specifically, significant spate events cause the mussels to be washed out of the river gravels, often dropping them in unsuitable river habitat, or sometimes even onto dry land. What is more this species is also vulnerable because of its dependency on other species such as Atlantic salmon and brown trout as part of its lifecycle process.

Higher precipitation in early summer could also have a negative impact on species such as **capercaillie**. Research confirms that wet weather during the summer months reduces the chick's ability to source food, diminishing its chances of survival. Climate models for the capercaillie indicate that a rise of 1.9°C by the 2050s could wipe out 99% of the capercaillie's potential climate space, where as a rise of .7°C may still give it a chance of survival, at 59% of its climate space being lost.

In terms of winter precipitation, this is expected to continue to rise. While an increase in winter temperatures could increase the survival rates over the winter period for some woodland bird species, increased precipitation and damp conditions would have a detrimental effect on their ability to survive. Birds such as treecreepers could have reduced chance of winter survival, as wetter conditions would affect dampen the birds' plumage, reducing insulation capabilities.

d) Increase in sea temperature levels:

Sea temperatures have increased by 0.4°C in the coastal waters of south of Scotland and 0.3°C in the northern waters. Certain data suggests that sea temperature rise of 2 to 2.5°C is expected by the 2080s. While north and west of Scotland may experience only 1°C warming of the seas, the warming will be most evident in autumn. With change in sea water temperatures some cetacean (whales, dolphins and porpoises) species will shift their range to waters with more suitable temperature.

As such, species that live in colder water are likely to shift their range northwards. As the area of warming waters expand this will have additional implications, the habitat range of these species would shrink. Populations of species such as **white beaked dolphin are threatened** due to climate change induced warming of the seas. These species are already being pushed further up north in their marine habitats of northern Minch, Outer Hebrides and the northern North Sea.

Rise in sea temperatures is also having an impact on food availability for certain species, which is then affecting their abundance due to their dependency on these food sources. Seabirds such as **kittwake have been affected**, as their populations have declined by approximately 60% since 1986. Rising sea temperatures are contributing to the birds' inability to breed as this is linked to the abundance of sandeels. Sandeels, abundant in low sea temperatures, are being affected by rising sea temperatures.

e) Rise in sea levels:

Climate change is likely to induce sea level rise, around Scotland's coastal waters. Current projections⁹ estimate a rise of approximately 30cm in the Clyde to Skye coastal waters and the Moray Firth by 2095. Rises of 35cm are projected for remainder of the mainland, along with rises of 40cm for the Hebrides and Orkney and 50cm in Shetland.

Found in only northern Scotland and north-western Ireland, machair lands are in a low-lying, relatively flat landscape, which make them vulnerable to sea level rise. Machair is distinguished for its rich diversity of wild species and invertebrates that attract birds like corn bunting and corncake. A combination of **coastal flooding and increased winter rainfall levels could result in waters being stagnant in machair lands**, for longer periods of time. Flood inundated machair lands would have implications on whether it can be maintained, thus there is a threat of flooding to the physical condition of machair lands.

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⁹ In terms of future projections different temperature pathways are dependent on different factors that will drive GHG emissions. The 'Scotland's Nature on Red Alert' report uses UK Climate 2009 projections, as the 2018 regional scale projections were unavailable at the time the report was written.