First Minister's Environmental Council

Key priorities and future work programme

Scottish Government
Riaghaltas na h-Alba
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TABLE OF CONTENTS

Executive Summary

Purpose of the report

Scotland, and all other countries, stand at a pivotal point with urgent and wide scale action required to address the twin crises of climate change and biodiversity loss.

This report by the First Minister's Environmental Council is published as Scotland hosts COP26 in Glasgow, arguably the world's last best chance to get runaway climate change under control. It notes Scotland's ambitions and response to the twin crises, international examples of environmental action, and sets out the directions of the future work programme for the Council.

The Role of the First Minister's Environmental Council

The Environmental Council is a newly established advisory group to the Scottish Government. It is co-chaired by the First Minister and Professor Sir Ian Boyd. The full membership is provided in Annex 1.

The group has two functions. Firstly, it will act as a "sounding board" for near-term policy issues, such as the balance of different environmental aims, or how environmental issues impact on wider policy considerations such as the economy and health. The second function, where the Council will focus most of its efforts, will be in thought leadership, advising on the long-term policy trajectory for Scotland.

The Council will engage across the range of environmental policy areas, such as biodiversity, marine resources, waste, and the nature-based aspects of climate change and the Just Transition.

The Need for Urgent Action

The world's economies are stretching the planet's resources beyond sustainable limits. Global demands on nature far exceed its supply and are causing unprecedented impacts on the climate and natural environment.

Tackling these crises is important in and of itself. There is a strong moral case for ensuring that future generations inherit a planet with a healthy and diverse environment. Tackling these crises in a just way is also fundamental to safeguarding Scotland's economic prosperity and wellbeing. The economy is embedded within nature, and a healthy natural environment is key for broader societal wellbeing.

Successive Scottish Governments have made important progress in addressing the drivers of these crises. Scotland's Greenhouse Gas (GHG) emissions have halved since 1990, and awareness of the importance of biodiversity has increased, with the

introduction of a statutory biodiversity duty on public bodies and the publication of Scotland's first ever biodiversity strategy. Steps to reduce the impact of consumption have increased recycling and reduced the volume of waste going to landfill by two thirds since 2005.

Scotland's geography also presents opportunities for responding to the twin crises of climate change and biodiversity loss. This has been evidenced already through the deployment of renewable energy technology, and the country's natural capital provides opportunities, such as peatland restoration, which if implemented correctly and with ambition can support both climate change and biodiversity goals simultaneously. As a country with a large land area and rich marine and renewable resources, Scotland has potential to be a global pioneer in tackling these crises and hence a model to other nations.

Despite progress, a significant acceleration in action is required. Scotland is still experiencing biodiversity loss, and whilst GHG emissions in Scotland have fallen, the pace of emission reduction needs to accelerate quickly, and encompass many more sectors, to end the country's contribution to climate change. More fundamentally, the level of consumption and resource use in Scotland, and other advanced economies, is continuing to stretch the planet's regenerative capacity beyond sustainable limits.

Three earths would be required for everyone in the world to live as Scotland does. This is not sustainable.

Emerging Priorities for the Council

The Scottish Government has set out ambitious goals for responding to these challenges. These are discussed further in Section two of this report.

In reviewing the government's future ambitions, and the contribution that the Council can make, members have identified three over-arching priorities that cut across the policy areas described above. These are areas where the Council believes that further society wide action will be particularly important if meaningful progress is to be achieved. They form the basis of the Council's future work programme, which is set out in Section five.

Scotland's Relationship with the Environment - The way Scottish society consumes, works, and travels is often at odds with measures required to respond to the twin crises. The Scottish Government has been clear on the need to move to a net zero, climate resilient and nature positive economy that operates within the planet's sustainable limits. However, challenges and uncertainties remain on how this transformation should be achieved. These challenges will require reconsideration of many long held values and resultant behaviours and a reappraisal

of how environmental impacts are accounted for in a wide range of societal and individual choices, decisions and preferences. For instance, how to embed the principles of a circular economy, and lower resource use across all aspects of society, changing modes of travel, and how goods and services can be priced to reflect the full environment cost of their production.

The Future Use of Scotland's Land & Marine Resources – the success of many of Scotland's policies to address biodiversity loss and climate change hinge on changing how the country's land and marine resources are utilised. On land, we can expect to see increased woodland cover, changing agricultural practices and produce, peatland restoration, increases in renewable energy deployment, increased planting of biomass crops, more space for nature and greater use of nature-based solutions to support climate change adaptation and other outcomes in our rural and urban environments. Scotland's oceans can also expect to see increased deployment of renewable energy facilities, protection and enhancement of blue carbon habitats[1], the need to create the right conditions for a resilient fishing industry and a healthy marine environment.

How these new demands can be effectively balanced, in addition to the existing uses of Scotland's land and marine assets and alongside other policy objectives, at both the local and national level, will be a key consideration. Likewise, it will be important to ensure that the frameworks needed to incentivise and support the changes in land and marine use needed are in place, and that all levers of government work in unison to achieve these objectives, including via the encouragement of increased, responsible private investment in terrestrial and marine natural capital.

Next Steps Towards Transformation – Many of the changes required to respond to the twin crises are clear, and the high level policy outcomes and objectives have been established. However as progress is made, the changes required will become more challenging.   The most straightforward choices, for example those with the lowest cost and greatest public support, will understandably be implemented first, whilst the more challenging, or higher cost choices will be encountered as the transition progresses. Many of these steps that need to be undertaken are known, and can be achieved with existing technology. However, collectively, countries have been hesitant to implement the more radical options necessary to achieve the transformational change required. The need to communicate these changes and build consensus across society will be vital if the Scottish Government is to be effective at achieving the change it desires[2].

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[1] State of Nature Report Scotland 2019

[2] This could be seen as a continuation of the process started with Scotland's 'Climate Assembly', which convened a group of people from across Scotland to discuss how Scotland should change to tackle the climate emergency.

Conclusion and Next Steps

This report outlines the current policy landscape in Scotland, emerging issues, case studies of international best practice and the Council's work programme for the coming years.   The report is necessarily open-ended as it remains for the FMEC to prioritise their actions within the scope of these areas. The priorities will evolve to reflect new developments and as the Council refines its ways of working. Further information about the Council is available on the Scottish Government website[3]. Any questions or comments on the report, or the Council's future work programme can be sent to csaenra@gov.scot

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[3] First Minister's Environmental Council - gov.scot (www.gov.scot)

1.   **Overview**

Responding to the global climate emergency and biodiversity crisis are two of the biggest drivers which will shape Scotland's society and economy over the coming decade. The same is true for all countries.

Tackling these crises is important in and of itself. Scotland's environment is an inherent part of its identity, and there is a strong moral case for ensuring that future generations inherit a planet with a healthy and diverse environment.[4] Tackling these crises in a just way is also fundamental to safeguarding Scotland's economic prosperity and wellbeing. Scotland's economy is embedded within nature, and a healthy natural environment is a prerequisite for broader societal wellbeing.

Scotland is well placed to respond to these challenges and has a long history of innovation and scientific excellence. From the Enlightenment through to the Industrial Revolutions, Scotland has played a key role in shaping the modern world through science, invention and innovation. This has continued into the present day, and the country is home to many world class universities and scientists and continues to lead world class innovation, for instance the International Barley Hub[5] funded as part of the Tay Cities Deal Development Programme and Intelligent Growth Systems vertical farming solutions that offer a smart system that can be built for any environment anywhere in the world[6].

Scotland's geography also presents a range of opportunities for responding to the twin crises of climate change and biodiversity loss. Over recent years, Scotland's energy sector has been transformed by the deployment of renewable energy, particularly onshore wind. In the years to come Scotland's natural environment offers many opportunities for responding to the challenges that Scotland faces whether it be through the expansion of woodlands to support carbon sequestration or through offshore renewable energy and sustainable aquaculture. As a country with a large land area and rich marine and renewable resources, Scotland has potential to be a global pioneer in tackling this crises and hence a model to other nations.

Even with its inherent advantages, Scotland is facing a number of challenges as it tackles these twin crises. The government's response will have wider ranging implications as Scotland transitions to a net zero, climate resilient, adapted and nature positive economy. It is key that the policy decisions that inform this transformation are supported by robust advice, and the Scottish Government has a

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[4] Before deciding how to achieve objectives for the environment, it is useful to consider these different ethical frameworks, within which decisions tend to be made. Understanding these can help to illuminate different personal perspectives and reconcile differences of approach and ambition. This is discussed further in Annex 2.
[5] https://www.hutton.ac.uk/about/facilities/international-barley-hub
[6] https://www.intelligentgrowthsolutions.com/

suite of advisory bodies to support this[7]. The First Minister's Environmental Council will support and enhance this advisory landscape by advising the government on international best practice and how Scotland can be at the forefront of tackling the climate emergency and ecological decline. It will have a particular focus on biodiversity, marine resources, waste, and the nature-based aspects of climate change and the Just Transition.

The Council is co-chaired by the First Minister and Professor Sir Ian Boyd and comprises environmental experts from around the world, spanning science, advocacy, governance and policy. A full list of members is provided in Annex 1.

This report has been published to coincide with the Council's first full meeting. It outlines the current policy landscape in Scotland, emerging issues, case studies of international best practice and sets out the broad directions for the Council's work programme for the coming years.   Further information about the Council is available on the Scottish Government website[8].

2.   Policy Context

2.1 The Twin Global Crises

Scotland's response to climate change and biodiversity loss is already driving the Scottish Government's key policy decisions and will continue to do so over the coming years. The intrinsic linkage of the twin global crises bring shared risks and challenges, but also the opportunity for common responses.

Scotland's climate is already changing, becoming warmer and wetter. Extremes in weather are also becoming more pronounced globally. Sea levels are also rising around Scotland's coastlines. Current projections indicate that the changes Scotland has already experienced over the last century, will continue and intensify over the coming decades.[9] These extremes will stress current infrastructure and will be a threat to wellbeing and may have disproportionate impacts, for instance, increased storminess on island communities. In other words where there might be unexpected impacts or consequences that are outside our ability to handle them, potentially challenging our resilience.

These trends, as well as others involving patterns of land and sea use, will further impact on Scotland's environment and wildlife by disturbing the ecosystems that support Scotland's plants and animals[10]. For example, climate change projections

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[7] This includes the Scottish Science Advisory Council - Scotland's highest level science advisory body, providing independent advice and recommendations on science strategy, policy and priorities to the Scottish Government.

[8] First Minister's Environmental Council - gov.scot (www.gov.scot)

[9] Adaptation Scotland – Climate Change Projections for Scotland summary 2021

[10] State of Nature Report Scotland 2019

suggest that mountain top arctic-alpine habitats and the species they support could be displaced by scrub habitats as the climate warms. Ocean acidification from rising levels of atmospheric CO_2 is likely to have wide-ranging and complex impacts on marine ecosystems. Habitats that depend on reef-forming corals are likely to be particularly affected. Indirect effects may be just as significant. Changing seasons have significant implications for agriculture, declining winter cold/snow pack, impact on marine food chains from warming seas, arrival of pests and diseases hitherto unknown.

The scale of the wider environmental changes, unrelated to climate change, that Scotland is already experiencing are also considerable. Some pressures on nature in Scotland, notably freshwater pollution, have decreased in recent decades. Other pressures continue to increase such as the continued net loss of biodiversity. Half of Scottish species have decreased in abundance over the last twenty years[11], primarily due to the intensification of agriculture, changing climate, fisheries, and urban expansion. For example, seabirds, an 'apex' species that sit at the top of the food web, have seen substantial declines in Scotland over the last 30 years. During that time, the average numbers of 12 species of breeding seabirds in Scotland declined by over a third. Surface-feeding seabirds such as Kittiwake, or species that depend on them, such as Arctic Skua, have been particularly affected, with declines of 72% and 77% respectively. This seems to result from a cascade of mechanisms originating with the declining abundance and nutritional quality of Sandeels as a result of the impact of fishing, increasing sea surface temperature, the timing and strength of ocean stratification, and a mismatch in reproductive timings with availability of prey[12].

2.2 Scotland's response

Against the backdrop set out in the preceding sections of this report, successive Scottish Governments have taken measures to reduce Scotland's greenhouse gas (GHG) emissions, build resilience to the locked in impacts of climate change and to reverse biodiversity loss.

The Scottish Government's Environment Strategy[13] provides an overarching strategic framework which brings current strategies and plans together, in the context of Scotland's National Performance Framework and the UN Sustainable Development Goals. This sets the vision that, by 2045, by restoring nature and ending Scotland's contribution to climate change, Scotland is transformed for the better- helping to secure the wellbeing of Scotland's people and planet for generations to come. The Strategy sets out 6 outcomes which provide a focus for responding to the crisis. Three outcomes describe ambitions for Scotland's

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[11] State of Nature Report Scotland 2019
[12] State of Nature Report Scotland 2019
13 Scottish Government - The Environment Strategy for Scotland: vision and outcomes

environment, focussed on climate change, nature and resource-use. Three outcomes describe the relationship between the environment and wider ambitions for economy, society and international impact.

Figure 1: Figure detailing contribution of the Environment Strategy vision and outcomes to National Outcomes and UN Sustainable Development Goals

Infographic text:
Centre: Environment Strategy vision
One Earth. One home. One shared future.
By 2045: By restoring nature and ending Scotland's contribution to climate change, our country is transformed for the better - helping to secure the wellbeing of our people and planet for generations to come.

Inner ring: Environment Strategy outcomes

Scotland's nature is protected and restored with flourishing biodiversity and clean and healthy air, water, seas and soils
 We play our full role in tackling the global climate emergency and limiting temperature rise to 1.5°C
 We use and re-use resources wisely and have ended the throw-away culture
 Our thriving sustainable economy conserves and grows our natural assets
 Our healthy environment supports a fairer, healthier, more inclusive society
 We are responsible global citizens with a sustainable international footprint

Middle ring: National Outcomes in the National Performance Framework
Children & young people; Communities; Culture; Economy; Education; Environment; Fair work & business; Health; Human rights; International; Poverty;

Outer ring: UN Sustainable Development Goals
1: No poverty; 2: Zero hunger; 3: Good health and well-being; 4: Quality education; 5: Gender equality; 6: Clean water and sanitation; 7: Affordable and clean energy; 8: Decent work and economic growth; 9: Industry, innovation and infrastructure; 10: Reduced inequalities; 11: Sustainable cities and communities; 12: Responsible consumption and production; 13: Climate action; 14: Life below water; 15: Life on land; 16: Peace, justice and strong institutions; 17: Partnerships for the goals
Source: The Environment Strategy for Scotland: vision and outcomes, 2020, page 6

Scotland's GHG emissions have halved since 1990.[14] The Scottish Government has committed to further accelerating the pace of emission reductions. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 introduces a legal requirement to reduce emissions by 75% by 2030 (compared with 1990) and to net zero by 2045. These are ambitious targets which will end Scotland's contribution to climate change within one generation[15]. A key challenge for the Scottish Government will be to build upon emission reduction to date to deliver the scale of decarbonisation required across all sectors of the economy, including in relation to how land is used (e.g. through forestry, peatlands and agriculture) See figure 2. The updated Climate Change Plan, published in December 2020, sets out the pathway by which the Scottish Government intends to meet emissions targets out to 2032.

Scotland's approach to climate change adaptation is set out in the second statutory Scottish Climate Change Adaptation Programme, which covers the period 2019 to 2024. The Programme is outcomes based and aligned to the UN Sustainable Development Goals (SDGs), with two of the high level outcomes directly related to the resilience of the natural environment to the impacts of climate change. The Scottish Climate Change Act requires that a new Programme is prepared every five years.

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[14] Scottish Greenhouse Gas statistics: 1990-2019
[15] Further information on the measures being taken by the Scottish Government to meet its climate change objectives are set out in the 'Climate Change Plan 2018–2032 – Update'

Figure 2: Greenhouse Gas Emissions in Scotland, 1990 to 2019 (in Megatonnes of CO_2 equivalents, Mt CO_2e)
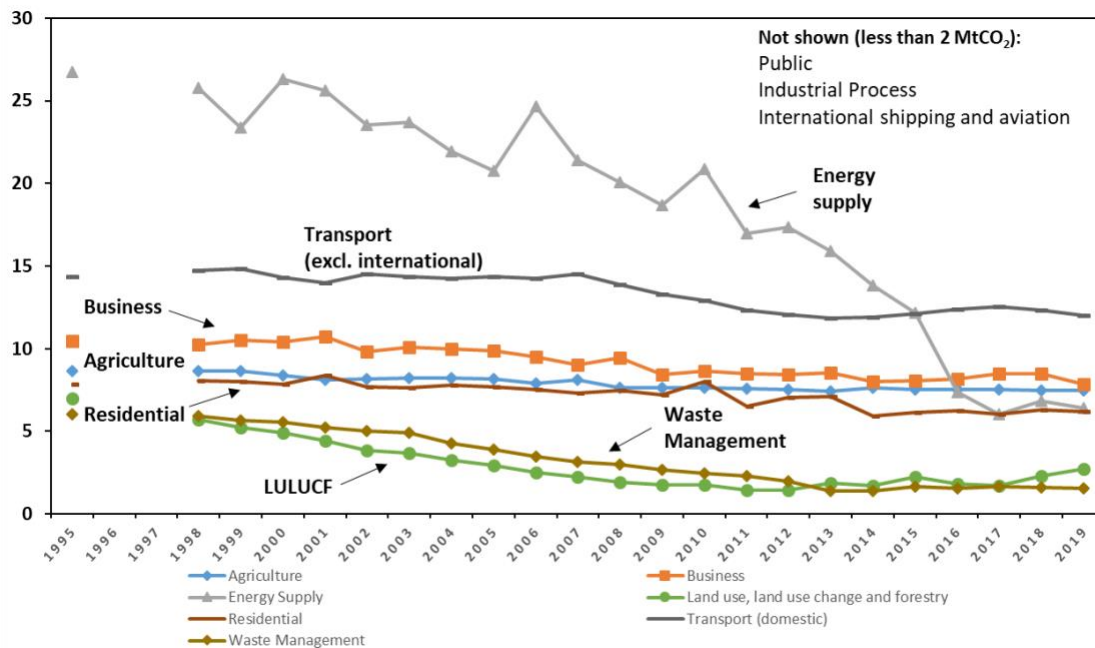

Figure 2. This graph presents Scotland's annual greenhouse gas emissions for various sectors since 1995 in millions of tonnes of carbon dioxide equivalents. Data is presented by sector for energy supply, transport, business, agriculture, residential, waste management and land use, land use change and forestry. The graphs shows the relatively rapid declines in emissions from energy supply and waste management.
Source: https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/documents/

Scotland's successes in relation to biodiversity are more fragile and tentative but reflect the increased understanding of the importance of biodiversity loss since the beginning of the century and the time-lag around species recovery and habitat restoration. In general, the decline in biodiversity is continuing, albeit with some trends appearing to stabilise. There is an increased understanding of the linkages between climate change and biodiversity loss and the fact that nature is key to addressing the former.

The Scottish Government is committed to tackling the two crises hand in hand. Scotland's approach to reversing biodiversity loss is set out in two documents which together constitute the Scottish Biodiversity Strategy[16] although these should have been refreshed in 2020 following agreement of a new global biodiversity framework. Delays in negotiation of that framework due to Coronavirus (COVID-19) led to the

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[16] The original strategy – Scotland's Biodiversity: It's in Your Hands – was published in 2004. In 2013, it was supplemented by the 2020 Challenge for Scotland's Biodiversity

publication of the 2020 Statement of Intent - 2020 Challenge for Scotland's Biodiversity pending production of a new Scottish Biodiversity Strategy due in Autumn 2022. The Statement of Intent[16] reflects Ministers increased ambition for improvements in biodiversity, making several important new commitments, such as to increase protected areas to 30% of Scotland's territory by 2030, and to introduce new nature networks, building upwards from locally agreed and negotiated partnerships, rather than as a centrally-driven initiative. This will be further supplemented by a Natural Environment Bill which will establish statutory targets for restoring and protecting nature, to be introduced in the Parliament in 2023-24.

Progress towards the objectives set out in the existing biodiversity strategy are reported on every three years. NatureScot, Scotland's nature agency, also published in 2019 an assessment of the country's progress against the 20 global targets. These targets were set by the Convention on Biological Diversity, also known as the Aichi Targets, which were to be met by 2020. Of the 20 Aichi targets, nine were assessed as being on track, and the other 11 as showing progress, although not sufficient to meet the targets[17]. Although this performance compares relatively well both within the UK, regionally within Europe and globally, it also reflects the overarching fragile and tentative successes outlined above, meeting fewer than half the global targets.

Both public and responsible private sector investment in Scotland's natural capital is central to responding to both climate change and biodiversity loss and, if implemented correctly and with ambition, can often support both goals simultaneously.

For example, increasing Scotland's forest cover can mitigate impacts of climate change through sequestration, enhance biodiversity by providing habitats and provide space for recreation. In 2020, Scotland created 10,660 hectares of new woodland, equivalent to approximately 80% of all new woodland in the UK that year. Under current plans, woodland creation will increase to 18,000 hectares a year by 2025. The most recent Scottish Government Programme for Government also commits to increase annual expansion of native woodlands which can bring particular biodiversity benefits in addition to sequestering carbon.

Where trees are planted has a huge impact on the environmental and social benefits and costs they generate. Planting on carbon rich peatlands can negate the sequestration attributes of the trees themselves in terms of their overall effects on GHG emissions. Whereas woodland creation can be one of the responses to the joint climate and biodiversity challenge that offers best value for money[18]. If tree

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[17] Scotland's Biodiversity Progress to 2020 Aichi Targets Report 2019

[18] Bateman, I.J., Harwood, A., Mace, G.M., Watson, R., Abson, D.J., et al. (2013) Bringing ecosystem services into economic decision making: Land use in the UK, Science, Vol 341, No. 6141: 45-50, 5th July 2013. DOI: 10.1126/science.1234379, https://science.sciencemag.org/content/341/6141/45

planting is targeted according to the carbon storage, biodiversity, environmental access and hence equality benefits woodlands can generate, taking account of their impacts on other land use such as agriculture.

Restoring Scotland's degraded peatlands, which are a significant source of GHG emissions, is another example of enhancing the natural environment. Peatlands can simultaneously contribute to multiple goals such as climate change adaptation through natural flood management and restoring natural habitats for wildlife. The government is investing £250 million in funding to support the restoration of 250,000 hectares of degraded peatland by 2030 which has the potential to transform, and enhance, many areas of Scotland.

Other land-uses also have an important impact on climate change and biodiversity. For example, agriculture, in addition to being a key source of Scotland's food supply, is a large emitter of GHG emissions, particularly from livestock. By 2030, agriculture is expected to be the third largest source of emissions in Scotland after transport and industry[19].

Farming practices have also had a negative impact on biodiversity over recent decades,[20] however in recent years efforts to fund targeted activities that are positive for biodiversity have seen some results. For instance, some farmers and crofters are managing their land with nature and the environment in mind and show how biodiversity can benefit with the right support. Leaving space for nature with wildlife-friendly practices such as enhanced field margins, good grazing management, reduced inputs of pesticides and fertilisers, and mowing and cutting at the right time can also have major benefits[21].

A key challenge in the coming years will, therefore, be the reform of agricultural support in Scotland to ensure that it can balance the need to reduce the sector's contribution to GHG emissions and biodiversity loss, align to other land uses such as expanded forestry creation, whilst continuing to support sustainable food production and broader social objectives (including in the face of the risks associated with a changing climate). This is likely to require a significant reappraisal of the nature and role of government support for the agricultural sector.

2.3 Balancing competing priorities

It is important to acknowledge that determining the optimal mix of land use to achieve climate, biodiversity and other economic and societal outcomes, in a given location, involves a complex set of interlinked considerations that are sometimes in tension, and involvement of all concerned in making those considerations. This is

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[19] Securing a green recovery on a path to net zero: climate change plan 2018–2032 - update
[20] Burns F, Eaton MA, Barlow KE, Beckmann BC, Brereton T, Brooks DR, et al. (2016) Agricultural Management and Climatic Change Are the Major Drivers of Biodiversity Change in the UK. PLoS ONE 11(3): e0151595
[21] State of Nature Report Scotland 2019

particularly the case for some forms of land use and both biodiversity and climate mitigation. For example, ensuring that peatlands become carbon sinks - as well as sustaining biodiversity - needs changes in current land use.

Similar trade-offs also occur in the marine environment. For example, offshore renewable energy production is needed to achieve the Scottish Government's GHG emission targets. They may also enhance the marine environment through the introduction of what amounts to new artificial reef structures. However the scale at which it is deployed has the potential, if not carefully managed, to negatively impact on some components of marine biodiversity, existing marine carbon stores and traditional marine sectors such as fisheries.

Furthermore, and if carefully planned, the marine environment has the potential to very significantly reduce the GHG emission load from our food production systems. As with land-based agriculture, the type of aquaculture sector we develop matters tremendously, with the potential for either substantial benefits or costs depending on the nature and location of its activities. However, the potential certainly exists for great improvements in food production through careful use of the marine environment[22].

The Scottish Government has recognised these trade-offs and emphasised the need for a 'Just Transition' to ensure that both the outcome which it is seeking to achieve - a net zero, climate resilient, nature positive and fairer society - and the means by which it is achieved, are equitable. It has committed to producing just transition plans for the transformation to net zero across key sectors, co-designed and co-delivered with a diverse range of stakeholders and advised by a Just Transition Commission to support the production and monitoring of the plans.

2.4 Consumption – a critical factor in the twin crises

Whilst the way in which Scotland's land and marine environments are used, and how communities are involved in those decisions, are key issues when considering how the government can meet its environmental priorities, the resources consumed by Scottish households and businesses also have a significant environmental impact, both domestically and internationally. Household consumption is a key driver of climate change and biodiversity loss worldwide. The impact that consumption has on the natural environment is a major challenge that all countries will have to address in the coming years. There is an opportunity for Scotland to demonstrate leadership in this area as it progresses towards its climate change and wider environmental objectives.

[22] Stentiford, G.D., Bateman, I.J., Hinchliffe, S., Bass, D., Hartnell, R., Santos, E., Devlin, M., Feist, S.W., Taylor, N., Verner-Jeffreys, D., van Aerle, R., Peeler, E.J., Higman, W., Smith, L., Baines, R., Behringer, D., Katsiadaki, I., Froehlich, H.E., Tyler, C.R. (2020) Sustainable aquaculture through the One Health lens, Nature Food, https://doi.org/10.1038/s43016-020-0127-5

At present, around 80% of Scotland's carbon footprint[23] comes from the goods, materials and services which the country produces, consumes and disposes of.[24] About half of these emissions occur overseas. This imposes an environmental burden, which is often borne by other countries, through the depletion of scarce resources, environmental degradation, and GHG emissions generated in both production processes and the subsequent disposal of products when they are no longer required or functional.

The world's economies are stretching the planet's regenerative capacity beyond sustainable limits, with demands on nature far exceeding its supply. It is estimated that 1.6 Earths would be needed to sustain humanity's current demands – or nearly 3 Earths if everyone lived as we do in Scotland[25]. Scotland's raw material consumption per capita[26], also known as a Material Footprint, was 18.4 tonnes in 2017. That's equivalent to each person in Scotland using their body weight in material every 1.4 days. The evidence is clear: the way we consume materials today is unsustainable and contributes to many global environmental and social problems, from climate change and biodiversity loss through to issues of economic inequality.

There are significant environmental and economic benefits which can be accrued by moving to a circular economy model which maximises the value from the goods already in circulation, and promotes the manufacture of products that are designed to last as long as possible and are repairable.   It has been estimated that such circular actions could reduce Scotland's carbon footprint by up to 20% by 2050[27]. Reduced resource consumption can also bring economic benefits, for example re-engineering production processes to minimise resource inputs can simultaneously minimise costs and the environmental impact of production[28].

Likewise, with waste disposal, particularly waste going to landfill, generating around 1.5 Mt CO_2e annually[29] and reducing the resources which can re-enter production processes, the need to maximise recycling rates, and directing waste to more productive uses, is key.

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[23] Scotland's Carbon Footprint refers to estimates of Scotland's GHG emissions on a consumption basis. This refers to GHG emissions which are associated with the spending of Scottish residents on goods and services, wherever in the world these emissions arise together with emissions directly generated by Scottish households, through private heating and motoring. These GHG emissions are often referred to as "consumption emissions" to distinguish them from estimates relating to the emissions "produced" within a country's territory or economic sphere.

[24] Zero Waste Scotland - Everything we buy has a carbon cost

[25] Scottish Government - The Environment Strategy for Scotland: vision and outcomes

[26] Zero Waste Scotland: Material Flow Accounts (2021)

[27] Update to the Climate Change Plan 2018 – 2032 (2020) Scottish Government

[28] https://chemsec.org/publication/chemicals-business,circular-economy/what-goes-around/

[29] Scottish Greenhouse Gas Emissions 2019

The Scottish Government has been taking a number of important steps in this area. Household recycling rates have steadily increased to 45% in 2019, and volume of biodegradable municipal waste going to landfill has fallen from 2.0 Mt in 2005 to 0.7 Mt in 2019. These, and other measures, have contributed to GHG emissions from waste declining by three quarters since 1990[30] (figure 3). The government is investing a further £70 million in improving recycling infrastructure across Scotland over the coming years. This reflects the fact that a further step change will be required to meet the Scottish Government targets of reducing food waste by one third by 2025 and recycling 70% of all waste by the same date. The Scottish Government is also due to introduce a Circular Economy Bill during the current parliamentary term to implement new measures to reduce wasteful resource use, such as single-use plastic items, and increase the recovery of materials.

However, it is important to acknowledge that waste is a direct consequence of consumption, as well as of the nature of the production process. The more materials we consume the more waste we will produce. To ensure true circularity of the economy and minimise waste, therefore, consumption needs to be reduced.

Figure 3: Waste Sector Performance and Greenhouse Gas Emissions, 2005 to 2019
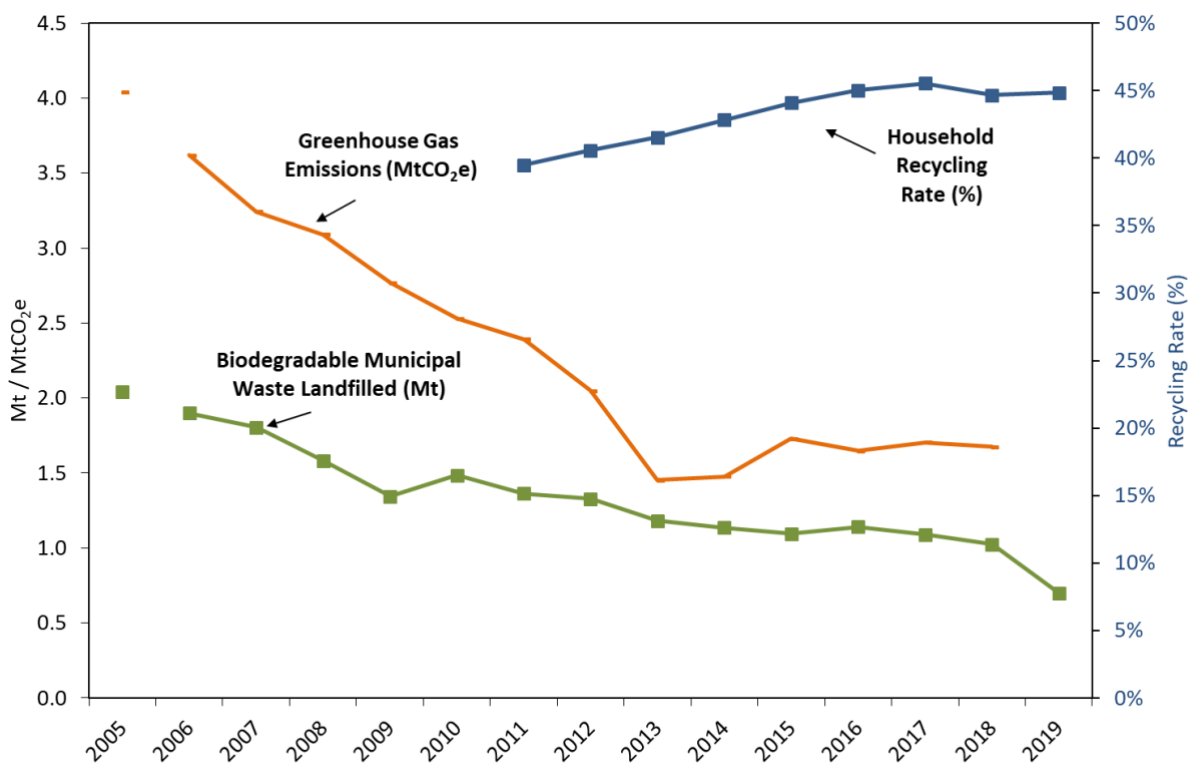

Figure 3. This graph presents Scotland's annual recycling rate, since 2005, as a percentage of waste generated, the annual amount of biodegradable waste landfilled in millions of tonnes, and the annual greenhouse gas emissions from the waste

[30] Scottish Greenhouse Gas Emissions 2019

sector in millions of tonnes of carbon dioxide equivalents. The graphs shows the decline in greenhouse gas emissions, the commensurate decline in biodegradable waste landfilling and the rise in the recycling rate, since 2005.

Source: [Household waste data | Scottish Environment Protection Agency (SEPA)](#) and [Waste data for Scotland | Scottish Environment Protection Agency (SEPA) * a change in how the data was recorded from 2006 means the data is not comparable with 2005.](#)

3. Emerging Priorities For The Council

The First Minister's Environmental Council has identified a number of over-arching priorities that cut across the policy areas described above. These are areas where the Council believes that further society-wide action will be particularly important if meaningful progress is to be achieved. They therefore form the basis of the Council's future work programme which is set out in Section five.

Scotland's Relationship with the Environment - The way society consumes, works, and travels is often at odds with measures required to respond to the twin crises. The Scottish Government has been clear on the need to move to a net zero, climate resilient and nature positive economy that operates within the planet's sustainable limits. However, challenges and uncertainties remain on how this transformation should be achieved. These challenges will require reconsideration of many long-held values and resultant behaviours and a reappraisal of how environmental impacts are accounted for in a wide range of societal and individual choices, decisions and preferences. They will also require change to the way in which policy objectives are implemented, for example by recognising the importance of targeting the right locations for change, embedding the principles of a circular economy, lower resource use across all aspects of society, changing modes of travel, and how goods and services can be priced to reflect the full environmental cost of their production.

The Future Use of Scotland's Land & Marine Resources – the success of many of Scotland's policies to address biodiversity loss and climate change hinge on changing how the country's land and marine resources are utilised. On land, we can expect to see increased woodland cover, changing agricultural practices and produce, peatland restoration, increases in renewable energy deployment, increased planting of biomass crops, more space for nature and greater use of nature-based solutions to support climate change adaptation and other outcomes in our rural and urban environments. A consistent priority here will be the need to target these changes according to the environments that receive them and the wider social benefits and costs that they generate including recognition of the communities they can enhance. Scotland's oceans can also expect to see increased deployment of renewable energy facilities, and protection and enhancement of blue carbon

habitats[31]. There is a need to create the right conditions for a resilient fishing industry, enhancement of new, sustainable approaches to marine food production that do not negatively affect wild marine resources and habitats; a healthy marine environment and healthy coastal communities.

How these new demands can be effectively balanced, in addition to the existing uses of Scotland's land and marine assets and alongside other policy objectives, at both the local and national level, will be a key consideration, as will the total resource footprint of Scotland, which accounts for impacts beyond Scotland. Likewise, it will be important to ensure that the frameworks needed to incentivise and support the changes in land and marine use needed are in place, and that all levers of government work in unison to achieve these objectives, including via the encouragement of increased responsible private investment in terrestrial and marine natural capital.

Next Steps Towards Transformation – Many of the changes required to respond to the twin crises are clear, and the high level policy outcomes and objectives have been established. However as progress is made, the changes required will become more challenging. The most straightforward choices, for example those with the lowest cost and greatest public support, will understandably be implemented first, whilst the more challenging, or higher cost, choices will be encountered as the transition progresses. Many of these steps that need to be undertaken are known, and can be achieved with existing technology. However, collectively, countries have been hesitant to implement the more radical options necessary to achieve the transformational change required. The need to communicate these changes and build consensus across society will be vital if the Scottish Government is to be effective at achieving the change it desires[32].

4. International Case Studies

In undertaking their duties, members of the Environmental Council will collectively draw on their experience and insights from operating in the UK and across the world. In doing so, they are able to draw on best practice solutions that simultaneously respond to the twin crises of climate change and biodiversity loss. Summarised below are examples of the case studies shared by council members, some of which they are involved in, of particular relevance to the remit of the Council. The emerging priorities and work themes that relate to the case studies are noted after each case study.

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[31] State of Nature Report Scotland 2019

[32] This could be seen as a continuation of the process started with the Scottish Government's Scotland's 'Climate Assembly' initiative which convened a group of people from across Scotland to discuss how Scotland should change to tackle the climate emergency.

Payments for Ecosystem Services – The Republic of Costa Rica[33]

In the 1990s, the vast forests of Costa Rica were reduced to half their former size. In response, the Ministry for Environment developed a Payments for Ecosystem Services (PES) scheme which has resulted in reforestation. This has benefitted both biodiversity and climate change.

Costa Rica's PES programmes paid citizens to protect forests, plant trees, and restore ecosystems. Landowners received direct payments for the environmental services that their lands produced when adopting sustainable land-use and forest-management techniques. Whilst previously the financial incentives resulted in landowners choosing to reduce forest cover, this scheme provided the incentive to do the reverse. The programme is funded through Costa Rica's fuel tax and water charge, as well as initiatives such as Certificates of Conservation of Biodiversity, carbon credits, and strategic alliances with the public and private sector.

The scheme has supported a doubling in size of Costa Rica's forests which led to a boom in ecotourism, contributing $4 billion to the economy. This strategic intervention has proven its worth, and the Costa Rica government is now taking the approach to urban areas. It believes 30% of the world's land and oceans could be protected in this way too. The Republic of Costa Rica has been awarded the first ever Earthshot prize[34] in the 'protect and restore nature' category.

Emerging priority 'First steps towards transformation' & work theme 'Scotland's communities in the environment'.

Nature-based solutions across a region – Ethiopia (Nature-based Solutions in Action: Lessons from the Frontline, IIED[35])

The forests and valleys of the Bale mountains are home to hundreds of thousands of people in Southern Ethiopia but their watershed supports 9-12 million people in the lowlands across three countries. The pressure from agriculture, erratic rains and soil erosion in the highlands left all these communities risking chronic food insecurity, while felling their forests released greenhouse gases. With so many issues to tackle, the policies designed to help were not joined up, nor followed through. Here the response focussed first on protecting people and nature locally, then scaled up to the natural resources across the Bale Eco-region.

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[33] https://pubs.iied.org/g04272
[34] www.earthshotprize.org
[35] https://pubs.iied.org/20451g

The mountainous heart of the region is a National Park, so the nature-based solutions extended from the park to its surroundings. A partnership of local and international NGO's and researchers worked with the regional and local governments, on projects to enhance the drought resilience and food security of the most vulnerable populations, as well as the wellbeing of both highland and lowland communities; and to protect the biodiversity and ecosystem functions. In a second phase, the package is being scaled up to the entire Bale Eco-Region, with best practices for managing watersheds, and improving livelihoods through market approaches. There's work for governments too, developing their ability to join up policies for managing natural resources and protected areas, and those for the livelihoods of their people. Finally, the evidence to show what works is being collected on a larger scale, in order to learn from the impact of this integrated, eco-regional approach.

Emerging priority: 'Scotland's land & marine resources and future use' and work theme: 'Scotland's Communities in the Environment'.

The big food redesign: Regenerating nature with the circular economy (The Ellen MacArthur Foundation, 2021)
The big food redesign explores how by rethinking the ingredients used and how food is produced, can provide choices that are better for customers, farmers and the climate – and reduce biodiversity loss associated with the food sector by up to 50% compared to business as usual[36].

Currently, the food industry is responsible for one-third of global GHG emissions[37] and more than 50% of human-induced pressure on biodiversity[38]; but instead of bending nature to produce food, food can be designed for nature to thrive. Circular design for food demonstrates opportunities for companies to go beyond better sourcing (sourcing the same ingredients through regenerative practices) to fundamentally redesign their product portfolios. The study explores a combination of four design opportunities where companies can take action:

- Diverse ingredients – Using a greater diversity of animal and plant varieties and species as ingredients. This can reduce threats to the food system such as pests, diseases and extreme weather shocks. It can also yield production benefits by enabling a shift towards regenerative production systems that integrate a variety of food types which benefit one another when grown together.

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[36] Ellen Macarthur Foundation - The Big Food Redesign Technical Appendix
[37] https://www.nature.com/articles/s43016-021-00225-9
[38] https://www.bcg.com/publications/2021/biodiversity-loss-business-implications-responses

- Lower impact ingredients – Simple swaps that have reduced environmental impacts, even when conventionally produced.

- Upcycled ingredients – Transforming food by-products, that would otherwise not have gone to human consumption, into new ingredients. For example, by upcycling post-harvest agricultural residues from growing oats into sweeteners. Such an approach can get the most value from the land, water and agricultural inputs which go into food production.

- Regeneratively produced ingredients – Producing food in ways that have positive outcomes for nature such as improved soil health. These methods can also be applied to the way diverse, lower-impact and upcycled ingredients are grown.

Emerging priority and work theme: 'The next steps towards transformation'

The Natural Capital Project[39] - A global partnership centred at Stanford University[40]

Often, the benefits that nature generates are widely appreciated only upon their loss. The Natural Capital Project (NatCap) seeks to change this. NatCap work with decision-makers to develop nature-based solutions, driving investments in ecosystem regeneration for maximal benefit to people. They use iterative engagement that begins with stakeholders and their needs, so the new science and tools developed are immediately relevant and can be incorporated into existing decision processes.

NatCap work in a wide array of places and sectors, systematically developing nature-based solutions to problems as varied as: building resilience to climate and coastal hazards in Belize and the Gulf Coast states of the United States; guiding development planning across China; managing corporate risk in global sourcing decisions for Unilever; targeting investments in forest restoration for IUCN and country governments in Africa; and making smart transportation loan decisions by the Inter-American Development Bank across Latin America.

In addition to demonstrating the power of natural capital approaches to transform decisions, NatCap have created software (now used in over 185 countries) that shows where and for whom nature matters most, built capacity through learning

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[39] www.naturalcapitalproject.org
[40] Core partners include the Chinese Academy of Sciences, Royal Swedish Academy of Sciences and Stockholm Resilience Centre, University of Minnesota, The Nature Conservancy, and World Wildlife Fund, working together with 300 other research and implementing partners

exchanges and training, and engaged leaders to accelerate the uptake and magnify the impact of successes.

NatCap have found that a major challenge is to find ways to transform human actions toward pathways of sustainability that, (1) appreciate the vital necessity of natural capital, (2) reconnect development to the biosphere, and (3) stabilise Earth in conditions favourable for a globalised, human-dominated world. While 'biosphere stewardship' entails cross-scale collaboration, it is ultimately place-based, emerging from direct interactions between people and the living world. Many case studies illustrate how place-based governance, that is, governance that is informed by and adaptive to local places in a cross-scale and even global context, can support transformations toward biosphere stewardship.

Now NatCap is advancing gross ecosystem product (GEP), a new framework for capturing the economic values of nature to society, together with the Chinese Academy of Sciences and Asian Development Bank. GEP is being deployed across China, to guide financial investments in restoration and regeneration, to evaluate policies, and to track progress. In March 2021, the UN Statistical Commission sanctioned GEP for global use, and several countries in Latin America, Asia, and Africa are already underway with adoption.

SeaBOS and the Keystone Actor Dialogues

Overexploitation of fish resources is a crucial problem with limited scope and scale of progress. The Stockholm Resilience Centre (SRC) initiated a scientific analysis of globally operating seafood companies engaged in seafood production. They found that thirteen companies were responsible for 11 to 16 % of all wild seafood caught, and that together they dominated the industry in white fish, pelagic fish, tuna, salmon farming, and feeds. Through their actions they shape marine food webs and ecosystems, connect ecosystems globally, control globally relevant segments of production through subsidiaries, and they also play a major role in ocean governance through participation in multiple institutions and governing bodies.

Then the SRC, together with several partner science institutions, engaged in bilateral dialogues with the companies and their CEOs. After two years of such engagement, eight companies were convinced of the value of participating in a global keystone dialogue. The companies agreed to form a global coalition for ocean stewardship, based on science - Seafood Business for Ocean Stewardship (SeaBOS[41]). A second global dialogue with 10 companies enabled agreement on priorities and a way forward to translate their high-level commitments to operational activities. At a third dialogue, companies reported real progress made and also committed to long-term funding, an article of association, and leadership of a secretariat. Whilst still in an

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[41] www.seabos.org

early phase of development, companies appear committed to change toward ocean stewardship, and their commitment is already affecting seafood supply chains.

Emerging priority: 'The future use of Scotland's land and marine resources' and work theme: 'Scotland's space on the planet'

NetZeroPlus (NZ+): The Right Tree in the Right Place
(University of Exeter, University of Aberdeen, Forest Research, National Trust)

The Royal Society, Committee on Climate Change, the National Academy of Sciences and many others have all highlighted the vital and urgent role that land use change has to play in meeting the net zero commitments flowing from the Paris Accord on climate change. But land use change is also vital to meet the challenge of biodiversity loss; creating high quality habitats that protect our wild species and bending the curve on biodiversity loss. Woodland creation in particular can play a positive role in addressing a wealth of other environmental, economic and social issues associated with land use issues, including flood risk and water quality, access to high quality environments for disadvantaged communities and the health and wellbeing benefits that accompany these. However, tree planting also favours some wildlife over others, and its potential costs include effects on farming incomes and livelihoods, food production, food imports and potential 'carbon leakage' from those imports (replacing domestic meat production with less-sustainable imports).

Considering all of these factors will help to design the policies that lead to genuine improvements for Scotland's present and future generations but the process to do so is complex. Altering the locations in which woodland creation occurs could radically change its benefits and costs. The more trees we plant, the more important that these decisions are well-guided.

The NetZeroPlus research programme unites Scottish academic excellence with research, governance and business partners from across the UK, to understand the relationship between changing the location of Scotland's woodland creation programme and the benefits it will generate. The research develops 21st Century decision support systems that combine the natural and physical sciences, economics and social science. A process of co-design with government and business is intended to deliver tools which are compatible with real-world policy creation and decision making.

Emerging priority: 'The future use of Scotland's land and marine resources' and work theme: 'Scotland's space on the planet'

5. The Environmental Council's Proposed Work Themes

Drawing on the above analysis, the Environmental Council has identified the following areas where members' collective expertise, spanning academic development, advocacy, communication through to empirical experience can be utilised to provide the greatest value to the Scottish Government.

These areas are summarised below under three overarching themes. The themes are different views of an interlinked system and are not intended to be neatly separable. The Council will prioritise amongst these, coordinating with other relevant advisory bodies.

5.1 Scotland's Space on the Planet

Transforming land use for multiple outcomes, including nature, climate, agriculture and people, and the equivalent activity for marine areas. Identifying actions and policy options that align with the scale of Scottish Government ambition and long-term trajectory to build a Scotland that lives, and thrives, within earth's sustainable limit and maintains a healthy environment for future generations whilst recognising the value of cultural heritage.

5.1.1. Change across the land

The approach to large-scale transformation of land uses to meet new demands. Large-scale transformation of management objectives for Scotland's landscapes encompassing a new balance and types of land use (scope could include targeting policy to the right locations for environmental, economic and social change; food system redesign, and just transaction for livelihoods and new approaches to agriculture: sustainably intensive through to regenerative, embedding biodiversity).

Policy areas: agriculture, biodiversity, environmental quality, energy, planning, forestry, rural economy, tourism and recreation

5.1.2 The space at sea

Accommodating the multiple demands/objectives on Scotland's marine resources and just transition for coastal communities.

Policy areas: marine biodiversity, renewables, mining, fisheries, aquaculture, tourism

5.1.3 The choice is local

Balancing priorities in practice, in a particular context, and how local circumstances, context (including culture and heritage) and communities are reflected in decision making, but national policies also delivered.

Policy areas: Regional Land Use Partnerships, rural and urban economy, green jobs, planning

5.2   Scotland's Communities in the Environment

Scotland's life and work, the society and economy that it generates and its relationship to the environment and society's response to the twin crises.

5.2.1   Innovating means Circular

How does Scotland continue the move from 'here' to a circular economy? Resources, supplies, education and skills required for a networked, sustainable economy. What needs to change (identify all aspects) and what needs to be in place to enable those changes? The role of innovation and of access to local goods.

5.2.2   Nature-based living

Ensuring that land based and marine-based transformation embeds a just transition for rural and coastal communities.

5.2.3   Supporting behaviour change

Supporting the behaviour changes needed to meet the government's long term environmental objectives.

5.2.4   Better choices

People have the information and resources they need on the sustainability of different choices so that their choices as consumers can be more informed (what to buy, how to buy it, how to travel).

Policy areas: sustainable economy, Just Transition, transport, energy, circular economy, planning

5.3   Next steps towards transformation (innovation & policy change)

Achieving the government's 2030 ambitions and preparing for 2045. This will involve considering:

5.3.1   Moving from understanding to action

If we recognise the dichotomy of motivation (see Annex 2) to take action as either a moral responsibility or to protect goods and services of value to society, we need to explain underpinning philosophies and motivations to achieve change.

5.3.2   Changing mindsets

The tools to effectively and inclusively listen, empathise, communicate, and build consensus on, the changes necessary at a national, regional and person level to meet the government's environmental policy ambitions.

5.3.3   A level playing field to fair transformation

The development of appropriate, fair and just objectives, incentives and accountabilities. Setting a level playing field for individuals, households,

communities, institutions, local and national business – to know what is expected, be incentivised and also be held accountable.

5.3.4   Systems and scope

Tools and processes to bring systems thinking and policy targeting, focusing on what is important and valuable for the society to survive and thrive, with global context and inter-generational timescale are needed to ensure clear direction through transformational change, aiming for multiple benefits that are adaptive to a changing climate. Ensuring these tools and systems are informed by an intersectional team that is representational and ensuring inclusivity and climate justice is not lost as we rapidly try to adapt to the crisis and mitigate further change.

Policy areas: rural economics, circular economy, biodiversity, just transition

6.   Conclusion and Next Steps

This report outlines the current policy landscape in Scotland, emerging issues, case studies of international best practice and the Council's work programme for the coming years.   The report is necessarily open-ended as it remains for the FMEC to prioritise their actions within the scope of these areas and these priorities will evolve to reflect new developments and as the Council refines its ways of working. Among other possibilities, the FMEC might seek to formulate some of the points above into an overarching narrative. Further information about the Council is available on the Scottish Government website[42].

Any questions or comments on the report, or the Council's future work programme can be sent to csaenra@gov.scot

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[42] First Minister's Environmental Council - gov.scot (www.gov.scot)

Annex 1

List of First Ministers Environmental Council Members

Name	Affiliation
Co-Chair - Professor Sir Ian L Boyd FRSB FRSE FRS	University of St Andrews, President-elect of the Royal Society of Biology
Professor Ian Bateman OBE, US-NAS, FBA, FRSA, FRSB	Director of Land, Environment, Economics and Policy Institute, University of Exeter Business School
Gordon Buchanan MBE	Award-winning wildlife camera-man and presenter
Revati Campbell	Member of the First Minister's National Advisory Council on Women and Girls, RSA Young People's Economic Security Advisory Group and University of Glasgow
Professor Gretchen Daily	Bing Professor of Environmental Science, Stanford University, USA Faculty Director – The Natural Capital Project
Professor Sandra Diaz, ForMemRS	National University of Cordoba, Argentina
Susan Davies FRSB	Chief Executive, Scottish Seabird Centre
Erin Fowler	Historic Environment Scotland
Dame Ellen MacArthur DBE	Founder & Chair of Trustees Ellen MacArthur Foundation
Professor Yadvinder Malhi CBE FRS	Professor of Ecosystem Science, University of Oxford
Dr Ece Özdemiroğlu	Founding director of eftec (economics for the environment consultancy)
Dr Dilys Roe	Principal Researcher and Team Leader (Biodiversity) and Chair, IUCN Sustainable Use and Livelihoods Specialist Group (SULi), International Institute for Environment and Development (IIED)
Dame Julia Slingo FRS	Chief Scientist of the UK Met Office (2009 - 2016)
Professor Pete Smith FRS, FRSE, FNA, FEurASc, FI Soil Sci., FRSB	Professor of Soils & Global Change, University of Aberdeen

Annex 2

Ethical foundations

Before deciding how to achieve objectives for the environment it is useful to consider the different ethical frameworks within which decisions tend to be made. Understanding these can help to illuminate different personal perspectives and reconcile differences of approach and ambition.

Divergent branches of ethics

Ethical frameworks normally break down in to two divergent branches of thinking. One very influential branch tends to assume that the morality of actions depends on their consequences. This branch of ethics is often known as *consequentialism* and it embraces various types of utilitarian methods of assessing the future costs and benefits of various actions. It is a branch of ethics which is very common in governments today because it is central to the practical economics applied by governments to assess the relative consequences of different policy options.

An alternative branch of ethics focuses more on the morality of the actions themselves rather than their consequences, and it comes from a framing attributable to Immanuel Kant. In the context of the environment, as rational agents, people would value the environment for itself and not necessarily in terms of what it can do for them. Often, people who take this perspective see the environment in holistic terms and emphasise its aesthetic or intrinsic value over instrumental value. When translated into a policy context these kinds of ethics emerge as rights- and justice-based arguments.

In practice, individuals often hover somewhere in a middle ground between these divergent views, depending on circumstances and depending on their own interests. However, it probably helps to know which side of the divide one sits on and, importantly, when others are arguing from the other perspective.

Strengths and weaknesses

Both of these approaches have strengths and weaknesses when applied to the environment but neither is necessarily better than the other.

Consequentialism has supported the development of a panoply of practical methods like the conceptualisation of Nature in terms of *natural capital* or *ecosystem services*, both terms which render the environment in the instrumentalist language of economics. They unambiguously set the environment up to provision for mankind. These seek to view the environment as an asset, aspects of which can be convertible into currencies which allow the assets to be traded for the benefits of people within markets created by people. These theories and practices may be an extreme version of environmental utilitarianism but they are used very commonly in

the present day and they make environmental conservation tractable within the paradigm of the normative economics applied within public policy.

However, there should be a significant question about whether this kind of framework actually works, given the evidence of continuing declines in biodiversity and rising consumption and waste emissions. Consequentialist systems of environmental policy development need a level of prescience about valuing the future which we struggle to achieve. Uncertainties in future valuations are downplayed. It is also harder to convince people to pay a cost for something where the benefits might accrue a long time in the future, which is common where environmental problems are involved. This results in prioritisation of the immediate needs of people over the future needs of the environment even when there are clearly understood benefits from the latter.

Rights-based arguments on the other hand create a simpler kind of decision framework. Instead of aligning with complex and sometimes dubious economic assessments, rights-based ethics align with the processes of legal argument and precedence. They set moral limits and these limits can be established within regulation and argued within courts of justice and parliaments. For example, air quality in Europe has been improved by continuously ramping up the regulation of emissions standards. Even if a consequentialist might argue that this has been done to deal with negative outcomes like acid rain, the central rationale has probably been more closely associated with the principle that minimising emissions is the right thing to do. Apart from anything else, everybody has a right to breathe clean air. Much protected area legislation exists because it has been deemed that protection is the right thing to do, not because of some sort of complex consequentialist argument involving a calculated benefit.

Nevertheless, rights-based approaches also have limits, especially when it comes to the rights of inanimate, non-sentient objects such as mountains or lakes. Rights are ultimately a human-centric valuation and, if rights are based on the possession of interests by the rights-holder, as is commonly argued, then it becomes hard to assign interests to the environment without resorting also to other ethical frameworks around divine beings such as God or Mother Earth, many of which are hard to operationalise within a policy and legal context (and many would argue should not be). Arguably, it is also possible that rights carry obligations and it becomes difficult to see how obligations can be held by inanimate objects or even other live organisms which cannot be held accountable unless specific people act as proxies and take on these obligations.

Conclusion

Experience to date has shown that the application of rights-based ethical frameworks to the environment often fail for the same reason as consequentialist ethical frameworks fail. Environmental rights are ultimately framed by human laws and values and when these perceived values change, as they inevitably will as the future

unfolds, any apparently innate rights assigned – either culturally or legally - to the environment become competitive with the broader rights of people, and experience shows that it is the rights of people which prevail. This is the same practical outcome as is generally experienced within consequentialist ethics, that the immediate interests of people will dominate future interests of either people or the environment.

Such failure does not mean that these ethical framings are wrong. Instead it means that there are weaknesses in their application. No amount of ethical framing can get away from the limits which the environment imposes on human development. But understanding that there are no specific magic bullets on either side of the practical ethical divide has the potential to create a more unified approach to meeting the challenge of developing more effective ways of managing the interface between people and the environment.

Ian L Boyd

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