

# Title: Climate Change Adaptation Framework

**Date: 21 August 2024**

| **Purpose:** | Decision. |
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| **How does this link with our corporate priorities of improving biodiversity or delivering nature-based solutions to climate change:** | This paper describes our understanding of, and sets out our approach to dealing with, climate risks and adaptation, including a draft core narrative. Understanding climate risks, uncertainty and building resilience in natural systems is vital to address the integrated climate-nature emergency. This is fundamental to the actions we take and advice we give across all of our Corporate Plan and purpose of NatureScot. |
| **Summary:** | Current uses of the land and sea assume a largely predictable and stable climate. This is no longer valid. Our climate is already more chaotic both within and across years and will become more so as global average temperatures continue to rise over the next few decades. Current patterns of land and sea use are highly vulnerable to climate risks, presenting significant costs to society, economy and environment. This paper outlines our response. |
| **Actions:**  | The Board is asked to approve:* our core message on climate change (paras 20-21)
* Next steps – influencing and advocacy (para 32-37)

and to note and comment on other aspects of the paper:* Progress (paras 24-28); Monitoring (para 29-31)
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| **Recommendations:**  | The Board is asked to consider the Actions in the paper |
| **Report Author(s):** | Clive Mitchell, with contributions from Debbie Bassett and Jason Ormiston |
| **Sponsor:**  | Nick Halfhide |

## Purpose

1. This paper describes our understanding of, and sets out NatureScot’s approach to dealing with, climate risks and adaptation. It seeks approval for the core narrative and associated influencing and advocacy. The background and context set out the position quite starkly and will form the basis for more tactical and empathetic communications with key partners.

## Introduction

1. In the discussion of the Scottish Biodiversity Strategy (6 December 2023), the Board requested a narrative to show the relationships between climate change, risks (adaptation) and the state of nature. The Audit and Risk Committee (9 May 2024) approved a review of the Corporate Risk Register as part of developing NatureScot Adapts (para 23) and sought an underlying narrative for our approach to climate risks. The context is outlined in the following paragraphs (3-19), leading to a core narrative (paras 20-23), progress (paras 24-28), monitoring (paras 29-31) and next steps, influencing and advocacy (paras 32-37).

## Background: the Climate Challenge

1. Climate and nature have worked as a coupled system for about 4 billion years, and especially over the last 400 million years through the development of soils. Our understanding of these relationships began to emerge in the 1970s, for example through James Lovelock’s *Gaia Hypothesis* (1972), and has deepened especially over the last 20-30 years – but this has yet to filter through widely to policies and practice for land and sea use and management. From a climate viewpoint, nature is ‘all life everywhere’ and regulates the global carbon cycle, removing greenhouse gases from the atmosphere - and so is a dominant ‘negative’ feedback, moderating abrupt emissions of CO2 both in the short and long term. This is especially through the oceans and soils, because of the pivotal role that healthy soils play in processing carbon into freshwaters and, eventually, marine sediments. The climate-nature crisis is an Earth system problem.
2. This is at variance with the way society uses natural resources: compartmentalising uses of the land and sea, and viewing climate as an independent variable acting on a preferred state of nature. Net zero and biodiversity are largely viewed mainly as accounting problems: getting the numbers to add up to zero or how many of this or that species and habitat, reflecting preferences in how the land and sea are used.
3. Especially since the 1950s, uses of the land and sea in Scotland and around the world have been to maximise productivity and yield, mainly by removing the competition, or nature. On land, the result has been to compartmentalise land cover for specific, mutually exclusive, uses. This is reflected in the greenhouse gas inventory where land cover comprises either farming or forestry or grassland or cropland or wetlands or settlements. Even agri-environment measures, typically overall about 15-20% of farmed land, are concerned mainly with field margins with minimal impact on the productive area or crop.
4. These binary choices fuel a sense that people are ‘apart from’ nature, rather than a part of it, with uses of the land and sea competing, and mutually incompatible, with nature. Conservation resources have focused mainly on the places where nature remains (protected areas, priority habitats and species, ‘edges and hedges’), or about 20% of the land, rather than where it has been lost or degraded over the other 80% (or 70%, if the 30x30 targets are met). While necessary in the sense that nature would be in a far worse state had steps not been taken, the approach is insufficient, certainly from a climate resilience perspective.
5. The result is that, while emissions from other sectors have halved, land use is currently responsible for over 50% of Scotland’s net emissions, largely flat-lining for the last 35 years. Emissions from marine systems are not currently included in territorial greenhouse gas inventories, although protocols for seagrass and salt marsh are underway. At the same time, the lack of diversity leaves most of our land cover highly exposed to climate risks, including pests, pathogens, disease, floods, fire, storms and drought. Nature and soils are degraded.
6. For many years most climate scientists considered that the effects of climate change up to around 2°C of warming in temperate latitudes (i.e. for most of the Global North) would be relatively muted. Sometimes the fertilisation effect of CO2 has been considered a potential ‘opportunity’ (more growth and hence productivity) up to 2-3°C warming. But this doesn’t allow for losses arising from climate risks. In recent years it has become clear that climate change is much more problematic than expected even for the 1.1°C rise over the last 100 years. A warmer atmosphere holds more moisture and recent work confirms that precipitation is increasingly variable: it rains; it pours. Climate is warming but, crucially, it is becoming more chaotic in terms of both extreme events and patterns of events, both within and across years. And the next 1°C of warming is coming 3x faster, by the 2050s.
7. The prevailing assumption guiding land use over the last 70+ years of a mostly stable and predictable climate is no longer valid. Managing for a more chaotic climate, both within and across years, is more challenging. While there will be long-term averages towards, for example, warmer wetter winters (especially in the west) and hotter drier summers (especially in the east) – there will be a lot of variation, or noise, on these trends. And it’s the extreme events, or patterns of unusual weather, that mainly drive shifts in ecosystems and associated benefits and costs to people.
8. Not all climate risks are equal: those to food, infrastructure, health, economy and finance ‘flow’ through ecosystems and water. If ecosystems and water are not in good health, everything else will quickly unravel.
9. For climate risks, managing for single benefits and associated risks heightens the vulnerability to climate risks and associated costs. The concept of maximum sustainable yield (MSY), well-established in fisheries management, could apply to land use: hedging bets by spreading risk across multiple products harvested at different times within and across years. Greenhouse gas removals into biological systems, such as trees, peatlands, bioenergy crops, hedges, and floodplains, and managed on a similar basis will build resilience to the same risks.
10. Perhaps the greatest risk lies in ‘do nothing’, because this assumes that the status quo is acceptable and risk free, even while it is a major contributing cause to the climate-nature emergency. The field on which evidence plays out is not level, but weighted to the status quo and associated interests. The burden of proof lies with the ‘new’ approaches, often advocating less intensive practices for multiple benefits and managing multiple risks, while prevailing choices geared for single benefits and maximum yield, apparently, have nothing to prove in our new climate.
11. For long-lived species and habitats we do not have time to wait for perfect knowledge to inform interventions, especially as the starting conditions change over time. For nature, as in every other choice about use of the land and sea, we must shift to hedging our bets through adaptive learning approaches, doing different things in different places to build more resilience at a range of scales from field to catchment. In some cases this may mean testing new approaches on some protected areas, such as woodlands now dominated by single species of restricted age and lacking structural diversity or what we perceive to be ‘native’.
12. In the face of a more chaotic climate, managing risks based on the average changes associated with a particular emission pathway is high risk, because it is the extremes and major events that cause most harm. For any asset, including natural capital and nature, five questions guide our choices:
	* How bad could this be (under a full range of emission pathways, extreme events and patterns of unusual events)?
	* How much does that matter, including who or what does it effect?
	* What can we do about it and how much would that cost?
	* What about unintended outcomes and who pays when it all goes wrong?
	* Is that fair/ just?

The distribution of risk is an important part of this discussion, especially if, for example, a small number of people profit in the short term by passing risks and associated costs to a majority in the longer term. We may not be able to change these decisions, bounded as they are by politics, but the decisions can be more transparent and open than they are.

1. In general, the more that natural processes dominate, the greater the resilience and security of any greenhouse gas removals or sequestration. The more that single benefits are favoured, including, for example, carbon sequestered in above-ground vegetation, the greater the risk of losses arising from a more chaotic climate.
2. The changes required to address this challenge amount to embedding the economy in nature, as detailed in Partha Dasgupta’s review of *The Economics of Biodiversity* in 2021. They represent an enormous shift in current uses of the land and sea: but no more than transformation over the last 70 years. Productivity and yield have been achieved through an alignment of public policy, incentives and practice with market interests, technology, machinery, agri-chemicals, education and training. A similarly systemic approach is required for a just transition to a net zero nature-rich and resilient economy.
3. A just transition is vital. Environmental justice concerns the distribution of the costs (or risks) and benefits (or profits) associated with choices in how we use the land and sea. Actions taken in one place may affect those in another and actions taken now may affect people in the future. Distributive justice is therefore both spatial and temporal, so for people and non-human species and the environment in different places and in the future. Distributive justice reflects who makes the decision, what viewpoints are represented and in whose interests the choice is made. This procedural justice reflects the framing of issues and who or what is deemed relevant, included, or excluded. For example, decisions about uses of the land and sea may be about economic benefits (productivity and yield), or net zero, or climate risks, or nature, or food security – or all of these things together. More tightly defined framings will lead to trade-offs with ‘other’ interests. These issues of recognition, together with procedural and distributive justice determine the boundaries of the choice, or the system.
4. This can be applied to the past, present and future aspects of a just transition.
	* The current emphasis is concerned mainly with one aspect of the future: the more carbon-intensive sectors of the economy most affected by the transition to net zero.
	* But there are also historical aspects - how we got to where we are and restorative justice. Because CO2 stays in the atmosphere for a long time, up to tens of thousands of years, all historical emissions count. On this basis, the UK is responsible for about 10% of the global problem, not including land use change under colonial rule. This compares with its current contribution of about 1% of territorial emissions to the global total, so not including the emissions embedded in imported goods and services.
	* The present is also important, including distributive justice, which sits behind the three underlying causes of biodiversity loss: values and a lack of transparency about how we think the world works; power imbalances; short-term and material gains.
	* And other aspects of the future are also important, especially the rate of transition to net zero. The earlier emissions are reduced, the closer the pathways to 1.5°C and the less time around 2°C warming, the lower the risk of escalating feedbacks and tipping points in the climate system. The latter determines the amount of control humanity has over the future and consequent exposure to climate risks, especially for the poor both in Scotland and globally.
5. Proposed measures that alienate large groups of people risk fuelling dissent and slowing the transformation needed. Involving a wider spectrum of viewpoints and people in decisions, informed by the distribution of benefits and burdens will inform better decisions.

## Core Draft Narrative

1. This draft narrative sets out the direction of travel.
2. Our starting assumption is that all uses of the land and sea will be for multiple benefits, managing multiple risks simultaneously, putting water and soil health first as our primary natural assets.
3. Nature - all life everywhere - exists across all settings in the land and sea with nature-based solutions fostering multiple benefits, including more secure sequestration of greenhouse gases and other benefits to people.
4. Solutions for climate must enhance the state of nature, and solutions for nature must enhance climate resilience.

## Progress

1. We are developing and implementing an Adaptation Framework – NatureScot Adapts - based on the narrative outlined above, comprising
* The Dynamic Adaptation Framework – updated alongside the Corporate Plan
* The Annual Adaptation Plan – integrated into the Business Plan
* Communication Plan (internal and external)
* Monitoring and Evaluation Plan – integrated into Corporate Reporting
* Climate Knowledge and Skills Project.

In addition, we are reviewing the Corporate Risk Register for the current Corporate Plan, as agreed with Audit and Risk Committee on 9 May 2024. Development of the next Corporate Plan and associated Risk Register will be fully embedded in climate risks.

1. Bringing climate risks and the resilience of more natural systems into the foreground of our work and advice is key to shifting debates away from ‘preferred’ states of nature to a just transition, including the risks and costs of doing nothing. The longer the change to more regenerative land management, nature restoration and sustainable use of the sea, the more vulnerability to climate risks because of the time taken for ecological systems to develop.
2. This understanding and articulation of risk will be important in our advice on public policy and green finance, since investment is all about risk and returns. Through this approach it should be possible to realise opportunities to align public and private goods and interests, with better integration of multiple benefits including for nature across all uses of the land and sea.
3. Our Chair is hosting a number of Roundtable events to develop coalitions of the willing for nature-based solutions to the climate-nature emergency with key partners, to be held later this year and next. One of these involves the Royal Society of Edinburgh to explore the policy and practical consequences of continuing to frame nature in competition with ‘other’ uses of the land and sea versus nature as ‘all life everywhere’ and a critical part of the Earth-life system, regulating climate change.
4. We have a corporate PowerPoint slide deck and narrative on nature-based solutions.

## **Monitoring and evaluati**on

1. All of our work should contribute to enhancing nature and so building resilience against climate risks. The changes are mainly in how we do things rather than what we do, and any Actions are delivered through Delivery Plans and hence the Business Plan. So monitoring and evaluation of NatureScot Adapts will, mainly, be integrated with quarterly and annual reporting. In addition, climate Risks will be embedded in the Corporate Risk Register, which is also reviewed as part of the corporate quarterly reporting cycle and annually by the Audit and Risk Committee.
2. In reviewing the Framework on each Corporate Plan cycle, the Annual Reports will form the basis of how well we are addressing the climate risks that NatureScot can control, together with any changes in our understanding of wider climate risks.
3. Climate Risks will be locked into organisational planning through:
* Specific Actions will be updated annually in line with our 1-year Business Plan.
* The Delivery Plans will be the main tool for delivery of our adaptation Actions, and the 90-day plan will help smooth out any resourcing issues alongside other priorities (although there should be few if any conflicts between actions for nature and those required for climate).
* Corporate climate change risks will be embedded and reviewed within the Corporate Risk Register.
* The Adaptation Framework will be reviewed alongside the Corporate Plan cycle, with the next due in 2026, including use of Adaptation Scotland’s Adaptation Capability Framework to assess NatureScot’s *adaptation maturity*, benchmarking our progress against other Scottish public organisations.

## Next steps

1. We continue to work closely with Scottish Government in the development of the Scottish Biodiversity Strategy (SBS), Climate Change Plan (CCP) and Scottish National Adaptation Plan (SNAP). A new Climate Change Bill will be submitted shortly, setting out how Scottish Government intends to meet its 2045 net zero target, guided by advice from the Climate Change Committee. We continue to work with Scottish Government on other key legislation including for agriculture, the uplands, wellbeing and sustainable development.
2. There is interest in Scottish Government in developing systemic approaches. We held a successful workshop with Scottish Government colleagues on systems approaches to the SBS, CCP and SNAP in May, centred on catchment level, place-based discussions. We presented the findings at SG’s Futures Thinking Network (31 July) and will continue to work on delivery-based systems thinking with SG colleagues in the Climate Division and Public Service Reform, including specific actions in the Climate Change Plan as it develops.
3. We are continuing to work with the Climate Change Committee on the 4th Climate Change Risk Assessment, and will establish a working relationship with their new Chief Executive and Head of Agriculture and Land Use.
4. We are working with Zero Waste Scotland and others, including Scottish Government, to expand the circular economy from material flows to include the biological economy.
5. We will explore common areas of interest with the Scottish Land Commission, especially in relation to their work on governance including property rights, responsibilities, risk and resilience.
6. In line with our Influencing Plan, possible influencing routes for the Board include:
	* The new Chair and CEO of the Climate Change Committee (on the interdependencies between nature, adaptation and net zero)
	* Scottish Government’s Climate Change Plan (now expected in 2025, following the new Bill bringing targets into line with advice from the Climate Change Committee) and National Adaptation Plan (2024)
	* Scottish Land Commission (rights, responsibilities, risk and resilience in their ongoing work on governance)
	* Developing the biological circular economy (Zero Waste Scotland and Scottish Government)
	* Wellbeing economy (proposed Wellbeing and Sustainable Development Bill)
	* Agricultural reform (for both emission reductions from the land and resilience to climate risks).

**Recommendations**

1. The Board is asked to consider the Actions in the paper. We welcome suggestions on any others and whether particular routes are of interest to Members.