SUBMITTING EVIDENCE TO A SCOTTISH PARLIAMENT COMMITTEE

DATA PROTECTION FORM

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Date:	**13th November 2018**
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Topic of submission:	**Climate Change impact on Biodiversity, Agriculture and Land Use emission reduction**

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Environment, Climate Change and Land Reform Committee

Climate Change (Emissions Reduction Targets) (Scotland) Bill

SUBMISSION FROM SCOTTISH ENVIRONMENT LINK

SUMMARY

- Scottish Environment LINK members support greater ambition for Scotland's climate change goals and **call for the Bill to include targets for net-zero emissions by 2050, at the latest, and a 77% emission reduction by 2030**.
- The recent report[1] published by the Intergovernmental Panel on Climate Change (**IPCC**), identifies climate change as a major threat to biodiversity on a global scale. The IPCC expect climate change to be a "**powerful stressor on terrestrial and freshwater ecosystems in the second half of the 21st century, especially under high-warming scenarios**".
- Based on the study of 105,000 species, the IPCC indicates that climate change is likely to have differential warming impacts on biodiversity, globally and locally. With an increase of **2°C in global mean temperature, 18% of insects, 16% of plants and 8% of vertebrates are projected to lose over half of their current climatic range.** At **1.5°C, fewer species will be affected, with numbers declining to 6% of insects, 8% of plants and 4% of vertebrates**.
- From the global to the local scale, there is significant evidence that our climate is changing. Scotland's climate trends indicate annual average temperatures have increased by average of 1ºC, and **Scotland's biodiversity is already experiencing a changed climate**, affecting species abundance, distribution and impacting on species ability to adapt.
- Agriculture and related land use is the second largest source of emissions in Scotland, 26.1% in 2016[2]. **LINK members believe[3] that farming can play a key role in helping Scotland achieve[4] a net-zero emissions target, with a just transition to carbon-neutral farming.** Farmers must be supported in ways, which reward farmers for reducing emissions and sequester carbon from the atmosphere.

[1] IPCC, 2018, Global Warming of 1.5C http://ipcc.ch/report/sr15/
[2] Scottish Government, Scottish Greenhouse Gas Emissions 2016 https://www.gov.scot/Publications/2018/06/6601
[3] http://www.scotlink.org/wp/files/documents/ag-cl-ch-letter-final-2.pdf
[4] Balancing Act (2018) http://www.scotlink.org/public-documents/balancing-act-how-farming-can-support-a-net-zero-emission-target-in-scotland/

INTRODUCTION

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.

LINK members welcome the opportunity of presenting evidence to Environment, Climate Change and Land Reform Committee on the Climate Change (Emissions Reduction Targets) (Scotland) Bill (hereafter the Climate Bill), especially the scrutiny and modification of the interim and 2050 targets.

LINK members note that the urgency and breadth of action required to arrest Scotland's biodiversity decline and reducing agriculture and land use emissions have not translated into progressive action within the Climate Bill in its current form.

LINK members have recommended throughout the consultation process, that urgent climate action needs to be taken by adopting **a net zero emissions target for 2050, and a 77% reduction by 2030.** With the recent IPCC report setting out the importance of keeping global warming to no higher than 1.5°C above pre-industrial levels, and the global actions required to limit this rise to 1.5°C, it is vital that warming is restricted to **1.5°C to limit the devastating impact on people, planet, and nature.** Even at 1.5°C the IPCC indicates that there will be damaging impacts on species, habitats and ecosystems, however the potential impacts of allowing global warming to reach 2°C are far worse.

1. THE IPCC EVIDENCE: DIFFERENTIAL IMPACT OF TEMPERATURE PATHWAYS ON BIODIVERSITY

A recent synthesis of scientific research into likely extinction rates under future climate change suggests that 5.2%, or 1 in 20 species could face extinction under a global temperature rise of 2ºC (extinction was assumed likely to take place if a species available range fell below a certain threshold)[5]. This study also highlights that even for species not directly threatened with extinction, climate change may lead to substantial changes in the abundance and distribution of species, as well as in the ways different species interact. The IPCC (2018) has high confidence that with an increase of 0.2°C anthropogenic warming per decade, global warming is likely to reach 1.5°C between 2030 to 2052, if it continues at current rate. While risks to ecosystems will be higher than it presently is at 1.5°C, there is high confidence that this will still be lower than the potential damage at 2°C. For example-

- Twice as many vertebrate animals will lose more than half of their home range, - 8% compared to 4% at 1.5°C,
- Twice as many terrestrial plant species will lose more than half of their home range, - 16% compared to 8% at 1.5°C,
- Three times as many insects, will lose more than half their home range, - 18% compared to 6% for 1.5°C

[5] Urban, M (2015) Accelerating extinction risk from climate change, Science: Vol. 348, Issue 6234, pp. 571-573, Accessed via: http://science.sciencemag.org/content/348/6234/571

- Greater impacts on marine species ranges and marine food-webs will be experienced.
- The Arctic will be ice-free at least once every 10 years, rather than once every 100 years, with far-reaching consequences for arctic wildlife; and
- Virtually all coral reefs are lost by 2100, due to bleaching, whereas 1.5°C means we keep up to 30% of today's coral reefs. A quarter of all marine species, and around a billion people, depend on coral reefs.

The IPCC highlights that it is possible to limit warming to 1.5°C whilst avoiding the catastrophic consequences of temperature rise to 2°C, this however, requires a significant (45%) reduction in global carbon dioxide emissions by 2045, based on 2010 levels, and "deep reductions" in other greenhouse gases. The IPCC also recommends that early action is needed.

2. CLIMATE PRESSURES ON SPECIES IN SCOTLAND

A study[6] on **climate trends in Scotland between 1961 and 2004, indicates an increase in annual average temperatures** by just over 1ºC in Eastern and Western Scotland and by just under 1ºC in Northern Scotland. The UKCCRA records[7] indicate a 58.3% increase in average precipitation totals for winter months between 1961 and 2004, suggesting a significantly wetter climate. In terms of impact on biodiversity, rising temperatures have the potential to impact many of our freshwater fish species, including salmon (*Salmo salar*), trout (*Salmo trutta*) and Arctic charr (*Salvelinus alpinus*). Salmon, Trout and Arctic charr are all cold-water adapted species and high-water temperatures can be lethal for them. Depending on the speed at, which the water temperature rises, and the length of time for which they are exposed to warmer water, water temperatures of between 27 and 33ºC are lethal to salmon[8]. Trout cannot survive water temperatures of more than 25 – 30ºC, whilst young Arctic charr can only survive temperatures up to 22 – 27ºC. A recent study has indicated that 10 of the 11 UK populations of Arctic charr have declined in abundance since 1990. Those populations considered to be most vulnerable to climate change (due to their location, altitude or depth) were found to have declined the most[9].

Increase in temperature rise of the oceans is affecting marine species, including whales, dolphins and seabirds[10]. The Marine Climate Impacts Partnership (MCCIP) has produced a series of report cards[11], which highlight impact of changing climate on marine habitats and species, such as saltmarsh, mearl beds, coral gardens, horse mussel beds, saline lagoons,

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[6] Barnett, C & Hossell, JE & Perry, M & Procter, Chris & Hughes, Gregory. (2006). A handbook of climate trends across Scotland.

[7] ASC (2016) UK Climate Change Risk Assessment 2017 Evidence Report – Summary for Scotland. Adaptation Sub-Committee of the Committee on Climate Change, London.

[8] Elliott, J.M.& Elliott, J.A. (2010) Temperature requirements of Atlantic Salmon *Salmon salor*, brown trout *Salmon trutta* and Arctic charr *Salvelinus alpinus*: predicting the effect of climate change, Journal of fish biology 77, 1793-1817 doi:10.1111/j.1095-8649.2010. 02762.x, available online at wileyonlinelibrary.com

[9] Winfield, I. J., Hateley, J., Fletcher, J. M. & James, J. B., Bean, C. W. & Clabburn, P. (2010). Population trends of Arctic charr (Salvelinus alpinus) in the UK: assessing the evidence for a widespread decline in response to climate change. Hydrobiologia 650, 55–65. doi: 10.1007/s10750-009-0078-1

[10] http://www.scotlink.org/wp/files/documents/Climate-Change-and-Marine-Species-1.pdf

[11] Climate Change and marine conservation: http://www.mccip.org.uk/adaptation-action/climate-change-and-marine-conservation/

seagrass and sandeels.

The UK's population of kittiwakes has declined by approximately 60% since 1986. Kittiwakes in the North Sea rely on sandeels during the breeding season and changing ocean conditions appear to be affecting sandeel populations. Sandeels feed on zooplankton, including the copepod *Calanus finmarchicus.* Studies have found that warming waters are less likely to be suitable for this copepod, leading to reduced abundance in the southern extent of its range, which includes the North Sea. This, in turn, leads to a decline in sandeel populations, which is then linked to low reproductive success in seabird species such as kittiwakes, which feed on sandeels[12].

Other studies[13] have looked at the change of range for specific invertebrate species, which are associated with colder water. Changes have been investigated in range changes for the upland summer mayfly (*Ameletus inopinatus*), where its range appeared to be contracting both northwards and upwards. In Clunie Water researchers found the mayfly to be present in north-facing burns, but absent in adjacent, warmer, south-facing burns, suggesting that water temperature plays an important role in the distribution of this species.

In terms of terrestrial species, climate change is likely to increase the pressures on species already on decline. Several of our declining rare breeding birds, including Dotterel, Whimbrel, Common scoter and Slavonian grebe, are likely to be at a higher risk of extinction in the UK, based on projections of how climate will become less suitable for them[14].

3. WHAT ACTION CAN BE TAKEN?

In our earlier evidence to the Committee we called for several amendments to the Bill designed to support the meeting of a net-zero target. Many of these ask for strengthening of action from the agriculture and land use sectors in Scotland. Agriculture and related land use is the second largest source of emissions in Scotland, 26.1% in 2016. To meet ambitious emission targets recommended within the Climate Bill, more actions are required in farming to reduce non-CO_2 emissions and sequester more carbon. These policies will help bridge the gap to net-zero greenhouse gas emissions by 2050 and will also benefit Scotland's wildlife and environment.

LINK members believe that **farming can play a key role in helping Scotland achieve a net-zero emissions target**. In a recently published report[15], RSPB Scotland makes recommendations on how farming can support Scotland's net-zero emission target through a range of new actions and steer the agricultural sector towards achieving those targets.

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[12] Frederiksen, M., B, Daunt, F, et al. (2012) Multicolony tracking reveals the winter distribution of a pelagic seabird on an ocean basin scale. Diversity and Distributions, 18, 6, pp 530-542 https://doi.org/10.1111/j.1472-4642.2011.00864.x

[13] Kitchen, L., Macadam, C. Yoemans, W.(2011) Is the upland summer mayfly (Ameletus inopinatus Eaton 1887) in hot water?

[14] The state of UK's Birds (2017) https://www.rspb.org.uk/globalassets/downloads/documents/conservation-science/220-0653-17-18-sukb-2017-web-20-3-18.pdf

[15] Balancing Act (2018) http://www.scotlink.org/public-documents/balancing-act-how-farming-can-support-a-net-zero-emission-target-in-scotland/

Positive recommendations are made to help achieve long-term targets, to strengthening policies in the Climate Change Plan and for additional policies to include in the short-term. Below are some of the recommended actions for the long-term. The summary document for policy makers and the report[16] can be accessed here.

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- **Aim for more ambitious targets for 2032**, specially methane and nitrous oxide. Calculate Scotland's emission floor, the level to which emissions can fall without compromising food production.
- **Calculate the full potential for sequestration in Scotland**, to drive policies aimed at increasing sequestration on farmland.
- **Pay farmers for meaningful action to meet Scotland's emission targets** through a post- Brexit Rural Policy. This should reward farmers for reducing emissions on farm and for action to create, restore and maintain carbon-rich habitats.
- **Establish regional land use frameworks in all areas of Scotland** under Scotland's Land Use Strategy (LUS), to guide implementation and funding in priority areas.
- **Skill and train** farmers to meet the challenge.
- **Ensure the Just Transition Commission** advises on farming
- **Create a circular economy for biological materials** in Scotland which recycles the valuable nutrients in farm manures and slurry, and in food waste back onto the land.
- **Reprioritise research and solution design** to meet the climate targets.
- **Research long-term scenarios for change**, e.g. healthy eating trends which change demand for farm products.

With the IPCC evidence highlighting the potential risks and losses from the 2ºC pathway, significant reductions need to be made in CO_2, non-CO_2 greenhouse gases emissions, to keep the warming at 1.5 ºC. Farming can reduce emissions associated with growing food and sequester carbon from the atmosphere locking it away in soil and vegetation, where we propose farmers, land managers and the wider agricultural industry can play a vital role in working towards a net- emissions economy.

[16] Balancing Act (2018) http://www.scotlink.org/public-documents/balancing-act-how-farming-can-support-a-net-zero-emission-target-in-scotland/