Game and Wildlife Conservation Trust[1] – Written evidence (NSD0046)

We hope our response, based on the scientific and experiential evidence outlined below, will provide the Committee with the information to encourage a more adaptive, inclusive (of all stakeholders) and broader approach to NbS policy.

1. What is the potential scale of the contribution that nature-based solutions can make to decarbonisation in the UK?

The 'go-to' NbS policies for climate change are planting trees (offsetting emissions) and restoring peatlands (reducing emissions). This simplistic focus is leading to associated dis-benefits; consequently unless well handled such approaches could be detrimental to other public good delivery (and livelihoods), particularly as they could be used to distract from continuing fossil fuel energy usage in other domestic sectors. For example increasing tree planting at scale has been highlighted as affecting albedo (with climate feedback impacts), biodiversity, carbon sequestration, groundwater recharge and risk of wildfire. This has resulted in calls for the "right tree in the right place" approach with risks of biodiversity and carbon losses (from other sources such as the soil when land is repurposed) in particular considered. To be an effective NbS, any dis-benefits need to be understood and compared and evaluated to the benefits on a site-by-site basis.

A better way to minimise risk and maximise potential would be to broaden land use options through considering opportunities in other habitats/land management systems; thereby also maximising NbS on a site-by-site basis. NbS as a policy has a major limitation – the availability of land. The Cambridge University Institute for Sustainability has estimated that, to meet all Society's needs in the next two decades, we need a third more land. This is the context in which the Climate Change Committee's recommendations requiring the release of one-fifth of agricultural land by 2050 need to be considered. Such an approach has significant consequences for domestic land use in the coming decades with implications for food production and biodiversity.

The key we believe is to focus on mitigating and adapting to climate change through measures across the landscape that are integrated with existing land uses and deliver multiple outcomes – land sharing – rather than policy that encourages single outcomes and the re-purposing of land – land sparing. Examples include agro-forestry, hedgerow planting and the use of 'hard to farm' areas[2] such as field corners to plant small copses/woodlands.

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[1] The Game & Wildlife Conservation Trust (GWCT) is a leading conservation charity conducting scientific research into game and wildlife management, and the effects of different farming methods on the environment to enhance the British countryside for public benefit. We share the results of our research through educational activities for practitioners and the public. The Trust has advised Defra on past environmental stewardship scheme options and option management such as conservation headlands, beetle banks and wild bird seed mixes.

[2] The term 'hard to farm' is important and is used advisedly as opposed to unproductive. The use of the latter is resulting in areas that might be agriculturally unproductive being identified for the large-scale commercial planting of trees, yet these areas are environmentally productive e.g. biodiversity or flood mitigation.

NbS should also support the appropriate management of existing land uses (see also Q3). For example the focus to date has been on new tree plantings. There is NbS value to be obtained from managing our existing woodlands better, increasing the number of trees planted in hedgerows, and to addressing the impacts of browsing pests on tree survival and growth.

The GWCT's Allerton project is undertaking research into different agro-forestry approaches to identify the best win-win options as well as looking at the value of other farmland green infrastructure to carbon sequestration such as beetle banks, grass margins and wildlife strips, and how farming systems can be adjusted to be low-carbon whilst maintaining yields and food production objectives e.g. soil management and restoration, crop rotations, tillage systems and other agro-ecological approaches. Beetle banks were developed to provide a range of in-field habitats and a crop protection service through biological pest management. In the hedgerow carbon code, currently under development, farmers might in future consider planting hedges on beetle banks to secure carbon sequestration payments.

The focus on upland peatland restoration is obscuring an even bigger lowland issue. Peatland accumulates carbon at a very slow rate compared to woodland or grassland but has the advantage of providing potentially very long term storage. The ongoing degradation of our lowland peatlands is a significant cost, which will be hard to address. Rewetting through, for example, paludiculture is suitable for only a handful of cases and so a broader more sustainable approach to our food production on lowland peat soils is needed. Recent research by Evans et al 2021[3] concluded that emissions from peatlands drained for agriculture could be reduced without necessarily completely halting their productive use.

2. What major scientific uncertainties persist in understanding the effects of nature-based solutions and affect their inclusion in carbon accounting, and how can these uncertainties be addressed?
Evidence gaps are of concern if unintended consequences are to be avoided. Whilst the benefits of the 'go-to' NbS policies are not disputed, the lack of comparative assessments and baseline metrics means that the 'true' cost or value is unknown.

To highlight the uncertainties and evidence gaps we have focussed on upland peatlands, heather moorland and farmland (highlighted in Q1), as these are areas where we have scientific knowledge and expertise and, through our members and Working Conservationists, have relevant practical experience.

We wrote an extensive review of the evidence (also identifying significant gaps) surrounding upland peatland and carbon last year (GWCT Peatland Report 2020). This is a complex and nuanced subject, which we, as a science-based organisation, are at great pains to try and present in a balanced way. We believe that the 'agreed' evidence base, which has defined no-burn approaches

[3] Evans, C. D. *et al.* (2021) https://doi.org/10.1038/s41586-021-03523-1

to peatland restoration, has not progressed in line with the science. Recent scientific findings, for example,

- 'cool' managed burns made moist peat more stable, often creating a protective crust that allowed more of its stored carbon to be retained[4]
- managed burning aids *Sphagnum* moss establishment by removing the canopy resulting in increased light and reduced competition[5], and
- leaving the brash after cutting may increase GHG emissions[6] and wildfire risk

suggest that the no-burn approach to upland peatland management could be misguided in the face of climate change. A Defra review[7] found that this was the over-riding threat to blanket bog, with wildfire second.

Whilst human influences on peatland integrity are important, the ability to restore function and what constitutes a healthy peatland today will be affected by changes in rainfall patterns. Natural England's Climate Change Adaptation Manual[8] identified that a large proportion of England's peatland is on the edge of their climatic limits but considered that a degree of resilience is provided by their function. This is an important observation. The focus on *Sphagnum* moss in peatland restoration does not fully take this into account, particularly as there is no clear relationship between *Sphagnum* abundance and peat formation. Instead the focus should be on the hydrological and environmental conditions that determine peat formation, and these are forecast to change.

These points also emphasise the complexity of the ecosystems involved and therefore the ability to produce reliable metrics. For example, whilst research has been done into carbon budgets on peatlands subjected to managed burning, the available data are sparse, biased towards a few repeat assessments of the same sites and only short term i.e. recording the years when the carbon is lost. This is important as over a full burning cycle – say 15 years – the lost carbon would be restored through the vegetative regrowth. As a complementary point, the value of biochar (charcoal)[9], a persistent and inert form of carbon produced during a cool managed burn, is not currently accounted for in upland carbon budgets.

However, our main concern is the threat of wildfire to peatland restoration. Lack of management has been identified as a compounding factor in the wildfires that have occurred on peatland under restoration resulting in significant losses of carbon and damage to the ecosystem. It has been estimated that the Saddleworth Moor wildfire in 2018 released 17,798 – 26,281 tCO_2e from soil carbon losses alone[10] i.e. this does not include surface vegetation losses or

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[4] Flanagan *et al* (2020) https://doi.org/10.1111/gcb.15102

[5] Whitehead, S., *et al*. (2021) https://doi.org/10.1016/j.ecolind.2021.107336

[6] early findings from on-going research by the University of York https://features.york.ac.uk/a-burning-issue/index.html

[7] O'Brien *et al* (2007) Review of Blanket Bog Management and Restoration. Technical report to Defra project No. CTE0513

[8] NE751, April 2020

[9] for detail see Heinemeyer *et al* 2018 https://doi.org/10.1002/geo2.63

[10] Alnajdawi, R. A. *et al* Carbon Dioxide Emissions of Saddleworth Moor Fire University of Salford and Skeggs 2018 (confidential paper)

'legacy' losses from the degraded site. This is, in our view, why vegetation management is important. Grazing, managed 'cool' burning, cutting, scrub clearing, and compartmentalising, help to mitigate the natural succession processes that occur, as the resulting fuel load can feed wildfires. Consequently a better understanding of emissions trade-offs in reducing the risk of damaging wildfires through vegetation management is needed. Re-wetting alone is not the answer as the forecast increase in drought periods will lower the water table risking wildfires such as seen in the Caithness Flow Country in 2019. Blocking drains dug for agricultural purposes will reduce carbon losses but this should be balanced with the short-term impacts of increased methane emissions[11]. Re-wetting is also part of Natural Flood Management policies; however, once the water table is at the surface there is little further capacity to absorb rain[12] and so the long term implications of peatland restoration on flood risk need to be considered[13].

Finally the focus on the carbon storage potential of upland peatlands, we believe, is creating an implied negative view of heather moorland. Upland peatlands are often not a single habitat type, comprising deep peat areas juxtaposed with shallow peat heathland. Focussing on peat risks overlooking the value of heather moorland to carbon sequestration (heather-dominated heathlands are twice as effective at sequestering carbon as grass-dominated ones[14]) and other environmental goods and services e.g. biodiversity. NbS should recognise the potential of heather moorland to sequestration ambitions[15] .

3. What frameworks already exist for the regulation and financing of nature-based solutions?

We are concerned that, for example, the Woodland Code focuses purely on new plantings. Some carbon credits should be available for the management of existing woodland that would support C storage capacity. In addition the Code should consider encouraging the sustainable use of the harvested timber for example in construction to lock up the carbon. The landowner should then be allowed to re-plant the wood and claim carbon credits because the next lot of growth would represent additionality over the previous stock, which is now "locked up". The points we made in answer to Q1 on looking at the potential of other green infrastructure, that may have had a different initial objective, should be considered.

These points support the argument that any successful framework should ensure the 'right approach in the right place'. Poorly designed public and private funded incentives can distort the market place, resulting in decisions being made that are driven by monetary value rather than by intended outcome resulting in this case in the repurposing of land for carbon farming e.g. the

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[11] Abdalla, M., *et al*. (2016), DOI: 10.1002/ece3.2469

[12] Allott, T. E. H., *et al* (2019). *Peatland Catchments and Natural Flood Management*. And University of Leeds Peat Club (2017) DOI: 10.19189/MaP.2016.OMB.253

[13] Ashby, M.A & Heinemeyer, A (2021) https://doi.org/10.1007/s13157-021-01400-1

[14] R Gregg, J. L. *et al* (2021) Carbon storage and sequestration by habitat. Natural England Research Report NERR094.

[15] Quin *et a*l 2015 https://doi.org/10.1016/j.scitotenv.2014.10.037

planting of trees in upland areas considered agriculturally unproductive (with implications for soil carbon degradation and loss of biodiversity) and "burn to earn" support payments where heat from renewable sources is used profligately.

4. Who are the key stakeholders for the implementation of nature-based solutions in the UK? How can stakeholders' expertise and concerns inform the incentives and requirements for implementing nature-based solutions?

We concur with the emphasis on the important role of landowners and farmers in NbS delivery. Public policy will influence land management decision-making and so it is vitally important that a balance between objective and outcome is achieved so that unintended consequences are minimised. Policy therefore needs to work from the bottom up and in so doing be adaptive not prescriptive. Policy should also be respectful of the complexities of natural ecosystems and not favour one objective over another or promote one management approach over another. Landowners and farmers know their land and its capabilities better than anyone and are far better placed to determine a "right tree right place" approach which considers the other natural capital assets.

In addition land managers need to be supported and encouraged to easily quantify their own management experiences of NbS de-carbonisation, and to report these data – which describes what works and what does not – to their peers and the next generation of land managers via peer-to-peer networks, land use advisors (Land Agents) and formal training (Colleges, CPD etc).

Landscape-scale NbS across a variety of habitats and land management systems could be supported by encouraging adoption by Farmer Clusters and Moorland Groups. These collaborative groups have been set up to successfully address a wide variety of objectives. In addition in our experience guidance and advice are vital to achieving successful outcomes. Aligning these support measures with incentives (both public and private) would minimise the potential for dis-benefits.

5. How should implementation of nature-based solutions be integrated with other government policies for landscapes and seascapes, for example, agricultural, forestry, and land-use planning policies?

There are two points we wish to make here:

1. Given the multiple demands on our land resource we feel that a land use strategy is needed to direct the implementation of the range of government policies that impact on land use. Without this framework, market forces (through incentives such as carbon credits) and lack of evidence based guidance will lead to lower quality outcomes. For example, forestry for carbon credits being planted on organic soils with impacts on carbon fluxes[16] and biodiversity, or agriculturally productive land being repurposed for carbon farming.
2. As we stated at the outset, NbS needs to be integrated with existing land management models in order to achieve multiple outcomes, consequently using agri-environment schemes to support NbS would be sensible. This

[16] Friggens, N.L., *et al* (2020). https://doi.org/10.1111/gcb.15229

approach would not require much additional work as many of the potential farm-scale NbS are already included as options. The key will be to promoting them, perhaps via a standard or option package, and ensuring they are targeted spatially. ELMS Landscape Recovery Scheme already addresses peatland restoration and tree planting.

6. How should nature-based solutions be planned and monitored at the national level?

Coordination through ELMS is one possible approach. The whole farm plan that forms part of the new scheme could require farmer's to record areas of land that are delivering NbS, and where opportunities for further delivery might lie. There are a number of apps with supporting platforms that allow the uploading of environmental data which would provide a simple way of monitoring NbS delivery, for example the extent (including dimensions as this important for carbon sequestration potential) of hedges on a farm.

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