Biodiversity Crediting Roadmap to Completion

A final outcome of this project will be to outline further work needed beyond 31st March 2026 (end of the funded project) for the Peatland Code and Woodland Carbon Code to be able to launch the biodiversity element of the Carbon+ credit. This document summarises the project background, work completed so far during FIRNS3, followed by some suggestions of barriers that would need to be addressed before the launch of biodiversity credits (or 'roadmap to completion').

1. Background of FIRNS biodiversity crediting project:

The current version of the Peatland Code and Woodland Carbon Code assumes that a carbon credit generated from peatland restoration or woodland creation has an associated benefit to biodiversity. Thus, each carbon credit has an implicit biodiversity value. However, the uplift in biodiversity between the baseline and at each verification is currently not measured. If biodiversity for each restoration site was quantified there could be two main benefits: a. this could unlock greater funding for restoration through the sale of biodiversity credits, and b. this could provide incentive to projects to better design restoration to enhance biodiversity, potentially leading to a greater increase in biodiversity than would have otherwise happened with carbon credits alone. Previous work, funded by FIRNS1 explored different ways of bundling and stacking carbon and biodiversity credits. It was identified that a 'Carbon+' bundle would be most appropriate for the Peatland Code and Woodland Carbon Code. In addition, previous work explored different approaches to quantifying biodiversity uplift and highlighted that the method proposed by The Wallacea Trust is the most appropriate for the codes as it is open-source, high integrity, and internationally reputable. The Wallacea Trust methodology is transparent and repeatable, based on measuring a variety of taxonomic groups (minimum of four) as well as one structural metric, such as peatland condition. Using the Wallacea Trust methodology, biodiversity is measured at the 'baseline' prior to restoration and then ideally compared to a relatively 'intact' reference site. Uplift is then calculated as the difference between the biodiversity baseline and the end goal, or 'reference' site, at each verification. Previous work identified that vegetation, invertebrates and birds were suitable taxonomic groups for the peatland restoration context. These same taxonomic groups were identified as suitable for the woodland context, with the addition of bats.

2. Progress throughout FIRNS3

2.1. Aggregated biodiversity dataset

Conducting biodiversity surveys on both the project site and a reference is likely to be prohibitively costly. A main outcome of this project was to aggregate biodiversity data available on near-natural and previously restored/created peatlands and woodlands in the UK and explore if this database could be used as a reference for peatland restoration or woodland creation projects, thus removing the need to pay for a reference site to be surveyed. This dataset is now available on the Peatland Code and Woodland Carbon Code websites.

2.2. Measuring biodiversity uplift: similarity index

The Wallacea Trust methodology for quantifying biodiversity uplift relies on weighting species by their conservation value. For example, a species that is critically endangered would receive a weighting of 5, whilst a species that is least concern would receive a weighting of 1. However, this could be difficult in the UK as many species, such as groups of invertebrates, have not been assessed for their conservation status. Due to the difficulty of weighting by conservation status in the UK, research during FIRNS1 suggested comparing the composition of communities between the baseline and the reference site to calculate biodiversity uplift. Thus, a key part of FIRNS3 was to explore and refine methods for measuring biodiversity uplift using a similarity metric. A detailed description of the similarity metrics explored is available on the Peatland Code and Woodland Carbon Code websites. Similarity indexes measure how similar two samples are in terms of species composition (abundance or presence/absence), often ranging from 1 (completely different) to 0 (identical). These indexes are also inherently dependant on a comparison community (ie. a reference site). For this reason, we have also explored an alternative approach to adapting the Wallacea Trust method that does not require the use of a reference site, based on weighting by specialist species rather than conservation status (details available in the ‘reference sites and similarity method’ document).

2.3. Financial modelling

As well as developing adaptations to the Wallacea Trust methodology, the FIRNS3 project explored the financial viability of the proposed Carbon+ credits for project developers/landowners. The aim was to quantify how much more a Carbon+ credit would need to sell for, compared to a carbon-only credit, to accommodate the additional costs of measuring biodiversity and to achieve a ‘breakeven’ point for the project. This financial modelling was contracted out to Ricardo. Ricardo produced two separate financial models, one for peatland projects and one for woodland projects. The Carbon+ breakeven price ranged from £22–£150 for woodlands, and £9–£122 for peatlands. It varied substantially based on whether credits were sold upfront or at verification, due to the impact of the discount rate. The breakeven price also varied depending on the woodland creation/peatland restoration scenario. A detailed report is available on the Peatland Code and Woodland Carbon Code websites. Ricardo also produced a financial modelling tool that could be used by project to input their own costs and calculate the breakeven point specific to their project.

3. Roadmap to completion

3.1. Investor engagement

Market demand will determine whether a Carbon+ product, with explicitly bundled biodiversity uplift, can be priced above the break-even implied by additional biodiversity monitoring and assurance costs. Early evidence points to uncertainty for private finance in nature outcomes, with barriers including political uncertainty, ecological and reputational risk, and a lack of investment opportunities offering attractive risk-adjusted returns, which increases the importance of early buyer testing and credible market rules (zu Ermgassen et al., 2025; Flammer et al., 2025). The emerging biodiversity credit landscape also shows wide variation in scheme design and pricing, reinforcing the need to test what buyers will accept as a minimum standard of measurement, governance and claims (Croci et al., 2025; Kim et al., 2025). Investor engagement is therefore needed to test product architecture and purchasing preferences. This includes whether buyers prefer a bundled Carbon+ unit or separate carbon and biodiversity units that can be stacked and sold to different buyers, as well as what evidence is required for procurement and public claims. Experience from voluntary carbon markets suggests that some buyers are more likely to focus on cost-effective outcomes while others are willing to pay more for independently verified co-benefits aligned with corporate values or market positioning (Lou et al., 2023). The decision to bundle or stack has implications for due diligence, because clarity is needed on what is being purchased, how each component is measured, how units are registered to avoid double counting (Deal et al., 2012; Schwerdtner et al., 2025) and how financial additionality is adhered to. Structured interviews could establish buyer decision criteria and constraints, and a short survey could quantify price sensitivity and feature preferences.

3.2. Explore avenues to reduce biodiversity surveying cost

Financial modelling indicates that biodiversity surveying and verification costs are a key driver of higher Carbon+ credit break-even prices. The effect is amplified by the fixed costs of survey programmes, and validation and verification administrative costs. These costs are similar regardless of the project size and credit volume. Small projects therefore face a disproportionate cost burden per credit, even where ecological uplift is strong. Credit timing may create additional challenges for some woodland projects. Carbon credits may not be issued until year 15 onwards, while biodiversity surveys, and validation and verification costs are incurred early on. Where credits are sold late in the project, discounting can materially reduce the net present value of credited volumes and increase the price required to recover the same fixed costs, further increasing the break-even point. This section proposes further work that could help to refine the structural metric, including exploring the use of remote sensing for woodlands, and investigating the possibility of streamlining the basket of metrics to reduce survey costs for projects.

3.2.1. The woodland structural metric

The FOrest Biodiversity Index (FOBI; Forest Research, n.d.) and Woodland Ecological Condition (WEC; Forestry Commission, 2020) are woodland condition frameworks developed for large-scale monitoring in Britain. These metrics integrate several relevant dimensions of habitat condition. FOBI is a composite index built from multiple local and landscape-scale structural and contextual metrics, designed to be repeatable and updateable. It draws from existing forest inventory databases and other spatial datasets, and current work is exploring the potential for remote sensing data to be used where detailed databases are not available. WEC is a condition classification approach built around a defined set of indicators and benchmarks, used to score woodland stands and place them into broad condition classes. For biodiversity crediting under the Woodland Carbon Code, a subset of variables could be extracted from both FOBI and WEC that (a) are responsive to the kinds of interventions being designed to generate biodiversity uplift, (b) can be measured consistently at low marginal cost using desk-based and routine forestry data, and (c) can be audited with clear rules. A streamlined version of FOBI could be scoped around a smaller, auditable set of local (within-woodland) structural and compositional metrics that are sensitive to management actions. These can be updated through time, for example tree age diversity, canopy openness or open habitat cover, stand type or structure diversity, and deadwood proxies, with inputs drawn mainly from routine forest inventory data and other spatial datasets (with increasing use of remote sensing), then normalised and aggregated into a composite score that can be recalculated at each verification to evidence change over project timeframes. Both options may be viable structural metrics for measuring the biodiversity of woodlands in the UK. A streamlined version of FOBI could be updated consistently at low cost using routine forestry data and spatial datasets. WEC provides clear, threshold-based condition classes that might better suit verification audits, but its full indicator set is more survey-dependent and hence costly. Thus, we propose that work to refine the structural metric for woodlands, through collaboration with Forest Research ideally, could provide further possibilities for reducing survey costs.

3.2.2. Peatland structural metric for bogs

For biodiversity crediting of bogs under the Peatland Code, Lindsay's (2025) Peat Bog Condition Matrix provides a structured condition classification method that uses a matrix-style, traffic-light approach to describing condition states across specific areas of a site ("ground units") and tracks change via repeat surveys. In a biodiversity crediting context, this approach may reduce field effort, for example: 1. Desk-based delineation of ground units prior to fieldwork could reduce time on site by limiting field tasks to checking and refining pre-mapped boundaries rather than mapping from scratch; 2. Criterion-based scoring reduces reliance on specialist judgement by limiting the number of interpretive decisions a surveyor must make in the field, so classification can be applied more consistently by trained practitioners and with less expert input; and 3. Minimum evidence requirements (mapped polygons, georeferenced photographs and recorded observations) could reduce verification costs by enabling desktop audit and quality assurance of scoring and boundary work, so a larger share of checks can be completed remotely and site visits can be targeted to a smaller number of higher-risk cases. To implement this reliably for biodiversity crediting, Lindsay's (2025) desk-study and field protocols for defining polygons, identifying zonal elements and recording matrix entries would need to be applied consistently across survey teams. If viable, this could allow field time to focus on checking that mapped ground-unit boundaries match conditions on the ground, clarifying units where desk-based classification is uncertain, and carrying out a small number of planned field checks to quantify and limit misclassification risk.

3.2.3 Structural metric for peatland fen and paludiculture projects

Whilst Lindsay's peat bog condition matrix is a good indicator of bog condition, it cannot be used for fens, which are structurally very different. Therefore, a suitable structural metric will need to be developed for fens. This could be done through an initial search of the peer-reviewed literature to identify structural components of fens that are good indicators of condition, expert opinion can also compliment this using contacts within IUCN UK Peatland Programme. Ideally the new metric would be tested in the field to check its useability.

3.2.4. Piloting of the biodiversity metric and analysis of data

The financial modelling shows that survey costs are driven in part by the basket of metrics approach, which requires multiple specialist teams and, for some taxa, laboratory work. A practical route to reduce these costs might be to increase reliance on structural metrics that already integrate several dimensions of habitat condition, before evaluating if further taxonomic sampling would be necessary to retain a defensible measure of change. Thus, piloting could be used to generate data that can then feed into an analysis to explore if using detailed structural metrics could justify a reduction in the number of taxonomic groups needed. Indeed, modelling can be carried out using data generated by piloting to test the sensitivity of the Wallacea Trust score to the removal of certain metrics in the presence of a detailed structural metric. Ideally, a range of projects at different stages would be involved in this pilot. This would help to understand the effects of removing certain metrics under different scenarios. For example, the removal of a taxonomic metrics at the baseline might make little difference to the Wallacea Trust score, but this could change for more mature projects. Piloting is also necessary to confirm that proposed woodland and bog structural metrics work effectively at project scales and can be used consistently by survey teams, with evidence that can be audited reliably by validation and verification bodies. For bogs, piloting might test the Peat Bog Condition Matrix protocol across a representative range of condition states to check boundary delineation, state assignment and repeat survey consistency. This could establish how movements between traffic-light states relate to independent biological measures, such as the presence/cover of established indicator species or environmental DNA evidence of taxonomic presence.

3.4. BSI-aligned integration of biodiversity crediting with Codes

The International Advisory Panel on Biodiversity Credits framework and the joint Biodiversity Credit Alliance–IAPB–World Economic Forum High-level Principles are increasingly being positioned as guidance for high-integrity biodiversity credit markets. However, while they set expectations for outcomes, equity and governance, they do not endorse, accredit or certify specific schemes or units. The biodiversity standard (BSI Flex 702), published in version 1 in 2024, sets requirements for biodiversity outcomes, including transparency of methods and data, robust quantification against baseline and counterfactual, independent testing of metrics, and monitoring and verification at intervals. The next version is expected to strengthen expectations on ex-ante sales, including precautionary buffers or risk multipliers and competence requirements for validation and verification, with ISO 14065 and ISO 14066 referenced as relevant accreditation standards for assurance providers. Appendix 1 outlines recommendations for ensuring any integration of biodiversity crediting into both the Peatland Code and the Woodland Carbon Code aligns with BSI Flex 702 (version 2). Certain requirements within the current Peatland Code and Woodland Carbon Code standards may be difficult to apply to the biodiversity methodology, or may need adapting. For example, verification occurring every ten years may be particularly risky when applied to biodiversity, as weather can have a significant impact on insects. Further work also needs to be done to integrate the biodiversity metric into existing Peatland Code and Woodland Carbon Code process. For example, appointing validation and verification bodies for the biodiversity aspect, and ensuring the UK Land Carbon Registry can incorporate the biodiversity metric.

3.5. Peer-review of the adjusted Wallacea Trust methodology

Throughout FIRNS3, we have developed a useable biodiversity metric to the codes. However, this has involved making some adjustments to the original Wallacea Trust methodology. For example, the use of a reference site database, and using a similarity index, or weighting species by specialists rather than conservation value. If the proposed structural metrics are found to explain a reasonable amount of variation in taxonomic groups, we also hope to reduce the number of taxonomic groups surveyed. To increase credibility in our method, our adjusted methodology should ideally undergo an independent peer-review process, which would also provide better alignment with BSI Flex 702 version 2. This could be provided by the Biodiversity Futures Initiative for example, who use a panel of academics to review changes made to The Wallacea Trust methodology.

4. Conclusion

The roadmap sets out a feasible route to operationalise biodiversity crediting within the Peatland Code and Woodland Carbon Code, centred on six tasks:

1. Testing buyer demand and product design
2. Reducing survey and verification costs
3. Piloting streamlined metrics
4. Aligning to BSI Flex 702 (version 2)
5. Integrating the biodiversity methodology into the current Peatland Code and Woodland Carbon Code standards
6. Submitting the biodiversity method to Biodiversity Futures Initiative for peer review

These steps could improve the financial viability of projects by reducing the costs of surveys, verification and administration costs. However, there would be a trade-off with methodological simplification. Greater reliance on structural metrics, reduced indicator baskets or aggregated reference datasets could cut costs materially, but each moves the method away from direct measurement of taxonomic change. This may be particularly important where there are uncommon, specialist or slow-to respond species, because these may be weakly represented by proxy metrics or broad reference classes. Cost reduction following these recommendations therefore needs to be informed by piloting and independent review.

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