The upcoming Scottish Climate Bill is an opportunity to set strong targets and binding policy frameworks in legislation.

Scottish Environment LINK members are asking for:

A net-zero greenhouse gas emissions target for 2050[2]. For Scotland to retain its reputation as a world leader in tackling climate change, it needs to be ambitious and bold. In order to align with the 1.5 ºC ambition, an 89 - 97% reduction in GHG on 1990 is needed for 2050[3]. Under principles of climate justice, developed nations need to take a more ambitious decarbonisation path than developing nations, and Scotland needs to adopt a target that sends a strong message to other developed nations. Early action is also vital if we are to avoid the most dangerous impacts of climate change, and an **interim 2030 target of 77%** reduction on 1990 levels should be adopted.

Incorporating climate change into a network of well-managed and ecologically coherent Marine Protected Areas (MPAs). For marine life, MPAs will act as vital refuges for marine species adapting to a changing climate, provide prey for seabirds and support continued connectivity, resilience and blue carbon potential of marine ecosystems. MPAs also help to protect, and in some cases recover, important 'blue carbon' habitats that store vast amounts of carbon from the atmosphere. LINK is advocating for the impacts of climate change on marine ecosystems to be monitored and incorporated into the design and adaptive management of MPAs.

Marine Plans to support Climate Change mitigation[4]. Marine Plans must fully support the Scottish Government's ambition for a just transition to a low carbon economy through sustainable development of offshore renewable energy technology, sited to minimise impact on nature, and reduced reliance on oil and gas reserves. The objectives in the National Marine Plan[5] Oil and Gas chapter are contrary to this ambition. The application of General Policy 5: *Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change,* must be evident and transparent in developments or projects. This could be supported by establishing targets to increase the amount of carbon stored and protected within Scotland's marine area.

Ecosystem based approach to Regional and National Marine Planning[6]. Marine features and ecosystems in good condition are likely to be more resilient to the effects of climate change than those which are damaged or isolated. Regional and National Marine Planning must adopt an ecosystem-based approach in order to support sustainable management of marine activities and healthy marine ecosystems throughout our seas. This could include requirements for planners and developers to consider potential options for ecosystem protection and recovery through the planning process.

[2] For more, see LINK's Climate Change consultation response scotlink.org/public-documents/link-response-to-the-scottish-governments-climate-change-bill-consultation-paper
[3] theccc.org.uk/wp-content/uploads/2017/03/Advice-to-Scottish-Government-on-Scottish-Climate-Change-Bill-Committee-on-Climate-Change-March-2017.pdf
[4] For more, see LINK 's scotlink.org/public-documents/link-marine-group-updated-response-february-2018-to-national-marine-plan-review/
[5] gov.scot/Resource/0047/00475466.pdf
[6] For more, see LINK's Living with the Seas Report and Briefing http://www.scotlink.org/public-documents/living-with-the-seas-briefing/ and The Future of Scotland's Seas scotlink.org/wp/files/documents/ScotLINK_Vision_Scot_Seas_1017.pdf

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Scottish Environment LINK

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Climate Change: Marine Species

There is strong evidence that climate change is affecting UK biodiversity and impacts are expected to rise as the magnitude of climate change increases[1]. As temperatures have risen, many species have been forced to move north. However, the rate of change, dispersal ability, and habitat fragmentation make this more difficult for some species.


Harbour Seal

Sea surface temperatures in parts of the North Sea and the Minch have risen by nearly 2˚C since the 1980s. Plankton communities, the basis of marine food chains, in the North Atlantic have shifted northwards by over 1000km during the same period and this has had a demonstrable effect on many species. Increasing temperatures have also resulted in further changes such as rising sea levels that can lead to a loss of coastal nursery habitats. Sea surface temperatures in parts of the North Sea and the Minch have risen by nearly 2˚C since the 1980s. Plankton communities, the basis of marine food chains, in the North Atlantic have shifted northwards by over 1000km during the same period and this has had a demonstrable effect on many species. Increasing temperatures have also resulted in further changes such as rising sea levels that can lead to a loss of coastal nursery habitats, as well as changes to the patterns of ocean circulation and reduced nutrient mixing. As the oceans continue to absorb a large proportion of carbon dioxide released into the atmosphere, they are becoming more acidic; making many species and ecosystems more vulnerable.

Although further research is needed to better predict how our changing climate will affect marine species, current understanding suggests a range of impacts.

Basking sharks are migratory, coming to British waters in the summer to feed on plankton. Ocean warming and shifts in plankton have led to a northwards shift in Basking sharks. The impact of climate change is likely to be to be affecting the availability of prey and distribution of the **harbour seal** and may be one of the factors behind the serious decline in harbour seals in the Northern Isles and on the east coast of Scotland. **Sea trout** are vulnerable to temperature change and reduction in sandeel population, one of the key prey species affected by the shift in plankton communities.

More acidic oceans, due to rising levels of carbon dioxide in the atmosphere, will weaken the growth of many organisms with shells and skeletons made up of calcium carbonate, including **flame shells, spiny lobster** and **northern sea fan.**

Climate change is affecting **leatherback turtles** in an unusual way. Incubation temperature affects hatchling gender and temperature rises are causing gender imbalances. Leatherbacks are also being spotted further north, probably linked to prey availability as their main prey, jellyfish, are also thought to be moving north.

[1] A recent IPES report predicts that by 2050, Climate Change could replace land-conversion as the main driver of species extinction.

*Whales & Dolphins have a separate card.

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Climate Change: Whales and Dolphins

There is strong evidence that climate change is affecting UK biodiversity and impacts are expected to rise as the magnitude of climate change increases[1].

The effects of climate change may be some of the biggest threats facing whales and dolphins today. Changes in sea temperature, freshening of seawater, acidification, sea level rise, loss of icy polar habitats and the decline of food sources are some of the issues posed by climate change.

Humpback Whale

Climate change is expected to affect the distribution of whales, dolphins and porpoises mainly through loss of habitat (given the distinct temperature-linked ranges of most species); changes in prey availability; and potential increased competition from range expansions of other species.

Recent warming of the seas around the UK has coincided with a northward shift in plankton and fish species which is having a knock on effect on the distribution of the whales and dolphins who feed on this. The **white-beaked dolphins** and **harbour porpoises** ranges may contract north and out of Scottish waters. Predictions suggest that **bottlenose, common** and **Risso's dolphins** and **orca** may be less susceptible to these climate-induced changes, and may benefit from range shifts.

Recent research describes the importance of whales in mitigating the effects of climate change through the 'whale pump' mechanism. Whales transport nutrients both vertically, between depth and surface, and horizontally across oceans, promoting primary production and thereby fixing atmospheric carbon. Many whale species consume prey at lower depths and release nutrient rich faeces upon return to the surface. This release of nutrients promotes enhanced primary production by phytoplankton, and thus uptake of dissolved carbon dioxide.

Also, through migrating, whales transport nutrients captured in their bodies over large distances. Migratory whales, including **humpback, sei, blue and minke whales,** travel across oceans bringing nutrients via their urine, placenta, carcasses, and sloughed skin from highly productive feeding grounds to low latitudes with reduced nutrient availability. It is estimated that **blue whales,** heard year-round and particularly in winter months in the deep offshore waters off Scotland, currently transport an estimated 88 tons of nitrogen per year to their calving grounds.

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Climate Change: Seabirds


Kittiwake


Puffin

There is strong evidence that climate change is affecting UK biodiversity and impacts are expected to rise as the magnitude of climate change increases[1]. As temperatures have risen, many species have been forced to move. However, dispersal ability and habitat fragmentation have made this more difficult for some species.

Climate change is having a significant and visible impact on our seabirds.

Sea surface temperatures in parts of the North Sea and the Minch have risen by nearly 2˚C since the 1980s. Plankton communities in the North Atlantic have shifted northwards by over 1000km during the same period and this has had a demonstrable effect on sandeel populations, reducing the availability of food for sea birds in the breeding season. This is thought to be one of the key factors behind declines in **kittiwake** and **puffin.**

The **common tern**, although showing a declining trend, appear to be more adaptable, switching to alternative food sources when sandeels are scarce. However, an increase in severe storms might be affecting breeding success, destroying nests and making it more difficult to hunt for fish.

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[1]A recent IPES report predicts that by 2050, Climate Change could replace land-conversion as the main driver of species extinction.