Scottish Environment LINK

Evidence on Stage 1 of Climate Change (Emissions Reduction Targets) (Scotland) Bill

Summary

- Scottish Environment LINK members support greater ambition for Scotland's climate change goals and **call for legislating a 77% reduction of climate emissions by 2030 and achieving net zero emissions by 2050**.
- LINK members are working for a more environmentally sustainable Scotland and believe that **existing science on climate change pressures on biodiversity demands a more urgent and ambitious approach**.
- Scotland's current biodiversity health status suggests that **"ecosystems may have fallen below the point at which they can reliably meet society's needs"**. According to the State of Nature Report, **almost one in ten Scottish species are at risk of extinction**, under pressure from human activities and climate change. As revealed in May, Scotland's progress on the Aichi targets indicates that out of the 20 targets that Scotland is committed to meeting in less than two years, only 7 are on track. For 12 targets progress is insufficient and "unless we increase our efforts the target[s] will not be met by [the] deadline". The remaining critical target that tracks financial resources available, which are key to delivering many of the other targets, is falling, meaning that we are moving away from the target. The report highlights that "total funding figures for most of the Scottish organisations that have some biodiversity remit have also declined in the last 5 years".
- In March 2018, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), described as the "IPCC for biodiversity", released the results of the most comprehensive biodiversity study in more than a decade, written by more than 500 experts from over 100 countries. It concluded that **such is the rate of decline that the risks posed by biodiversity loss should be considered on the same scale as those of climate change**.
- As indicated in the Scottish Government documents accompanying the proposed Bill, one of the criteria used for setting climate change targets is **"environmental considerations and the likely impact of the targets on biodiversity"**. This suggests that due regard must be given to the environment and biodiversity across climate policy and legislation.
- The current state of biodiversity health of Scotland, and the shortfall in fulfilling statutory biodiversity commitments indicate **that not enough is being done to halt biodiversity decline.**
- In addition to concerns regarding the absence of due consideration to climate change impacts on biodiversity, **LINK members believe that the Climate Bill is a missed opportunity in terms of advancing the land use agenda.**
- Given that the 2009 Climate Change Act introduced the Land Use Strategy, LINK members propose amendments to the current Bill to address both the challenges that climate change presents to land use sectors.

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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 to provide evidence to the call for evidence issued by the 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 biodiversity decline in Scotland has not translated across the emissions reductions target and other parts of the Climate Bill in its current form.

LINK members have strongly recommended throughout the consultation process that the net-zero emission target year needs to be set immediately. LINK members put this evidence forward on the basis that by adopting **a net zero emissions target for 2050, and a 77% reduction by 2030,** the Climate Bill's biodiversity target setting criteria will be translated into an actionable outcome across several policy areas. Additionally, LINK members reiterate that target setting criteria cannot be considered without giving due consideration to additional actions that are required in the Climate Bill.

(1) SETTING CLIMATE TARGETS THAT SUPPORT HALTING BIODIVERSITY LOSS

Biodiversity[1] is a marker of ecosystem[2,3] health, and can be measured through the Biodiversity Intactness Index (BII). For an ecosystem to be in a healthy state and "reliably meet society's needs" [4], its BII should be at 90%, **Scotland's BII currently stands at 81.3%.** The State of Nature 2016 report indicates that almost **one in ten Scottish species are at risk of extinction**. The long-term trends (around 1970-2013) across three taxonomic groups (vascular plants, butterflies, birds) indicate that nearly 54% of vascular plant species (such as juniper) have shown decline, 39% of butterfly species have shown decline, and 44% of bird species (upland species such as dotterel and curlew, seabirds such as puffins and kittiwakes) have declined.

Declining biodiversity can change the way an ecosystem functions[5,6] and impact on how ecosystems deliver services. Set against the wider context of climate change pressure on ecosystems, currently

[1] "The term biodiversity refers to the genes and species from which ecosystems are constructed and which enables their function and provision of services such as soil stabilisation and fertility, water supply, regulation of atmospheric gases etc." Source: Wright (2009) SPICe Briefing- Climate Change the threat to species.

[2] An ecosystem is a functional unit of interaction of plant, animal and micro-organism communities with their environment. Source: UK National Ecosystem Assessment (2018)

[3] R. Pinto., et al (2014) Linking biodiversity indicators, ecosystem functioning, provision of services and human well-being in estuarine systems: applications of a conceptual framework

[4] State of Nature 2016- Scotland https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/stateofnature2016_scotland.pdf

[5] Naeem, S. et al (1994) Declining biodiversity can alter the performance of ecosystems Nature, 368, pp.734-737

[6] Walker,B. and Salt,D (2006) Resilience Thinking: Sustaining Ecosystems and People in a changing world; Island Press

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there is strong evidence that even in low and medium range warming scenarios ecosystems are susceptible globally[7]. Climate change is already one of the key pressures on biodiversity in Scotland[8],which is declining at a high rate[9]. If emissions are not reduced by setting ambitious targets soon enough, it is likely that Scotland's ecosystems in a high emission scenario will experience a marked variability in rainfall patterns, with wetter winters and drier summers, where average summer temperatures are likely to increase by 1.0°C to 4.5°C[10]. If we are to halt the current rate of biodiversity decline and aim for the Paris Agreement's ambition of limiting warming to 1.5°C, we need to aim for the highest possible emission reduction targets sooner rather than later.

At the same time, it is important to note that more resilient ecosystems and rich biodiversity can help mitigate climate change by acting as sinks for greenhouse gases. New research[11] published in August 2018 by Thomas E. Lovejoy, former World Bank Chief Biodiversity Advisor, and Lee Hannah, Senior Researcher in Climate Change Biology at Conservation International concludes that "focused and purposeful ecosystem restoration could help us keep global temperature rises at 1.5°C".

THE EVIDENCE

Ecological Mismatch

There is compelling evidence that changing climate is **one of the main threats to biodiversity in Scotland and that the threat is likely to magnify** as the climate further changes[12,13]. Extreme weather events, changes in annual rainfall patterns, and rising temperatures are having an impact on species populations by way of ecological mismatch[14]. Any climatic perturbations that affect the long-term conditions for species, when compounded with other factors such as fragmented landscapes, availability of food and dispersal ability, determine a species' capacity to respond to changes and its ability to adapt. Species in Scotland, particularly those with low genetic diversity and reproduction ability will not be able to cope with the changes being caused by the changing climate[10]. Evidence suggests that with the onset of warmer temperatures and later Autumn frosts, reproductive cycles of terrestrial species such as common frogs, common toads and newts are being affected. With onset of

[7] Scholes, R., and Settele, J. (2014). Terrestrial and Inland Water Systems. Working Group 2 Contribution to the Fifth Assessment Report. IPCC, International Panel on Climate Change, Geneva.

[8] Scotland's Biodiversity: A Route Map to 2020- https://www.gov.scot/Resource/0048/00480289.pdf

[9] Often described as the "IPCC for biodiversity" IPBES is an independent intergovernmental body comprising 129-member Governments. Established by Governments in 2012, it provides policymakers with objective scientific assessments about the state of knowledge regarding the planet's biodiversity, ecosystems and the contributions they make to people, as well as the tools and methods to protect and sustainably use these vital natural assets. For more information about IPBES and its assessments visit www.ipbes.net

[10] Enviro Centre- SEPA (2007): The Conservation of Scottish Biodiversity in a changing environment

[11] Avoiding the climate failsafe point: http://advances.sciencemag.org/content/4/8/eaau9981

[12] Biodiversity Climate Change Impacts: Report Card 2015- https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity/

[13] IPES-Food. (2016). From uniformity to diversity: a paradigm shift from industrial agriculture to diversified agroecological systems. *International Panel of Experts on Sustainable Food systems*.

[14] Ecological mismatch are climate change consequences on the natural environment and this includes the effect on the "timing of periodic biological events" such as migration, reproduction cycles, that influence a species ability to respond to changes. Kerby, J. et al (2012) Climate Change, phenology and the nature of consumer-resource interactions: advancing the match/mismatch hypothesis in Trait-Mediated Indirect Interactions: Ecological and Evolutionary Perspectives eds. Ohgushi, T. et al, Cambridge University Press

warmer winters, bat populations are being affected as their periods of hibernation are being reduced, thus influencing their metabolic rates, body condition and reproduction cycles.

Shift in species distribution and range

Over the period of 20-25 years, species have shifted to higher altitudes, due to increasing temperatures[15,10]. Species such as smooth newt and common lizard are spreading northwards and are likely to expand their range in Scotland. Freshwater invertebrates are at risk, as warmer water holds lower levels of dissolved oxygen, which is less than what the they need to survive. Moreover, variability in rainfall patterns is likely to affect evapotranspiration and flow rates, which will have a knock-on effect on "habitat continuity and availability"[16]. It is **quite likely that fresh water species may be one of the first groups to show effects of climate change** due to short life-cycles, and high mobility, where cold loving species will retreat northwards, and warmth-seeking species will expand their range across the UK. Surveys indicate that Upland summer mayfly (*Ameletus inopinatus*) - a predominately montane species restricted to cold water streams - has disappeared from lower altitudes and with the rise in water temperatures is being forced further up north[17]. Climate modelling using business as usual scenarios for the year 2080 project that habitat of the upland summer mayfly will contract to such an extent in the UK that it will only be found in certain parts of the Scottish Highlands[18]. Initial studies are observing a range shifts in several cetacean species, and while it is not conclusive that climate change is the primary pressure, the impact warming sea temperatures cannot be ruled out. A northward shift in the distribution of cetacean species such as short-beaked common dolphin and striped dolphin has coincided with warming of the seas around the British Isles[19].

Impact on Habitats

Under medium to high emissions scenarios it is projected that winter snowfall may reduce by 50% or more by the 2080s[20]. Warmer temperatures will lead to less snow, and that in return will have an impact on vegetation that grows in snowbeds. This will also impact invertebrates such as the snowflea that requires snow cover where the adults are only out in the winter. The Snowbed Monitoring project observes that this trend is already taking place and in the coming years "smaller and less persistent" patches of snow will have impact on the vegetation that grows in snowbeds[12]. The recent warming of the seas around the UK has coincided with the northward shift in plankton and fish species and has had a ripple effect on the distribution of species such as whales, white-beaked dolphins and harbour porpoises. Sea temperatures in parts of the North Sea and Minch have risen nearly by 2°C since the 1980s. The northward shift of plankton communities has had a visible effect on sandeel populations,

[15] SPICe Briefing: Climate Change: The threat to species
http://www.parliament.scot/Research%20briefings%20and%20fact%20sheets/SB09-28.pdf
[16] Buglife Freshwater Strategy Report: Freshwaters for the future: A strategy for freshwater invertebrates
https://www.buglife.org.uk/sites/default/files/Freshwater%20strategy%20full%20report_0.pdf
[17] Kitchen, L., Macadam, C.R. and Yeomans, W.E. (2010). Is the upland summer mayfly (Ameletus inopinatus Eaton 1887) in hot water? Unpublished report to the Freshwater Biological Association.
[18] Taubmann, J., et al. (2011). Modelling range shifts and assessing genetic diversity distribution of the montane aquatic mayfly (*Ameletus inopinatus*) in Europe under climate change scenarios. Conservation Genetics 12: 503-515
[19] Evans, P and Bjørge, A. (2013) Impacts of climate change on marine mammals, MCCIP Science Review
http://www.seawatchfoundation.org.uk/wp-content/uploads/2015/05/Evans-Bj%C3%B8rge_2013.pdf
[20] UK Committee on Climate Change (2009) Science and Environment. [Online] Available at:
http://www.theccc.org.uk/topics/science-and-environment/cccs-recommendations

reducing availability of food for sea birds in the breeding season. This is thought to be one of the key factors contributing to the decline of kittiwake and puffin populations.

Pollution

Despite current policies, there are significant greenhouse gas emissions from agriculture and land use, which not only place competing demands on ecosystems, but are also negatively impacting biodiversity. For instance, in the case of agriculture runoff, excess nutrients such as phosphorous and nitrogen, when combined with other compounds deposited from the air[21] are causing terrestrial and marine eutrophication[22]. Studies suggest that if land use practices remain unchanged, "direct emissions are predicted to increase by up to 14% in 2080" in comparison to current levels[23].

(2) TAKING FORWARD THE LAND USE AGENDA

Development of a land use strategy for Scotland was a key commitment of the Climate Change (Scotland) Act 2009, recognising the important role that influencing land use can play in reducing emissions and adapting to climate change.

Since then, and despite being in its second edition, the Strategy has not been properly implemented and the benefits arising from better and a more coherent land use policymaking has not been delivered, including emissions reductions in the agriculture and land use sectors.

Despite the opportunities for climate change mitigation and adaptation through land use change, sectoral priorities continue to be set in isolation of each other, which fails to maximise the potential benefits to be gained from a more coordinated approach to land use in Scotland.

It is important to note that there is wide support for bolder action to achieve **carbon-neutral farming by 2050**. An open letter signed by 50 organisations, NGOs, farmers, rural groups and academics[24], sets out a roadmap for a just transition towards carbon neutral farming. This roadmap will help in minimising Scotland's emissions from land use, which currently account for 26.1% of total greenhouse gas emissions.

(3) ACTION NEEDED

LINK members believe that to achieve climate targets, and protect wildlife under threat from it, further urgent action across sectors is needed and that the Bill should set forth legislation to achieve this.

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[21] Nourish Scotland (2017) Climate change bill- Blog 2 Nitrogen Budget http://www.nourishscotland.org/climate-change-bill-blog-2-nitrogen-budget/

[22] Tilman, D, et al. (2002) Agricultural sustainability and intensive production practices https://www.nature.com/articles/nature01014

[23] Prof K. Smith, Dr J. Smith & Dr P. Smith (2004) Review of the contribution to climate change (through greenhouse gas emissions) of fertiliser use on different soil types and through different application methods, Environment Group Research Report to the Scottish Government https://www.gov.scot/resource/doc/30701/0007034.pdf

[24] See the LINK press release here: http://www.scotlink.org/public-documents/scottish-government-must-drive-just-transition-towards-carbonneutral-farming-urge-50-ngos-farmers-rural-groups-and-academics/ and article in The Herald here: http://www.heraldscotland.com/news/16114555.Farms_at_centre_of_new_bid_to_halt_climate_change/

We believe that the proposed actions below are within the scope of the Bill as they aim to 'make provision about advice, plans and reports in relation to those targets' [25]. Impacts on biodiversity will differ substantially depending on the route to the 2050 targets. Early action will enable avoidance of tipping points[26], which if unchecked can potentially worsen climate impacts. Legislation on policy action is needed to prevent Scotland exceeding environmental limits.

LINK members recommend the following amendments to the Bill:

1. **Legislate a 77% reduction of climate emissions by 2030 and achieving net zero emissions by 2050**.
2. **Account for the degree of protection and enhancement of blue carbon habitats and to recognize the scale and significance of blue carbon stores**:
    - This can be done through the Climate Change Plan. The Plan must reflect existing policies in the National Marine Plan and those proposed for Regional Marine Plans, seeking to reduce human pressure on carbon sinks and consider opportunities to proactively enhance blue carbon habitats.
    - Climate change (along with fishing) is identified as one of the largest pressures pushing on Marine ecosystems. Scotland's Marine Atlas[27] documents the widespread concerns about and declines in the status of seabed habitats and species, and while Scotland and the UK are party to firm international commitments to reverse declines and help restore marine biodiversity[28], more can be within the Climate Bill by recognizing marine carbon stores. Many Marine Planning Areas in Scotland's seas contain habitats that are known to sequester and store huge amounts of carbon[29] (known as 'blue carbon' habitats[30]).
    - Many examples of 'blue carbon' habitats exist outside the existing marine planning area network, which merit protection and potential restoration using other mechanisms such as marine planning. Protecting and enhancing blue carbon habitats will be crucial for ensuring Scotland meets its net zero emissions target because of the negative emission potential of these habitats.
3. **Set a duty on Ministers to establish a National Ecological Network[31]** in line with commitments made in Scotland's Biodiversity Route Map:
    - A National Ecological Network would provide a strategic, practical and long-term way to invest in and protect natural carbon-rich assets such as peatlands and woodlands, which sequester and store carbon.

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[25] From the introductory sentence to the Bill – page 1.

[26] Lenton , T. (2010) Earth System Tipping Points https://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0564-112.pdf/$file/EE-0564-112.pdf

[27] http://77.68.107.10/MarineAtlas-Complete.pdf

[28] International Commitments include: The Convention on Biological Diversity (CBD); the World Summit on Sustainable Development (WSSD); the OSPAR convention; the European Marine Strategy Framework Directive (MSFD)

[29] https://www.nature.scot/snh-commissioned-report-761-assessment-carbon-budgets-and-potential-blue-carbon-stores-scotlands

[30] Scottish National Heritage (2017) Assessment of Blue Carbon Resources in Scotland's Inshore Marine Protected Area Network- Blue Carbon Habitats include: seagrass meadows, kelp forests, coldwater coral reefs and maerl beds, and potential carbon stores such as horsemussel beds. Most of blue carbon is stored in relatively stable seabed sediments, accumulated over many years. However, some carbon sequestering habitats such as maerl and flame shell beds, which are recognized Priority Marine Features, are sensitive to physical disturbance, and can release carbon back into the atmosphere when damaged or destroyed.

[31] http://www.scotlink.org/wp/files/SEL_A-Roadmap-for-Adopting-a-National-Ecological-Network-in-Scotland.pdf

- To achieve new 2050 targets Scotland will need to balance emissions from agriculture with sequestration, also known as negative emissions. Scotland's carbon-rich natural environment, including peatlands, native woodlands and intertidal habitats need to be protected, restored, enhanced and expanded to achieve the huge potential for negative emissions as described in a new study[32].
- A National Ecological Network would also significantly help regarding adaptation, having a key role in building biodiversity resilience.

4. **Strengthen the Scottish Land Use Strategy by legislating for:**
   - A Land Use Strategy Action Plan, outlining the specific actions and milestones to deliver the policies and proposals;
   - An annual progress report, to be laid before the Scottish Parliament; and
   - A duty on Ministers to establish Regional Land Use Frameworks, in all parts of Scotland.
5. **Introduce a duty on Ministers to produce a Nitrogen Balance Sheet for Scotland by 2020.**
   - A Nitrogen Balance Sheet is an established technique and for gathering information on nitrogen flows and losses throughout Scotland. It can then be used to plan and deliver emission reductions in Scotland by informing the Government's policies on nitrogen use efficiency, e.g. using fertiliser better, and its development of a fertiliser reduction target[33].
6. **Establish a target for increasing the area of agroforestry in Scotland**, to be set by 2020.
   - Tree planting is a key established method for sequestration of carbon and to meet afforestation targets and climate targets, farmers too will need to plant more trees. Agroforestry techniques can provide food and trees on the same land and avoid tensions of farmers feeling they are losing land to forestry. Despite this agroforestry has not caught up, and a target is needed to boost activity and Government policy to make this happen across Scotland.
7. **Establish a duty for a "sunset clause" for peat extraction in Scotland:**
   - This duty is needed to provide transparency regarding the stocks of carbon in peatlands, which are under threat from extraction at a commercial level. The "sunset clause" will set a time for companies that hold consents to extract peat, granted through the planning process, to re-activate them or they permanently expire. The outcome of the clause will give the Government a better picture of peatlands under threat and allow it to plan for their protection.

CONCLUSION

Scotland's species response to climate change is that of adaptation, migration and for those, which are unable to cope, that of extinction[12].

As evidenced by this submission, Scotland is not on track to meet its international obligations to halt biodiversity loss, for example in terms of **habitat loss, control of invasive species and prevention of extinction of species** (Aichi 2020 targets).

[32] Alcalde, J., Smith, P., Haszeldine, R. S., & Bond, C. E. (2018). The potential for implementation of Negative Emission Technologies in Scotland. International journal of greenhouse gas control, 76, 85-91. DOI: 10.1016/j.ijggc.2018.06.021

[33] As described in the Scottish Government Climate Change Plan https://www.gov.scot/Resource/0053/00532096.pdf

Given that climate change is one of the key threats to biodiversity, LINK members support greater ambition for Scotland's climate change goals and **call for legislating a 77% reduction of climate emissions by 2030 and achieving net zero emissions by 2050**.

To realise Scotland's commitment to halting biodiversity loss should incorporate a range of policies and actions which work closely with stringent emissions reductions targets.

LINK members underscore that the proposed targets and the absence key policy actions, demonstrate that not enough consideration has been given to Scotland's already fragile and vulnerable ecosystems[34] in the Climate Bill in its current form. The argument to arrest biodiversity decline in Scotland is not only an ecological, or economic one but also an ethical one, as not only are ecosystem services being affected by declining biodiversity[35] but the survival of struggling species is now dependent on the actions we will take to ease pressures on biodiversity. It therefore becomes our responsibility as custodians of our environment to take immediate and effective action on easing those pressures.

This submission is supported by the following Scottish Environment LINK member organizations

- Badenoch and Strathspey Conservation Group
- Buglife Scotland
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- Froglife
- National Trust for Scotland
- Marine Conservation Society
- RSPB Scotland
- SCAPE Trust
- Scottish Wild Land Group
- Scottish Wildlife Trust
- Scottish Badgers
- Trees for Life
- Whale and Dolphin Conservation
- Woodland Trust Scotland

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[34] SEPA (2007) The conservation of Scottish Biodiversity in a Changing Environment https://www.sepa.org.uk/media/163170/biodiversity_conservation.pdf

[35] O'Brien, A. *et. al*. (2016) How is ecosystem health defined and measured? A critical review of freshwater and estuarine studies. http://hpkx.cnjournals.com/config/hpkx/news_category/2017-05-02/1-s2.0-S1470160X16302370-main.pdf