MARKETS FOR BIODIVERSITY OFFSETS

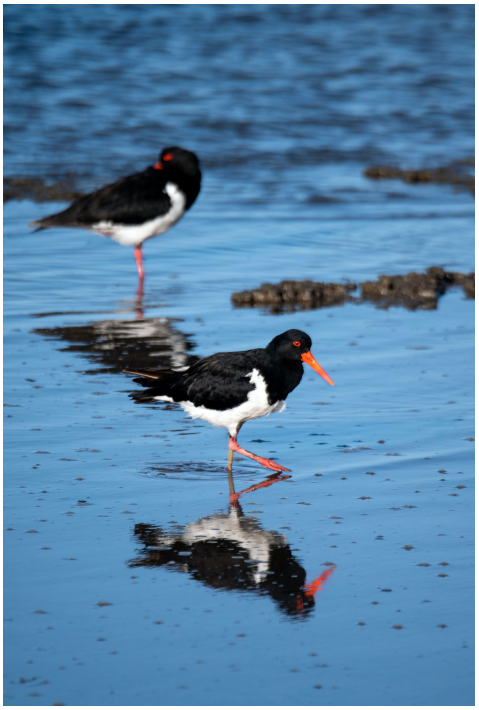
Developing an ecological-economic modelling framework for biodiversity offset markets.

A Redshank poses on a rock

Background

The UK has taken a pioneering step by implementing legislation that requires a 10% net gain in biodiversity (BNG) for all new developments such as house building. This requirement, outlined in the 25 Year Environment Plan and National Planning Policy, is mandated by the Environment Act 2021. The government envisions achieving this net gain through a flexible market involving habitat banks, landowners, and brokers. However, current engagement from landowners, crucial for creating and selling biodiversity offsets, is limited. In previous pilot studies, landowners expressed concerns about the long-term costs of managing offset sites and the appropriate timescale for offset provision considering factors such as climate change and future development.

Around the River Tees in North East England



Oystercatchers looking for preys
David Clode - Unsplash

The Legislative Change

With the implementation of the Environment Act 2021, there is now a pressing need to re-engage with agricultural landowners who could potentially supply biodiversity offsets. In particular, incentive structures need to be revisited, with schemes needing to capture the opportunity costs associated with converting land from agricultural to biodiversity offsets. The UK Government is currently revising agricultural subsidies through the Environmental Landscape Management (ELM) scheme, transitioning from farm income subsidies to payment for public goods. One can view the use of markets in biodiversity offsets with a net gain requirement as re-enforcing this change, but here the increase in the supply of public goods (more farmland birds, for example) is being paid for by the private sector (house builders and thus, by implication, house buyers), rather than the public sector via taxpayer funds. Whilst there are clearly overlaps between who is a taxpayer, who is a house buyer and who owns shares in house building firms, there will be distributional impacts from a switch away from agri-environment schemes and towards offset markets as a means of incentivising biodiversity conservation on private land.

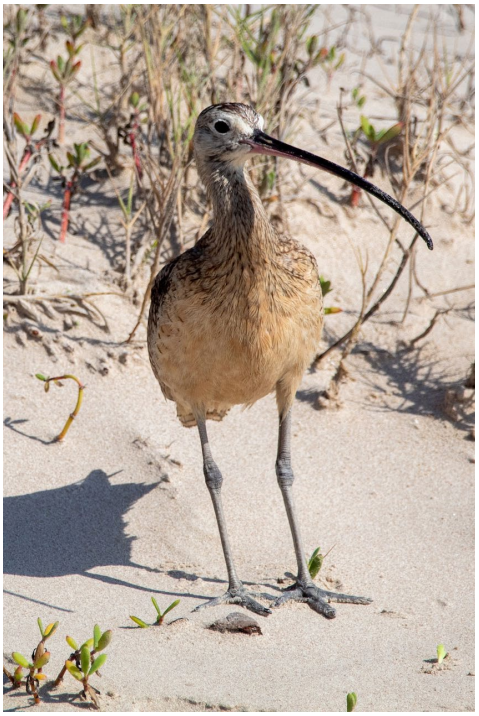
Around the River Tees in North East England

Two Alternative Contractive Mechanisms

Given these legislative changes and the redesign of agricultural subsidies, this research explores two contracting mechanisms for farmers and landowners: a market for biodiversity offsets (private funding) and payment for biodiversity outcomes (public funding). Using agent-based modelling, the study aims to enhance understanding of how contractual design mechanisms influence the economic and ecological outcomes at a landscape scale. Key questions addressed include what to trade and at what scale within biodiversity offset markets; and farmer participation in an agri-environment scheme that pays for environmental outcomes rather than actions. The distribution of the economic and environmental gains and losses are considered under these alternative contracts. The study also involved surveys with key stakeholders (farmers, land managers, advisors, regulators and the policy community) to gather their perspectives on the newly proposed ELMs and emerging biodiversity offset markets.

Around the River Tees in North East England

Around the River Tees in North East England



A Curlew takes a walk around the shore
Joshua J. Cotten - Unsplash

Outcomes

• **Changing the narrative around BNG and ELMs**: There is a misalignment between the financial opportunities offered by BNG and farmers/landholders' expectations. BNG funding is more limited, at present, compared to funding under ELMS.

• **The scale and geography of BNG markets**: On-site creation of small, bespoke sites is criticised, as it has limited impact on nature recovery at the landscape scale. There is a need to focus on landscape-scale habitat restoration andcreation over small-scale on-site projects for more effective nature recovery.

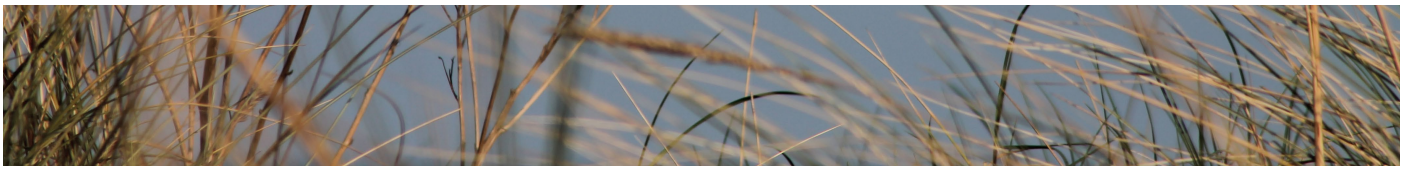
• **Regulation of nature markets is key**: Stakeholders emphasised the importance of regulation to manage unintended consequences of the BNG markets.

• **Metric limitations**: Simple metrics (how offsets are measured and reported) focus on no net loss of a single habitat or species, but these are not effective in ensuring a no-net loss or net gain of closely related habitats and species. A simple no-net loss target is insufficient if the aim is to mitigate impacts on a range of interconnected habitats and species.

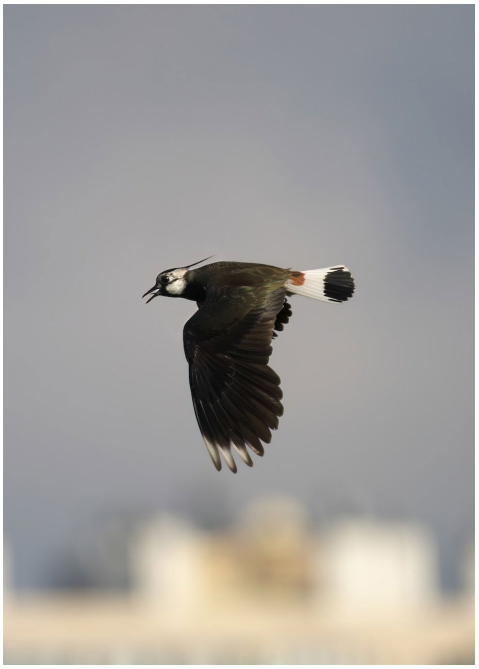
• **Economic and ecological implications**: Our modelling demonstrates significant economic and ecological consequences resulting from the choice of metric in a biodiversity offset trading scheme. These outcomes are influenced by observable variables like agricultural profits and development rents. These findings have broader implications for agri-environment schemes and biodiversity offset markets.

• **Understanding Landowner Decision-Making**: To achieve the most ecologically beneficial design of offset policies, whether based on habitats, species, or other metrics, it is crucial to comprehend the economic decision-making processes of landowners. Policy interventions should be designed to provide strong incentives for conserving and enhancing ecologically valuable sites within a landscape.

• **AES contract design and ecological outcomes**: The study reveals significant variations in ecological outcomes depending on the payment mechanism employed, in terms of whether this is payment for modelled results or payment for actions. Payment for modelled results yields greater increases in both the target species and off-target farmland waders, despite restoring a smaller area of habitat. Under the payment for modelled results approach, total farm surplus is higher, despite fewer farmers participating. The observed differences in outcomes are attributed to specific spatial relationships among observable variables, such as agricultural profits, land use, and predicted bird numbers.



Around the River Tees in North East England



A Northern Lampwig flying over northern british shorelines

Andrey Gulivanov - Unsplash

Around the River Tees in North East England

Key Recommendations

• **Integrated Approach**: Recognise the economic and ecological implications of metric choices and adopt an integrated approach that considers observable variables such as agricultural profits and development rents. Emphasise landscape-scale habitat restoration/ creation over small-scale on-site projects for effective nature recovery.

• **Landowner Engagement**: Promote an understanding of landowners' decision-making processes and develop incentive-based policies that encourage the conservation and enhancement of ecologically valuable sites. Clarify and communicate the financial benefits and limitations of BNG to farmers and landholders.

• **Alternative AES contracts**: Recognise the significance of payment mechanisms in influencing ecological outcomes and economic factors within Agri-Environment Schemes. Assess the trade-offs between payment for modelled results and payment for actions when determining the most effective approach.

• **Spatial Differentiation**: Explore the potential benefits of incorporating spatial differentiation within payment mechanisms to enhance ecological outcomes. Assess how such differentiation can align with specific landscape contexts and species conservation goals.

• **Ecological Model Evaluation**: Address the question of "how good is good enough?" in terms of the ecological models used to predict outcomes and inform contract design. Continuously re-evaluate and improve the accuracy and reliability of ecological models to improve the effectiveness of agri-environment schemes.

• **Stakeholder Engagement**: Engage farmers and relevant stakeholders in the design and implementation of agri-environment schemes. Consider their perspectives and incorporate their expertise to enhance the ecological and economic effectiveness of the schemes.

• **Holistic Design**: Design offset policies that go beyond individual metrics and consider the broader landscape context to maximise ecological benefits.

• **Continuous Evaluation**: Regularly assess the effectiveness of chosen metrics and adapt policies accordingly to ensure optimal ecological outcomes in biodiversity offset markets and agri-environment schemes.

This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement N°817903.

Contacts:
Nicholas Hanley - nicholas.nanley@glasgow.ac.uk
Katherine Simpson - katherine.simpson@glasgow.ac.uk
Amy Proctor - amy.proctor@newcastle.ac.uk