

Written Evidence submitted by Natural England

Achieving Net Zero

1. Executive Summary

1.1 Natural England is the Government's advisor for the natural environment in England. Our purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

1.2 We welcome the opportunity to submit comments to this important inquiry and offer the following points on the role we feel that the natural environment and nature-based solutions can play towards the net zero ambition.

- Climate change and biodiversity loss are closely linked problems and need to be addressed in an integrated way.
- There is a need for a strategic approach to land use and management which maintains a balance of different land uses and incentives the right action in the right place.
- The natural environment can play a vital role in tackling the climate crisis as healthy marine and terrestrial ecosystems, take up and store a significant amount of carbon.
- The destruction and degradation of natural ecosystems, has resulted in:
 - a) the direct loss of carbon stored within them; in the case of carbon rich habitats such as peatlands, these emissions can be very large, and
 - b) a reduction in the carbon sequestration potential of these ecosystems.
- Restoring natural systems can help reduce net greenhouse gas emissions at the same time as supporting and restoring biodiversity and providing a range of other benefits such as flood prevention and people's health and wellbeing.
- Nature-based solutions can take time to deliver the most impact for the delivery of net zero, it is important to scale up implementation as soon as possible.

2. Potential of nature-based solutions to contribute to Net Zero

2.1 Globally, as well as in the UK, increasing attention is being paid to the potential for nature-based solutions to deliver climate change mitigation. Such solutions include actions to reduce greenhouse gas emissions (emission avoidance) and to promote sequestration of carbon (removal from the atmosphere).

2.2 Terrestrial

2.2.1 In the context of net zero, uptake of carbon from the atmosphere by woodlands and other terrestrial habitats is one of the few proven mechanisms for offsetting emissions from hard-to-decarbonise sectors. It is worth noting however that the land where action is desirable is often in private ownership and while those landowners

can be incentivised or encouraged to take action, they cannot be compelled to alter land practices to further carbon sequestration.

- 2.2.2 Emissions and removals of greenhouse gases from the land are reported under the Agriculture and Land Use, Land Use Change and Forestry (LULUCF) sectors. The National Audit Office (NAO) report notes that these sectors together were responsible for net emissions of 38 Mt CO₂e out of total UK emissions of 496 Mt CO₂e in 2018. This is a net value comprised of a number of different emissions and removals. Within this, UK forests removed 18.2 MtCO₂e (Brown, 2020). Even with a significant uplift in woodland creation, which will increase the size of the woodland carbon sink as analysis by the Committee on Climate Change shows, very large cuts in emissions will be required from all sectors to reach net zero. There is insufficient land to offset more than a small fraction of present emissions.
- 2.2.3 It is also important to note that not all emissions in the Agriculture and LULUCF sectors are fully accounted for. In particular, emissions from peatlands which have been drained, burnt or converted to agriculture and forestry, are substantial but only partially accounted for at present. A project to improve this has estimated the figure at 23.1 million tonnes CO₂e yr⁻¹ (Evans, et. al. 2017) and work to integrate its methodology into national emissions reporting is progressing. Arable management on peat has a high agricultural value but is estimated to lead to annual peat wastage of 10 – 30mm and, depending on their depth and management, some arable peats may lose all their organic matter within a century (Evans et al., 2016). Peatland restoration is therefore a key element of this nature-based solution alongside woodland creation.
- 2.2.4 Nature-based solutions also include the contribution that can be made through a range of agri-environment approaches, support by schemes such as Countryside Stewardship, including creating grass buffer strips beside streams, biodiverse field margins and hedgerows, which can increase carbon storage and sequestration (Warner et al. 2020). On productive agricultural land, arable systems with depleted soil organic matter are key targets for regenerative practices such as reduced or no-tillage systems. In grasslands, soil carbon content can be increased in by adjusting sward composition, modifying the grazing regime and reducing the reliance on manufactured nitrogen by the inclusion of legumes.

2.3 Marine

- 2.3.1 Emissions and sequestration by marine habitats are relatively under-studied in comparison to woodlands and peatlands and are not currently accounted for in national emissions reporting. There is however potential to increase sequestration through a range of other actions to create or restore coastal and marine habitats, such as salt marsh (85% of which have been lost due to development and coastal squeeze), sea grass meadows, and kelp forests. Per hectare, seagrasses can store up to twice as much carbon than terrestrial forests, primarily in associated sediments
- 2.3.2 A significant amount of carbon is also stored in marine shelf sediments ([estimated](#) UK total marine stock of ~220Mt C) which is at risk from activities which disturb the seabed including demersal trawling. Natural England is working to improve the evidence base to allow a more informed approach and will publish a report on carbon storage and sequestration across terrestrial, freshwater and marine habitats later this year.

2.3.3 The marine environment has not been the focus of carbon sequestration protection to date. This represents a significant shortfall in our current efforts and many UK scientific bodies are now collaborating to rectify and appropriately tap into the vast marine potential. Further, as the marine environment is legally a public resource, the Government can regulate the type and locations of activities that can occur here

3. Risks and opportunities of land-based mitigation approaches

3.1 In assessing the best approaches to achieving net zero it is important to take account of wider factors. True nature-based solutions tackle societal challenges in ways that benefit both biodiversity and people (IUCN, 2016). There is significant scope for well-designed schemes to confer additional benefits for society such as enhancing water quality and reducing flood risk in addition to climate change mitigation and nature recovery. It is vital that these co-benefits are maximised to make the best use of land, including to allow sufficient area for food production.

3.2 New woodlands composed of native species can support a wide range of species of wild plants and animals as well as sequestering carbon. Our analysis shows that over much of England native tree species, such as oak and birch, can sequester similar amounts of carbon to many non-native conifer species, but support significantly higher levels of biodiversity. If sited in the right places they can also play an important role in reducing flood risk and providing valuable recreation opportunities for people. As woodlands get older the rate of carbon uptake declines, but this takes many decades and an old woodland with mature trees becomes an important carbon store for the long term.

3.3 There is potential to create new native woodlands and scrublands using natural colonisation of tree and shrub species from existing woodlands rather than by planting. We are investigating the practicalities of this approach in different circumstances, but there are promising indications that this can offer savings in cost, confer greater benefits for wildlife through the more structurally diverse habitat created.

3.4 Woodland will also be planted primarily for timber production and this is important for net zero aspirations. There are however caveats to their value for climate change mitigation in that the long-term value depends on how the timber is used and there are emissions from forest management. The best strategy for woodland creation needs to be site specific and take account of wider considerations: a native woodland managed by minimum intervention can be a good solution for carbon sequestration and storage in many situations, especially when wider policy considerations are taken into account.

3.5 Trees in urban areas provide nature based solutions to climate change and can help address a variety of other urban challenges including improving air quality, increasing permeability to reduce flood risk; and cooling the air by up to 4°C in urban areas (Forest Research 2019). ONS ecosystem accounts for urban areas identify that woodland accounts for 5% of the urban area and it is estimated that 537,000 tonnes of CO₂ equivalent are removed by this woodland each year, with a UK social value of £89m in 2017 based on Green Book valuation. Urban trees and woodland provide other co-benefits such as contributing to physical and mental wellbeing, community cohesion and sense of place; bringing people close to nature and supporting a range of urban wildlife including nesting birds and invertebrates. Natural England is currently developing a Framework of Green Infrastructure Standards on how to deliver good green infrastructure including quantitative, qualitative and functional

standards. These will help to incentivise the incorporation of more green infrastructure into urban areas including trees and woodland.

- 3.6 The principle of the right tree in the right place is important. There will be places, for instance biodiverse habitats and peatlands, where planting leads to emissions of greenhouse gases that may outweigh any uptake by trees. Planting should be avoided in these habitats.
- 3.7 As noted above peatlands are an important carbon store with high rates of emissions and restoration is a priority for both conservation and net zero. Peatlands in good condition are an internationally rare habitat supporting a unique flora and fauna. The UK is one of the world's top ten countries in terms of peatland area, covering two million hectares. The UK is a global leader for peat restoration and England's peatlands provide prime opportunities to achieve a significant proportion of the 25 Year Environment Plan ¹targets for bringing 75 per cent of protected sites into favourable condition and creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits.
- 3.8 Besides their significance for biodiversity and carbon, peatlands also act as water reservoirs and buffer discharge from catchments into lakes and rivers. In a natural catchment they store water and slow its flow, reducing flood risk and supporting river flow during periods of drought. They also support water quality and water companies have bought and restored peatlands to support this.
- 3.9 The costs and benefits of peatland restoration differ in different places. In upland areas, which remain semi-natural habitat, blocking of drainage ditches to restore a natural hydrology and stabilising and revegetating bare peat is a well-established, cost effective technique with proven benefits in reducing greenhouse gas emissions. The highest emissions are from lowland peatlands which have been converted to arable agriculture, such as the East Anglian Fens, although restoration is technically challenging and a new approach to agriculture in these areas will be required. This is likely to include both habitat restoration and production systems designed to minimise carbon loss, including by raising water tables while maintaining appropriate agricultural use. This system, known as paludiculture, has high potential to reverse peat loss with additional carbon gains when converting to perennial biomass crops. Although this solution is not immediately implementable, it has been recognised as a solution with considerable potential in a recent DEFRA study (An assessment of the potential for paludiculture in England and Wales, April 2020).
- 3.10 A widely cited climate change mitigation measure, including in the NAO report and those of the Climate Change Committee, is Bioenergy with Carbon Capture and Storage (BECCS). Whilst this is a land-based approach, it is not in most cases likely to be a true nature-based solution as benefits for biodiversity are likely to be small and impacts could be negative in some cases. If deployed at large scale it would also add to pressure on land use for other purposes. New approaches to BECCS using mixed species, including those with benefits for pollinators and birds, are being developed which could be considered as a nature-based solution.
- 3.11 There is therefore a need for a strategic approach to land use and management which maintains a balance of different land uses and incentivises the right action in the right place. This requires planning policies, NSiPs and strategies for land use (e.g. for tree planting and peat restoration) to be delivered in a coherent way. Local Nature

¹ <https://www.gov.uk/government/publications/25-year-environment-plan>

Recovery Strategies, proposed in the Environment Bill, afford an important opportunity to take a strategic approach to planning the creation of new habitats and to strategically plan the deployment of nature-based solutions.

- 3.12 One important consideration with nature-based solutions of all sorts is timescale. In comparison to many of the technological approaches to delivering net zero, techniques such as woodland creation and peatland restoration are reliable and low risk in the right locations. However, they take time to implement and become fully effective; to deliver the most impact for the delivery of net zero, it is important to scale up implementation as soon as possible.

4. Risks and Opportunities: Marine

- 4.1 The UK has a legal requirement to deliver Good Environmental Status (GES) throughout its waters under the UK Marine Strategy Regulations 2010². This legal requirement was reiterated when it was incorporated as one of the eight Fisheries Objectives that sit at the heart of the Fisheries Act³ 2020. The Fisheries Act also has a new *climate change objective* (clause 1(1)(h)) which states:

*(9) The “climate change objective” is that—
(a) the adverse effect of fish and aquaculture activities on climate change is minimised, and
(b) fish and aquaculture activities adapt to climate change.*

- 4.2 The latest assessment of the marine environment published in 2019⁴ set out that the wider marine environment was in a poor state with 11 of the 15 indicators flagged as red (GES not achieved) or amber condition (GES partially achieved). Commercial fishing has been identified by the government as the principal activity that is preventing the delivery of GES.
- 4.3 It may be the case that certain habitat types are identified as offering significant carbon sequestration potential. Some carbon rich habitats are currently afforded protection through the marine protected area network, but many are not. The new Fisheries Act has provisions to manage damaging fishing activities (for nature conservation reasons) anywhere and steps are currently being taken to fully evaluate how fishing impacts our wider seabed.
- 4.4 Of fishing activities, demersal trawling is likely to have the greatest impact on the ability of marine habitats to sequester and store carbon. Therefore, taking action to curtail seabed disturbance, especially over muddy habitats will facilitate carbon sequestration and directly contribute to Net Zero.

5. Natural England’s role

- 5.1 Natural England is well placed to address the challenges of net zero and is working with Defra, other public bodies and partners in the private, NGO and research sectors. We are a science-based advisor to government and are expanding our capacity to advise on climate change mitigation and fill evidence gaps through research.
- 5.2 Our science and evidence and delivery expertise has enabled us to:

² <https://www.legislation.gov.uk/ukxi/2010/1627/contents/made>

³ <https://www.legislation.gov.uk/ukpga/2020/22/contents/enacted>

⁴ <https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status>

- provide advice and support the delivery of agri-environment schemes thereby effecting major change in the management of agricultural land.
- lead the planning and development of the Nature Recovery Network working with national and local partners.
- work on the Nature for Climate Fund, supporting tree planting and leading on managing the peatland restoration element on behalf of Defra
- provide advice to support Defra in the development of the new Environmental Land Management (ELM) scheme, which will support climate change mitigation alongside other environmental benefits.
- work alongside Defra and other public bodies to improve the evidence base around blue carbon sequestration and storage with a view to
 - marine habitats being included and recognised internationally in future net zero accounting, and
 - informing the management of activities to promote biodiversity recovery and protect and restore blue carbon stocks.

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