

Climate Solutions Exchange – Written evidence (NSD0035)

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

- *Which ecosystems are most relevant to the UK for nature-based solutions, and which have the largest potential to sequester carbon or reduce emissions?*

Climate regulation services (e.g. carbon sequestration or prevention of GHG emissions) are essential in national and international efforts to address global environmental change. Peatlands and woodlands are two natural assets that deliver high flows of climate regulation services, and there are already private markets for carbon credits provided by planting woodlands or restoring areas of degraded peat. These projects also have multiple 'co-benefits' in that they deliver uplifts in other ecosystem services, notably water quality regulation, flood mitigation and biodiversity value. For example, healthy peatlands capture CO₂ from the atmosphere through photosynthesis. Because the plants that grow on peatlands do not fully decompose under wet conditions, they do not release carbon which would otherwise be returned to the atmosphere as CO₂. Peatlands store vast quantities of carbon – 'locking in' an estimated 3.2 billion tonnes in the UK alone. However, overall, peatlands in the UK are a net source of greenhouse gas emissions to the atmosphere, as opposed to a net sink. 80% of peatlands in the UK have been damaged by human intervention – primarily through drainage to allow for the growing of crops and trees. Drainage leads to decomposition of plant material and soil shrinkage which releases carbon into the air and is thereby a source of CO₂ emissions into the atmosphere.

Scaling woodland creation and peatland restoration is central to DEFRA's 25 year environment plan and the government's Net Zero targets, but will be extremely difficult if landowners do not have confidence in the long-term income generation potential of such projects, nor believe they are being fairly and transparently rewarded given the high levels of corporate payments that are being hypothesised in this space.

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?

- *How reliable are the estimates of the quantity of greenhouse gas emissions reduction or sequestration by nature-based solutions, as well as the duration and reliability of storage?*

Quantification of the climate mitigation benefits of land sector protection, restoration and creation requires accurate **measurement, reporting and verification** (MRV) of vegetation biomass. Carbon trading should require a baseline measure of, and change in carbon through time, with an associated uncertainty. GHG emissions/removals on land are crudely estimated as AD x EF. Where AD is *Activity Data*, data on the magnitude of human activity resulting in emissions or removals. EF is *Emission Factor* and refers to the changes in carbon stock per unit area, e.g. tons carbon per hectare. Satellite based methods for mapping and monitoring land use and change have matured considerably over the last two decades with increased access to high and very high resolution,

global coverage, operational platforms. However, accurate assessment of finer scale change and forest degradation and disturbance remains a challenge with the free satellite capabilities available at present. Further, soils can contain more organic carbon than the trees, but cannot be estimated using satellites. Moreover, there is substantial evidence that intensive agriculture has significantly altered the carbon storage within soil, often detrimentally, and this negative impact varies greatly depending on soil type, area and farming practices involved. There is very significant differences of opinion on these soil carbon impacts, and on how to develop an appropriate methodology for assessing the current soil carbon levels on a sufficiently localised, granular and still cost effective basis.

Emissions factors are even more notoriously difficult to determine. Estimating forest aboveground carbon stocks has traditionally required measurement of standard tree mensuration parameters and number of trees per area, using sampling protocols. These data are then used to estimate stem volume using mensuration tables or sample harvest data and then appropriate empirical relationships (allometric equations) are used to estimate branch, crown and root biomass to give whole-tree biomass estimates, and therefore C stocks. Development of allometric models in these calibration datasets is often biased towards smaller trees, which are easier to harvest, cut and weigh, and extrapolation through regression is employed for bigger trees. Current protocols implemented in the UK (i.e the Woodland Carbon Code) for broadleaved tree species depend almost exclusively on a single calibration dataset generated in the 1960's containing just over 200 destructively sampled trees across 5 different species at 4 localities in the English Lake District. Even though sampling was done across the full tree size range at those localities at the time, it does not cover anywhere near the size range in other locations. Furthermore the growth of trees, of ostensibly the same species, has changed significantly in that time. It is believed that climate change, particularly with regards to temperature ranges and atmospheric carbon levels, has changed the growth of trees. Forestry practices have also developed to provide the best genetic tree specimens and improved silvicultural management of woodlands to enhance growth rates and overall woodland form.

- *Which bodies should be involved in establishing an agreed evidence base to inform best-practice techniques for restoring peatlands?*

Independent scientific analysis in cooperation with land owners and land managers (private sector and government).

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

- *What can be learned from the implementation of the Woodland and Peatland Codes for the regulation and financing of nature-based solutions?*

Current approaches, coming out of the Kyoto Protocol, are not designed for the level of demand or accuracy the world now needs in its fight against the climate emergency. To calculate the carbon within woodlands, the current Standards (in the UK the most common being the Woodland Carbon Code), uses outdated

calibration and limited verification data (as outlined above). In short, the carbon calculation can be wildly inaccurate.

- *How should a hybrid public-private financing model be regulated? How should any carbon offsetting markets be regulated to ensure that they prioritise and support well-designed and effective nature-based solutions?*

There is clear demand from corporates for carbon offsetting, and a move towards investing in natural capital more widely. To turn this demand into realisable finance, there is a need for an accurate and transparent system of verification for landscape recovery projects which meets corporate ESG auditing requirements. Current methods of verification and monitoring add significant time and financial costs to a project and are not well understood or trusted by either the supply or the demand sides. This fast-growing private market for carbon (and natural capital more broadly) could provide much-needed funding to support and scale these projects. But in many cases the market is not yet sufficiently developed, the prices for carbon units are not strong enough or intermediary and monitoring costs are too high, to make ambitious projects financially viable or attractive with private finance alone. In a fledgling market, it is also difficult to give farmers or landowners a long-term income projection that they can have confidence in. CSX sees an opportunity to use blended finance to overcome these barriers by using ELM payments to address market failures and bridge the gap between the level of funding required to make a project financially viable, and the funding currently available from the private sector. CSX are developing a mechanism to support woodland creation and peatland restoration work at scale supported by blended finance and CSX technology.

- *How can we ensure that the carbon accountancy is science-based, robust, and consistent across nature-based solutions?*

Long-term investment in the ongoing scientific measurement infrastructure and programs that will improve the understanding of ecosystems and their response to climate, environment and anthropogenic influences as well as investigate new and emerging technologies for carbon MRV. Reducing the cost and increasing the credibility of verification and monitoring, would boost private sector confidence in nature based solutions and enhance the viability of these projects by reducing the burden of monitoring requirements for the farmer or land manager.

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?

- *How can farmers (including tenant farmers) and land managers be supported in their deployment of nature-based solutions by policy and legislative frameworks?*

For land owners and managers the financing of restoration is the single biggest obstacle that stands between them and the valuable benefits of peatland restoration. For tree planting the principal hurdles are risk involved in the application and approvals process when considering afforestation as a land use change within a business model. We must provide a strong investment case for

landowners to put private funds towards restoration and management of these unique peatland natural assets, and provide them with the financial rewards necessary to overcome the risks involved in the afforestation approvals process.

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?

- *How could nature-based solutions implementation contribute to the UK's goals surrounding biodiversity, the preservation of nature, and adaptation to climate change?*

Woodland and peatland creation, restoration and management will have multiple 'co-benefits' by delivering uplifts in other ecosystem services (water/air quality, biodiversity, health and wellbeing). However, some projects that deliver significant environmental benefits require land use change (e.g. woodland creation may require taking land out of agricultural production) and/or disruption or reductions in current land management activities (e.g. peatland restoration works may disrupt sporting activities), which may affect the profitability of existing enterprises. Historically these types of projects have also required significant capital investment from the landowner. The ELM Test and Trial process offers an opportunity to address Strategy and LMP Theme related policy questions by developing, testing and trialling a mechanism for delivering landscape scale improvements in climate regulation services, funded through blended finance and enabled by technology-based solutions to monitoring and verification.

- *Which ongoing governmental plans, policies, and strategies are relevant to nature-based solutions, and can they be better coordinated? For example, are the Nature for Climate Fund and associated targets for peatland and forestry restoration designed so as to support nature-based solutions?*

The cost of providing an assessment of the state of peatland prior to intervention is prohibitive. It is a time consuming and entirely manual process. Currently the surveying of peatlands, the planning of interventions and the development of contractor work specifications are carried out by an ecologist walking the peatland and making ground-based assumptions. Grants are available via DEFRA for completing surveys and specifications for publicly funded projects. These currently present poor value for money for the tax-payer and would not be available to land owners seeking private finance for restoration work, presenting a significant obstacle to the development of private markets for peatland carbon projects. The conditions and timescales associated with (often competitive) grant funding also limit the scale and number of projects that a landowner can take forward. Due to the limited number of restoration projects proceeding each year, there are very few contractors employed. This has not only restricted implementation but limited the development and exploration of improvements in methods/practice and potentially scientific progress. Without competition, the existing contractors have been able to maintain high prices, driving the cost of restoration out of the reach of many land managers. Therefore, all projects are now funded through public sector grants. Increasing the accuracy of the specification of works will reduce the need for contractors to build 'contingency'

into their quotations to allow for discrepancies between the specification and the actual requirements on the ground. This will reduce the cost of delivering peatland restoration, making it more financially viable for the land owner.

- *Should incentives for nature-based solutions be included in future agri-environment schemes, and if so, how?*

Where 'market failures' occur yes, otherwise no.

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

- *What measuring, reporting, and verification requirements should be put in place to determine the degree of success of nature-based solutions? Which techniques and technologies are best suited to accomplishing robust monitoring?*

The success of NBS is a subjective assessment which will have different goals for each stakeholder (i.e, generation of carbon credits for offsetting GHG emissions through to habitat restoration for biodiversity gain or improved air/water quality). Future implementation of NBS projects whether supported by government, private or blended finance, must draw on lessons learned from nature's response to past management practices. A robust mechanism for measurement, reporting, verification and monitoring that can 1) reward the party taking action to deliver the interventions and 2) inform adaptive decision making on further improvements in land management practices through time. CSX are developing such a mechanism to support woodland creation and peatland restoration work at scale, supported by blended finance, that will make use of state of the art technology coupled with robust scientific measurement protocols and procedures for long-term Measurement, Monitoring Reporting and Verification.

19 September 2021